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G·M·D·S·S Handbook on CD-ROM

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G·M·D·S·S Handbook

Handbook on the Global Maritime Distress and Safety System

3rd Edition, 2001

This Handbook is not to be considered as a replacement or substitute for the ITU "Manual for Use by the Maritime Mobile and Maritime Mobile-Satellite Services" or any other publication required to be carried on board a ship by the Radio Regulations or any other international convention.

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Foreword

Since its establishment in 1959, the International Maritime Organization and its Member Governments, in close co-operation with the International Telecommunication Union (ITU) and with other international organizations, notably the World Meteorological Organization (WMO), the International Hydrographic Organization (IHO) and the International Mobile Satellite Organization (Inmarsat), and with the COSPAS–SARSAT partners, have striven to improve maritime distress and safety radiocommunications.

The culmination of this work was the entry into force and implementation of the global maritime distress and safety system (GMDSS) in February 1999.

The intent of this Handbook is to provide in a single comprehensive publication an explanation of the principles upon which the GMDSS is based, the radiocommunication requirements and recommendations for its implementation, the operational performance standards and technical specifications to be met by GMDSS equipment, and the procedures for and method of operation of the various radio services which form the GMDSS and the Master Plan for the GMDSS.

Regulations cited in the text are taken from the 1988 (GMDSS) amendments to the International Convention for the Safety of Life at Sea, 1974, as amended.

Note

Every effort has been made to ensure that the material in this publication is accurate and up to date, but a certain degree of obsolescence is inevitable. Most of the texts in this publication are up to date as of July 2000, but in case of doubt or uncertainty about the material, readers should contact their national maritime Administrations or the International Maritime Organization for guidance.

Contents

Page

Abbreviations vii

Part 1 – *Introduction*

1.1 History. 1

1.2 The old system and the need for improvement 2

Part 2 – *Basic concept of the GMDSS*

2.1 General 3

2.2 Communications functions in the GMDSS. 7
Alerting
SAR co-ordinating communications
On-scene communications
Locating
Promulgation of maritime safety information
General radiocommunications
Bridge-to-bridge communications

Part 3 – *Communications systems in the GMDSS*

3.1 General 9
Satellite communications
Terrestrial communications
Frequencies used in the GMDSS

3.2 Inmarsat system. 10
Introduction
Space segment
Coast earth stations
Ship earth stations
Inmarsat services

3.3 COSPAS–SARSAT system 16
Introduction
General concept of the system
Coverage modes
121.5 MHz satellite EPIRBs
406 MHz satellite EPIRBs
Space segment
Local user terminals and mission control centres
System performance and operations

>>>

3.4 Digital selective calling system 25
Introduction
Basic description of DSC

3.5 Search and rescue radar transponders 28
Introduction
Operational and technical characteristics

3.6 Equipment performance standards 28

3.7 Maritime safety information system 29
Introduction
The International NAVTEX system
Enhanced group call system

Part 4 – *GMDSS equipment carriage requirements* 32

Part 5 – *Operational procedures for the GMDSS* 34

Part 6 – *Shore-based SAR communication network and operation* 35

Part 7 – *Master Plan for the GMDSS* 37

Part 8 – *Maintenance of equipment in the GMDSS* 38

Annex 1 – *Amendments to the 1974 SOLAS Convention concerning radiocommunications for the GMDSS and Conference resolutions*

Annex 2 – *IMO Assembly and MSC resolutions relevant to the GMDSS*

Annex 3 – *GMDSS radio equipment (IMO performance standards and related ITU-R recommendations)*

Annex 4 – *Maritime safety information*

Annex 5 – *Master Plan for the GMDSS*

Annex 6 – *COSPAS–SARSAT system data*

Annex 7 – *MSC Circulars relevant to the GMDSS*

Annex 8 – *COM and COMSAR Circulars relevant to the GMDSS*

Annex 9 – *Articles and appendices of the Radio Regulations relevant to the GMDSS*

Annex 10 – *WARC-Mob-83, WARC-Mob-87, WRC-95, WRC-97 and WRC-2000 Resolutions and Recommendations*

Annex 11 – *Resolutions of the 1979 SAR Conference relevant to the GMDSS*

Abbreviations

In addition to standard SI units, the following abbreviations are used in this publication:

ADE	above-deck equipment
ALC	automatic level control
BDE	below-deck equipment
CCIR	International Radio Consultative Committee
CES	coast earth station
CMC	COSPAS mission control centre (Moscow)
COSPAS	Space System for Search of Distress Vessels
CSS	co-ordinator surface search
DMG	distress message generator
DSC	digital selective calling
EGC	enhanced group call
ELT	emergency locator transmitter
EPIRB	emergency position-indicating radio beacon
GMDSS	global maritime distress and safety system
HF	high frequency
ICAO	International Civil Aviation Organization
IF	intermediate frequency
IFRB	International Frequency Registration Board
IHO	International Hydrographic Organization
IMO	International Maritime Organization
Inmarsat	International Mobile Satellite Organization
ITU	International Telecommunication Union
ITU-R	ITU Radiocommunication Sector (former CCIR)
ITU-T	ITU Telecommunication Standardization Sector (former CCITT)
LCD	liquid-crystal display
LUT	local user terminal
MCC	mission control centre
MF	medium frequency
MSI	maritime safety information
NBDP	narrow-band direct printing (telegraphy)
NCC	network control centre
NCS	network co-ordination station
OCC	operations control centre
OSC	on-scene commander
PLB	personal locator beacon
RCC	rescue co-ordination centre
RF	radio-frequency
RR	Radio Regulations
RSC	rescue sub-centre
SAR	search and rescue
SAR Convention	International Convention on Maritime Search and Rescue, 1979
SARSAT	Search and Rescue Satellite-Aided Tracking
SART	search and rescue radar transponder
SES	ship earth station
SOLAS	International Convention for the Safety of Life at Sea, 1974, as amended
VDU	visual display unit
VHF	very high frequency
VTS	vessel tracking system
WARC	World Administrative Radio Conference
WMO	World Meteorological Organization
WRC	World Radiocommunication Conference
WWNWS	World-Wide Navigational Warning Service

Part 1
Introduction

1.1 History

Since its establishment in 1959, the International Maritime Organization (IMO), in its efforts to enhance safety at sea by the adoption of the highest practicable standards, has sought to improve the radiocommunication provisions of the International Convention for the Safety of Life at Sea (SOLAS) and to exploit the advances made in radiocommunication technology.

The shipborne radiocommunication equipment prescribed by the 1960 and 1974 SOLAS Conventions consisted of radiotelegraph equipment for passenger ships of all sizes and cargo ships of 1,600 tons gross tonnage and upwards, as well as radiotelephone equipment for cargo ships of 300 to 1,600 tons gross tonnage. The ships so fitted, although they could receive a distress alert, could not communicate with each other, and it was not until 1984 that all ships were required to be able to communicate by means of VHF and MF radiotelephone. The range of transmission on MF was only 150 miles, so for ships beyond this distance from the nearest coast station, the old system is essentially a ship-to-ship distress system.

In 1972, with the assistance of the International Radio Consultative Committee (CCIR), IMO commenced a study of maritime satellite communications which resulted in the establishment, in 1979, of the Inmarsat organization, thus making available to shipping an international satellite communications system.

In 1973, through Assembly resolution A.283(VIII), IMO reviewed its policy on the development of the maritime distress system so as to incorporate satellite communications and foresaw the possibility of automatic alerting and transmission of maritime distress and safety information.

In 1979 the International Conference on Maritime Search and Rescue adopted the International Convention on Maritime Search and Rescue, 1979 (1979 SAR Convention), the ultimate objective of which is to establish a global plan for maritime search and rescue (SAR) on a framework of multilateral or bilateral agreements between neighbouring states on the provision of SAR services in coastal and adjacent ocean waters to achieve co-operation and mutual support in responding to distress incidents. The Conference also invited IMO to develop a global maritime distress and safety system, including telecommunication provisions, for the effective operation of the search and rescue plan prescribed in the 1979 SAR Convention.*

The IMO Assembly, at its eleventh session in 1979, considered the existing arrangements for maritime distress and safety communications and decided that a new global maritime distress and safety system should be established to improve distress and safety radiocommunications and procedures. In conjunction with a co-ordinated search and rescue infrastructure, it would incorporate recent technical developments and significantly improve the safety of life at sea.

With the assistance of the International Telecommunication Union (ITU), CCIR, other international organizations, notably the World Meteorological Organization (WMO), the International Hydrographic Organization (IHO), Inmarsat, and the COSPAS–SARSAT partners, IMO developed and proved the various equipment and techniques used in the global maritime distress and safety system (GMDSS). The ITU also established the appropriate regulatory framework for the implementation of the GMDSS.

The 1983 and 1987 World Administrative Radio Conferences for the Mobile Services (WARC Mob-83 and -87) and WARC-92 adopted amendments to the ITU Radio Regulations which prescribe the frequencies, operational procedures and radio personnel for the GMDSS.

In 1988, the Conference of Contracting Governments to the 1974 SOLAS Convention on the Global Maritime Distress and Safety System (GMDSS Conference) adopted amendments to the 1974 SOLAS Convention concerning radiocommunications for the GMDSS, together with several relevant resolutions. These amendments entered into force on 1 February 1992, and the GMDSS was fully implemented on 1 February 1999.

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* See annex 11-2.

1.2 The old system and the need for improvement

The old maritime distress and safety system, as defined in chapter IV of the 1974 SOLAS Convention in force prior to 1 February 1992, was based on the requirements that certain classes of ships, when at sea, keep continuous radio watch on the international distress frequencies assigned in accordance with the ITU Radio Regulations and carry radio equipment capable of transmitting over a minimum specified range. The master of any ship at sea should, on receiving a signal that a ship, aircraft or survival craft is in distress, proceed with all speed to the assistance of the persons in distress, informing them that he is doing so. Since the minimum specified range of communications provided by the required shipborne equipment is 100–150 nautical miles, assistance to a ship in distress could generally only be rendered by other shipping in the vicinity of an incident, which means that the old system is primarily intended for ship-to-ship operation. However, in accordance with the ITU Radio Regulations, coast stations generally maintain a continuous watch during their service hours on the distress frequencies.

The old system includes two major manually operated subsystems:

- The Morse telegraphy system on 500 kHz for all cargo ships of 1,600 tons gross tonnage and over and all passenger ships. Since Morse competence is essential to the operation of this system, a Morse-qualified radio officer is required on all ships having radiotelegraph installation.
- The radiotelephony system on 2182 kHz and 156.8 MHz for all cargo ships of 300 tons gross tonnage and over and all passenger ships, which provides common distress communications for all ships subject to the 1974 SOLAS Convention.

It has proved difficult to make any significant progress in the communication arrangements for a ship in distress when it is beyond the range of MF coast radio stations, although various measures have been implemented to improve the situation.

The introduction of modern technology, including satellite and digital selective calling techniques, enables a distress alert to be transmitted and received automatically over long range with a significantly higher reliability.

Part 2
Basic concept of the GMDSS

2.1 General

2.1.1 The basic concept of the GMDSS (shown in figure 1) is that search and rescue authorities ashore, as well as shipping in the immediate vicinity of the ship in distress, will be rapidly alerted to a distress incident so that they can assist in a co-ordinated SAR operation with the minimum delay. The system also provides for urgency and safety communications and the promulgation of maritime safety information (MSI) – navigational and meteorological warnings and forecasts and other urgent safety information to ships. In other words, every ship is able, irrespective of the area in which it operates, to perform those communication functions which are essential for the safety of the ship itself and of other ships operating in the same area.

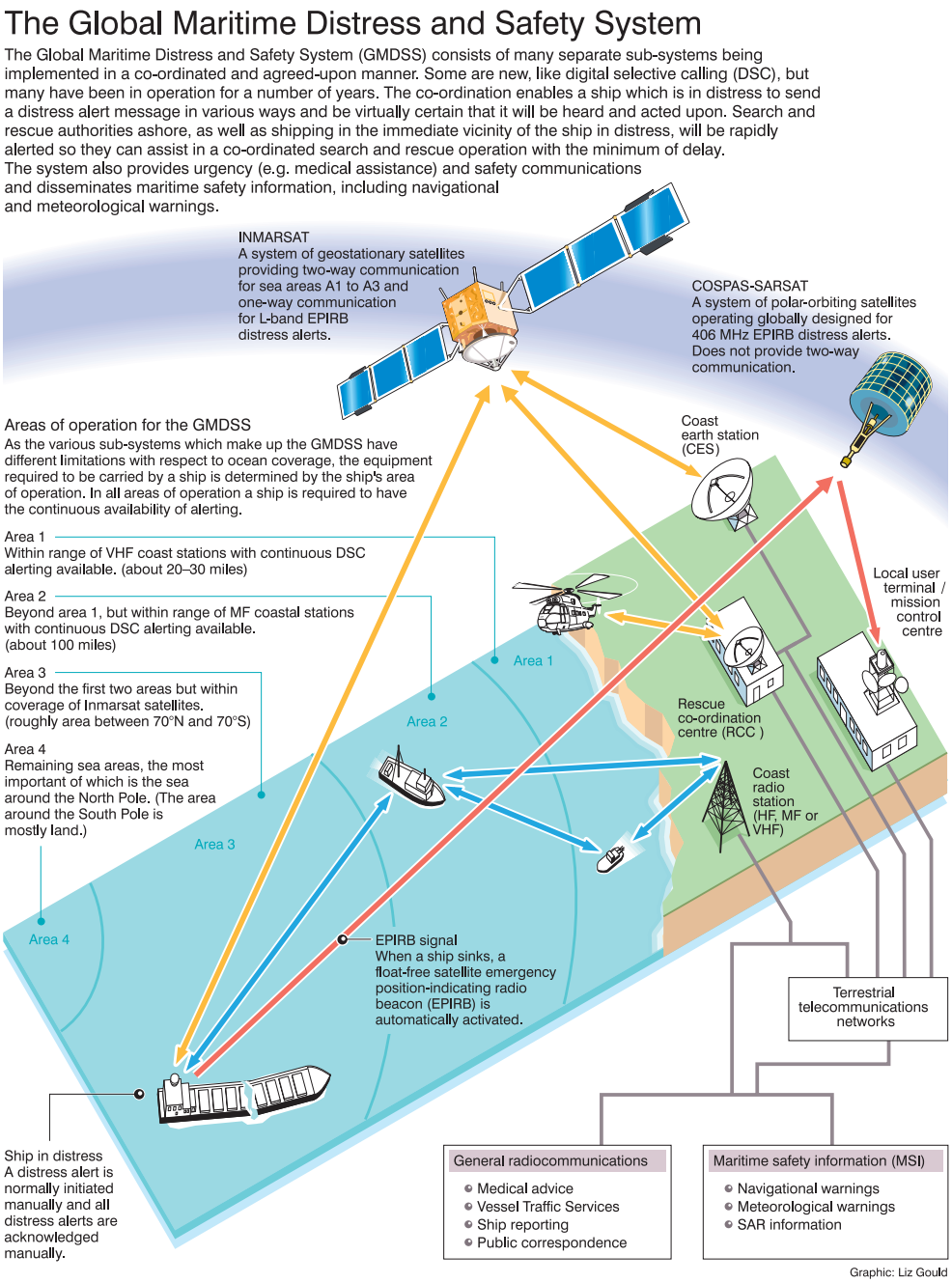
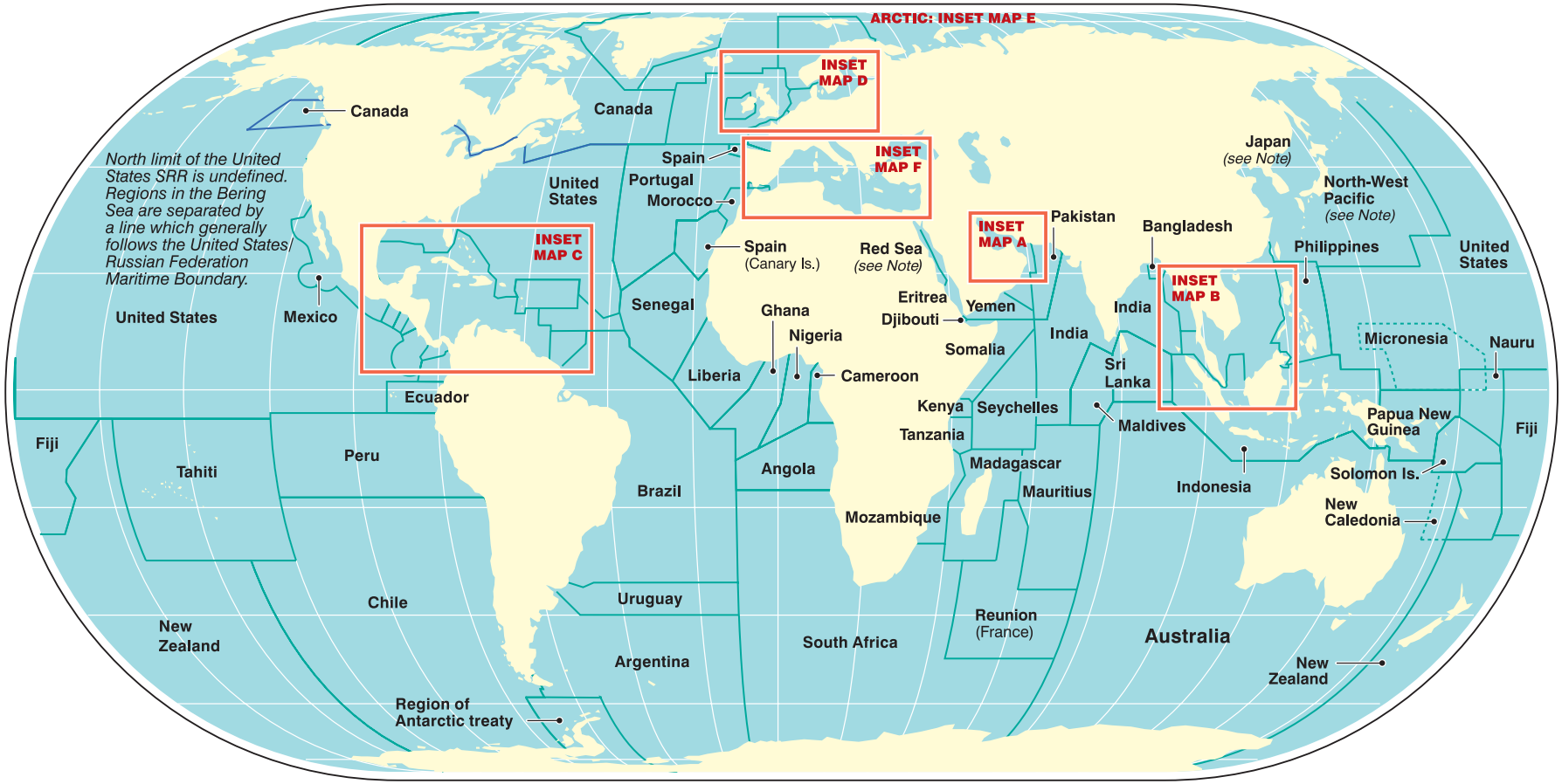


Figure 1 – *General concept of the GMDSS*

Global Maritime Search and Rescue Areas



KEY

- Agreed Maritime Search and Rescue Region boundary
- Provisional unilaterally declared Maritime Search and Rescue Region boundary
- Areas of overlapping responsibility

NOTES

Red Sea
Provisional SAR boundaries for the Southern Red Sea between Djibouti, Eritrea, Saudi Arabia, Sudan and Yemen have yet to be established.

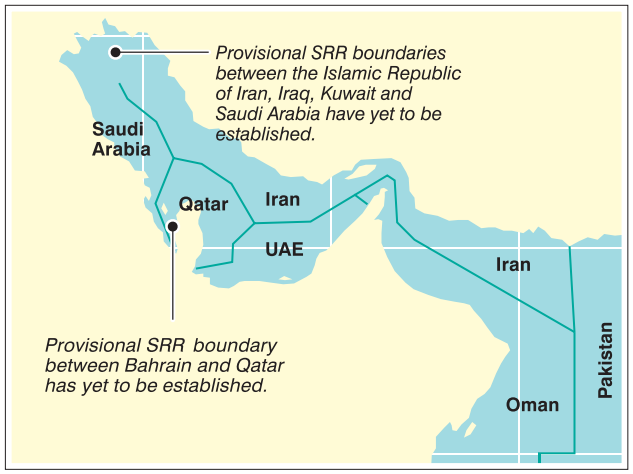
Japan SRR
The SRR is limited on the eastern and southern sides by a line connecting the following positions: (1) 52°30'N, 165°00'E (2) 17°00'N, 165°00'E and (3) 17°00'N, 130°00E.
The remainder of the SRR is subject to bilateral discussions between the countries concerned

North-West Pacific SRR
SAR is conducted by China, Democratic People's Republic of Korea, Japan, Philippines, Republic of Korea and the Russian Federation. Areas of responsibility have not yet been defined by the above States. However, each country in the area has undertaken, on receipt of a distress alert, to ensure that action will be taken to co-ordinate SAR in the most expeditious manner. The northern limit of the SRR is undefined.

MAPS NOT TO BE USED FOR NAVIGATION

The delimitation of a Search and Rescue Region (SRR) is not related to and shall not prejudice the delimitation of any boundary between States. These areas are established to ensure that primary responsibility for co-ordinating Search and Rescue services for the geographical area is assumed by some State. In practice, SAR services may not necessarily be provided by the designated State. In such cases, SAR facilities are likely to be provided by the nearest country having the most appropriate SAR assets.

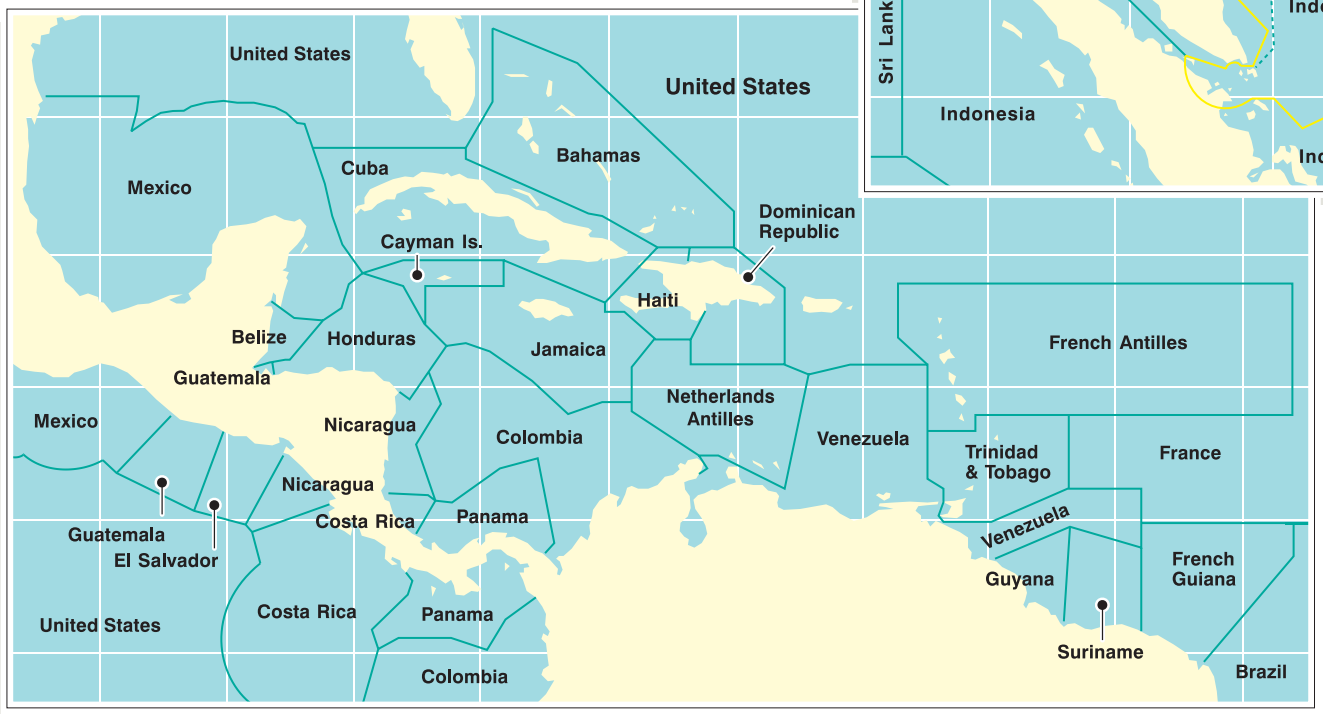
INSET MAP A: Persian Gulf



INSET MAP B: South-East Asia

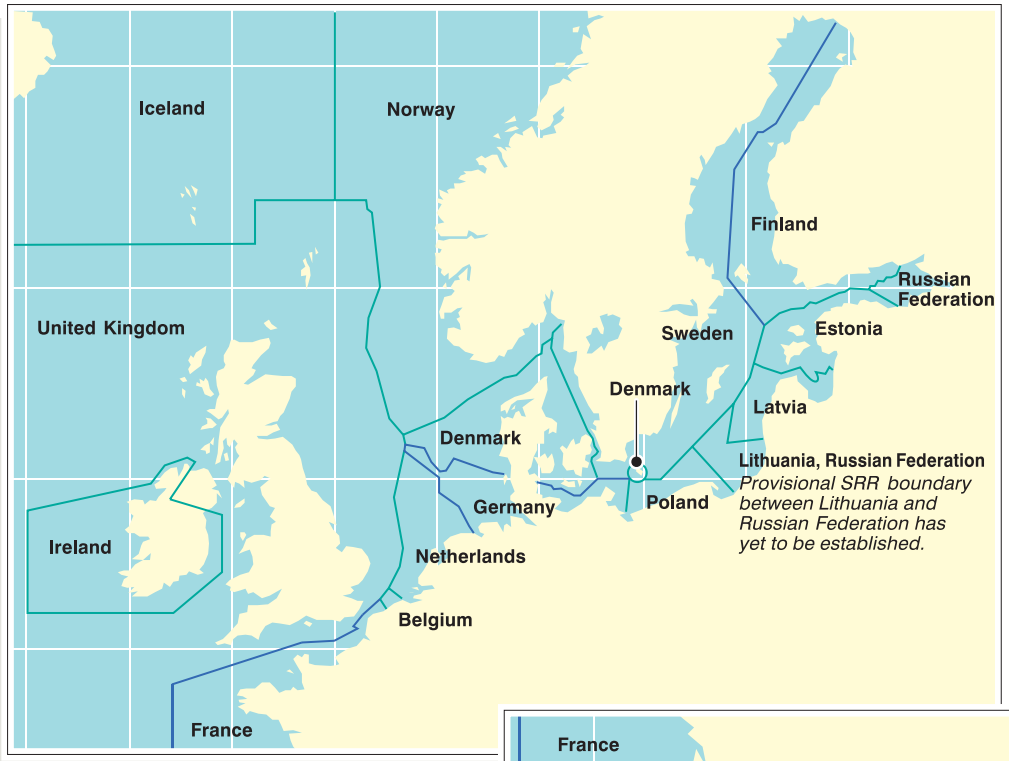


INSET MAP C: Caribbean and Central America



- Agreed Maritime Search and Rescue Region boundary
- Provisional unilaterally declared Maritime Search and Rescue Region boundary
- In Map B, limits of overlaps of individual State's provisional SRRs unilaterally declared at IMO Pacific Ocean Conference on Maritime SAR and GMDSS, April 1997

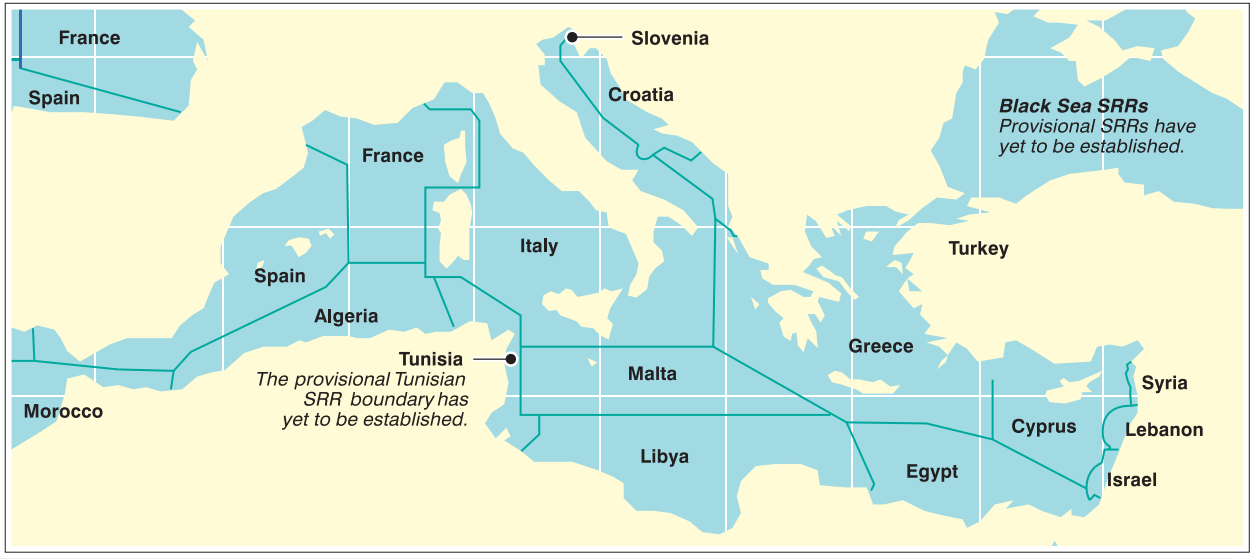
INSET MAP D: Northern Europe



INSET MAP E: Arctic



INSET MAP F: The Mediterranean



— Agreed Maritime Search and Rescue Region boundary

— Provisional unilaterally declared Maritime Search and Rescue Region boundary

The provisional SRR boundaries between Cyprus, Greece and Turkey have yet to be established.

2.1.2 Recognizing that the different radio subsystems incorporated in the GMDSS system have individual limitations with respect to the geographical coverage and services provided, the equipment required to be carried by a ship is determined in principle by the ship's area of operation, which is designated as follows (regulation IV/2.1.12–2.1.15):

- Sea area A1 – an area within the radiotelephone coverage of at least one VHF coast station in which continuous digital selective calling (DSC) alerting is available, as may be defined by a Contracting Government;
- Sea area A2 – an area, excluding sea area A1, within the radiotelephone coverage of at least one MF coast station in which continuous DSC alerting is available, as may be defined by a Contracting Government;
- Sea area A3 – an area, excluding sea areas A1 and A2, within the coverage of an Inmarsat geo-stationary satellite in which continuous alerting is available; and
- Sea area A4 – an area outside sea areas A1, A2 and A3.

In all areas of operation, the continuous availability of alerting is required. Criteria for establishing those GMDSS sea areas are given in annex 2-16.

2.2 Communications functions in the GMDSS

The GMDSS comprises the following communications functions as required by regulation IV/4. These functions are individually performed by the radio subsystems set out in part 3.

Alerting (regulation IV/4.1.1–4.1.3)

2.2.1 Distress alerting is the rapid and successful reporting of a distress incident to a unit which can provide or co-ordinate assistance, as prescribed in RR N3112* This would be a rescue co-ordination centre (RCC) or another ship in the vicinity. When an alert is received by an RCC, normally via a coast station or coast earth station, the RCC will relay the alert to SAR units and to ships in the vicinity of the distress incident. A distress alert should indicate the ship's identification and the position of the distress and, where practicable, its nature and other information which could be used for rescue operations (RR N3113*).

2.2.2 The communication arrangements under the GMDSS are designed to enable distress alerting to be performed in all three directions – ship-to-shore, ship-to-ship and shore-to-ship – in all sea areas (regulation IV/4.1.1–4.1.3). The alerting function is based on both satellite and terrestrial means and the initial distress alert is primarily transmitted in the ship-to-shore direction. When the distress alert is transmitted by DSC on VHF, MF or HF, ships within DSC range of the ship in distress will also be alerted (ship-to-ship alerting).

2.2.3 A distress alert is normally initiated manually and all distress alerts are acknowledged manually. When a ship sinks, a float-free satellite emergency position-indicating radio beacon (EPIRB) is automatically activated. Ships operating exclusively in sea area A1 may, in lieu of satellite EPIRBs, use VHF EPIRBs on channel 70.

2.2.4 The relaying of a distress alert from an RCC to ships in the vicinity of a distress incident is made by satellite communication or by terrestrial communication, using appropriate frequencies. In either case, to avoid all ships in a large sea area being alerted, an ''area call'' is normally transmitted so that only those ships in the vicinity of the distress incident are alerted. On receipt of a relayed distress alert, ships in the area addressed are required to establish communication with the RCC concerned to enable the assistance to be co-ordinated. Parts 5 and 6 deal with the operational procedure and routeing of the distress alert.

SAR co-ordinating communications (regulation IV/4.1.4)

2.2.5 In general, these are the communications necessary for the co-ordination of ships and aircraft participating in a search and rescue operation following a distress alert and include communications between RCCs† and any ''on-scene commander (OSC)''† or ''co-ordinator surface search (CSS)''† in the area of the distress incident.

* See annex 9-6.

† They are defined in the annex to the 1979 SAR Convention, chapter I, as amended.

2.2.6 For SAR operations, messages are transmitted in both directions, as distinct from "alerting", which is generally the transmission of a specific message in one direction only, and distress and safety traffic by radiotelephony and direct-printing telegraphy will normally be used for passing such messages.

2.2.7 The techniques which are available for SAR co-ordinating communications are radiotelephony or direct-printing telegraphy or both. These communications can be carried out by terrestrial or satellite means, dependent upon the equipment fitted on the ship and the sea area in which the incident occurs.

On-scene communications (regulation IV/4.1.5)

2.2.8 On-scene communications normally take place in the MF and VHF bands on frequencies designated for distress and safety traffic (given in annex 9-3), by radiotelephony or direct-printing telegraphy. These communications between the ship in distress and assisting units relate to the provision of assistance to the ship or the rescue of survivors. When aircraft are involved in on-scene communications they are normally able to use 3023, 4125 and 5680 kHz. In addition, SAR aircraft can be provided with equipment to communicate on 2182 kHz or 156.8 MHz or both, as well as on other maritime mobile frequencies.

Locating (regulation IV/4.1.6)

2.2.9 *Locating* is the finding of a ship/aircraft in distress or its survival craft or survivors, as defined by regulation IV/2.1.8. In the GMDSS this function is performed by means of 9 GHz SAR radar transponders (SARTs) carried by the ship in distress or its survivors, whose position is indicated when the SART is interrogated by the searching unit's 9 GHz radar. Use of the frequency 121.5 MHz in most satellite EPIRBs is provided for homing by aeronautical SAR units.

Promulgation of maritime safety information (MSI) (regulation IV/4.1.7)

2.2.10 Ships need to be provided with up-to-date navigational warnings and meteorological warnings and forecasts and other urgent maritime safety information (MSI). MSI is made available by narrow-band direct-printing telegraphy broadcasts, using forward error correction, on the frequency 518 kHz (International NAVTEX service – regulation 2.1.7) and, for ships which navigate beyond the NAVTEX coverage, by broadcasts via the Inmarsat enhanced group call (EGC) system (known as the International SafetyNET system). A high-seas MSI broadcast system by HF direct-printing telegraphy is under development.* Details for MSI systems are given in section 3.7.

General radiocommunications (regulation IV/4.1.8)

2.2.11 General radiocommunications in the GMDSS are those communications between ship stations and shore-based communication networks which concern the management and operation of the ship and may have an impact on its safety (regulation IV/2.1.5). These communications can be conducted on any appropriate channel, including those used for public correspondence. Examples are orders for pilot and tug services, chart replacement, repairs, etc.

Bridge-to-bridge communications (regulation IV/4.1.9)

2.2.12 Bridge-to-bridge communications are inter-ship safety communications conducted from the position from which the ship is normally navigated (regulation IV/2.1.1), normally performed by VHF radiotelephony.

* See regulation IV/7.1.5 and annex 2-12, paragraph 3.5 of this publication. See also annexes 3-5-3, 3-5-4 and 3-5-6.

Part 3
Communications systems in the GMDSS

3.1 General

Satellite communications

Satellite communications are particularly important elements of the GMDSS.

3.1.1 The Inmarsat system, which employs geostationary satellites and operates in the 1.5 and 1.6 GHz band (L-band), provides ships fitted with ship earth stations with a means of distress alerting and a capability for two-way communications using direct-printing telegraphy, data transmission and radiotelephone. L-Band satellite EPIRBs are also used for distress alerting. The International SafetyNET system is used as a main means to provide MSI to areas not covered by the International NAVTEX system.

3.1.2 A polar-orbiting satellite system, operating in the 406 MHz band using satellite EPIRBs (COSPAS–SARSAT system), provides one of the main means of distress alerting and determining the identity and position of the ship in distress or its survivors in the GMDSS.

Terrestrial communications

3.1.3 With terrestrial communications, DSC forms the basis of distress alerting and safety communications. Distress and safety communications following a DSC call can be performed by radiotelephony or direct-printing telegraphy or both.

Long-range service

3.1.4 Use of HF provides a long-range service in both the ship-to-shore and shore-to-ship directions. In areas covered by Inmarsat it can be used as an alternative to satellite communications and outside these areas it provides the only long-range communication capability. Frequencies have been designated in the 4, 6, 8, 12 and 16 MHz bands for this service.

Medium-range service

3.1.5 MF radiocommunications provide the medium-range service. In the ship-to-shore, ship-to-ship and shore-to-ship directions 2187.5 kHz is used for distress alerts and safety calls using DSC, and 2182 kHz is used for distress and safety traffic by radiotelephony, including SAR co-ordinating and on-scene communications. 2174.5 kHz is used for distress and safety traffic by direct-printing telegraphy.

Short-range service

3.1.6 VHF provides short-range service on the frequencies:

- 156.525 MHz (channel 70) for distress alerts and safety calls using DSC, and
- 156.8 MHz (channel 16) for distress and safety traffic by radiotelephony, including SAR co-ordinating and on-scene communications.

There is no short-range direct-printing telegraphy service on VHF.

Frequencies used in the GMDSS

3.1.7 Frequencies used in the GMDSS communications systems allocated by ITU WARC Mob-87 are given in annex 9-3 (RR Art. N38).

3.2 Inmarsat system

Introduction

3.2.1 Inmarsat grew out of an idea that originated within IMO in 1966. Following extensive study by IMO experts, an international conference was convened which, after three sessions, on 3 September 1976 unanimously adopted the Convention and Operating Agreement on the International Maritime Satellite Organization* (Inmarsat). According to its Convention, Inmarsat is "to make provision for the space segment necessary for improving maritime communications, thereby assisting in improving distress and safety of life at sea communications".

3.2.2 The Inmarsat system has three major components: the space segment provided by Inmarsat, the coast earth stations (CESs) provided by Inmarsat signatories and ship earth stations (SESs).

3.2.3 The nerve centre of the system is the operations control centre (OCC), located at Inmarsat's headquarters in the United Kingdom. The OCC is responsible for controlling the Inmarsat system operation as a whole. Operating 24 hours a day, it co-ordinates a wide range of activities. The OCC also arranges the commissioning of SESs upon application by the shipowner.

Space segment

3.2.4 Four satellites in geostationary orbit 36,000 km above the equator cover four ocean regions, namely AOR-E (Atlantic Ocean Region – East), AOR-W (Atlantic Ocean Region – West), IOR (Indian Ocean Region) and POR (Pacific Ocean Region), and provide near-global coverage. The current status of the Inmarsat system is given in annex 5 of the GMDSS Master Plan (see annex 5 of this publication).

Coast earth stations

3.2.5 The CESs provide the link between the satellites and terrestrial telecommunications networks. Currently, all CESs are owned and operated by telecommunications carriers. A typical CES consists of a parabolic antenna about 11 m to 14 m in diameter, which is used for transmission of signals to the satellite at 6 GHz and for reception from the satellite at 4 GHz (figure 2). The same antenna or another dedicated antenna is used for L-band transmission (at 1.6 GHz) and reception (at 1.5 GHz) of network control signals. The type of communication service provided varies depending on the CES. A CES designated for each ocean area for each



Figure 2 – *Example of an Inmarsat coast earth station*
(The photo includes antennas other than Inmarsat)

* The full name was amended to "International Mobile Satellite Organization" in December 1994, but the acronym "Inmarsat" is retained.

communication service (i.e. telephone, direct-printing telegraph, etc.) serves as a network co-ordination station (NCS) which assigns communication channels, on demand, to SESs and other CESs and monitors signals transmitted by these stations.

Ship earth stations

3.2.6 The requirements for the SESs in the GMDSS can be met by Inmarsat SESs capable of two-way communications, such as Inmarsat-A, Inmarsat-B and Inmarsat-C SESs. Performance standards for SES equipment are given in annex 3-4.

Inmarsat-A SES

3.2.7 An Inmarsat-A SES consists of two parts, above-deck equipment (ADE) and below-deck equipment (BDE) (figure 3). The ADE includes a parabolic antenna, about 0.85 m to 1.2 m in diameter, mounted on a platform and stabilized so that the antenna remains pointed at the satellite regardless of ship motion. It also includes a solid-state L-band power amplifier, an L-band low-noise amplifier, a diplexer and a low-loss protective radome. The BDE consists of an antenna control unit; communications electronics used for transmission, reception, access control and signalling; and telephone and telex equipment



Figure 3 – *Example of Inmarsat-A SES*

3.2.8 The new generation of Inmarsat-A equipment currently being produced by manufacturers is smaller and easier to use than earlier models. ADE is now available weighing less than 50 kg, making it suitable for installation on most types and sizes of vessels and yachts. Many of the current systems are modular in design and allow the addition of optional equipment such as facsimile, data and slow-scan television, etc. Some BDE has a microcomputer with a visual display unit (VDU), alphanumeric keyboard, hard-copy printer and modem. The computer can be used to prepare telex messages with the ease of modern word-processing equipment. Messages can be composed, edited and transmitted directly from the screen or stored for later transmission. In some models, the computer memorizes the satellite's co-ordinates and CES tariffs and automatically routes the call in the most economical way.

3.2.9 With additional facilities, users have modified their terminals to allow automated vessel reporting. Those involved in vessel management on shore can dial the ship at any time of the day or night and automatically receive information as to its position, heading, etc., as well as data on its cargo and operation – all without disturbing or distracting the crew. A distress message generator is normally built into a terminal (mostly a software modification) for storage of basic essential vessel information and automatic transmission in a distress situation.

Inmarsat-B SES

3.2.10 The Inmarsat-B SES is a digital complement of Inmarsat-A SES developed to replace Inmarsat-A SES equipment in the future. It provides the same communications services as an Inmarsat-A SES.

Inmarsat-C SES

3.2.11 Inmarsat-C SESs are small, lightweight terminals designed for two-way message communication (figure 4). Inmarsat-C SESs cannot be used for radiotelephone communications; they operate at 600 bits/s and provide access to the international telex/teletex networks, electronic mail services and computer databases. This low-powered terminal with its omnidirectional antenna and light weight is a practical solution for installation on the smallest of vessels, thereby bringing the benefits of satellite communications within the reach of all mariners. It will enlarge the user community by providing equal access to existing and emerging satellite services to all seafarers.



Figure 4 – *Example of Inmarsat-C SES*

3.2.12 Additionally, an Inmarsat-C SES can serve as a back-up for an Inmarsat-A SES on large ships and also fulfill a potentially vital role as a fixed or portable transmitter/receiver for use on board ship or in survival craft. The omnidirectional antenna characteristics are particularly valuable for a vessel in distress as the SES continues to operate even when the vessel is listing severely. As with the Inmarsat-A SES, a distress message generator can be included in the terminal software for storage of basic essential vessel information and automatic transmission in a distress situation.

Enhanced group call receiver

3.2.13 The Inmarsat EGC receiver is a dedicated piece of equipment for the reception of information by Inmarsat EGC service. It has been designed to enable automatic continuous watch on International SafetyNET MSI broadcasts and commercial Inmarsat FleetNET messages, such as subscription to news services, etc. An EGC capability can be added to Inmarsat-A, Inmarsat-B and Inmarsat-C SESs or it can be a stand-alone receiver with its own antenna. Annex 3-5-2 gives the performance standards for EGC receivers.

3.2.14 An EGC receiver is required in the GMDSS for all ships which proceed beyond coverage of the International NAVTEX service (regulation IV/7.1.5).

Inmarsat services

Ship-to-shore distress alerting

3.2.15 The Inmarsat system provides priority access to satellite communications channels in emergency situations. Each SES is capable of initiating a "request" message with distress priority (Inmarsat priority-3 call). Any "request" message with a distress priority indication is automatically recognized at the CES and a satellite channel is instantly assigned. If all satellite channels happen to be busy, one of them will be pre-empted and allocated to the SES which initiated the distress priority call. The processing of such calls is completely automatic and does not involve any human intervention. The CES personnel, however, are notified of the reception and passing through of a distress priority message by audio-visual alarms.

3.2.16 To ensure the correct treatment of distress priority requests, the NCS in each ocean region automatically monitors the processing of such calls by all other CESs in that region. In the event that any anomalies in processing are detected, the NCS will take appropriate action to establish the end-to-end connection. In addition, the monitoring NCS also checks the CES identity contained in the distress priority message and automatically accepts the call if an identity of a non-operational CES has been detected (which may happen due to operator error aboard the vessel in distress).

3.2.17 The distress priority applies not only with respect to satellite channels but also to the automatic routeing of the call to the appropriate RCC. Each CES in the system is required to provide reliable communication interconnection with an RCC; these national RCCs are known as *associated RCCs*. The means of CES–RCC interconnection may vary from country to country and include the use of dedicated lines or public switched networks. Thus, any distress priority request message received at the CES is automatically processed and passed to the associated RCC. Some CESs, due to national considerations, pass distress priority messages to special operators, who are responsible for the subsequent routeing of the call to the appropriate RCC, or provide an option which allows the shipboard operator to contact any RCC when a satellite channel has been assigned on the distress priority basis.

3.2.18 The initiation of a distress priority message in most SESs is made simple for ship crew members by provision of a ''distress button'' or code in the SES. On activation of this button, the equipment instantaneously transmits a distress priority message. This single operation, a push of the ''distress button'', provides automatic, direct and assured connection to a competent rescue authority, thereby avoiding the need for the SES operator to select or key the telex or telephone number of the RCC and eliminating possible human error. The establishment of this end-to-end connection, being completely automatic and on a priority basis, takes only a few seconds.

3.2.19 Inmarsat has issued technical guidelines to manufacturers for a distress message generator (DMG), which consists of SES software to transmit automatically, after the connection has been established, the distress message in a standardized format that provides information on the vessel's identification, its position and the particular emergency.

3.2.20 The procedure described above is the primary means of ship-to-shore distress alerting in the Inmarsat system. It should be noted, however, that Inmarsat SES-equipped ships can also contact any RCC of their choice by following the calling procedure for routine calls. In this case, the complete international telephone/telex number has to be selected.

3.2.21 A major benefit of the Inmarsat distress priority system is that it eliminates the need for dedicated frequencies to be allocated for distress and safety communications. Distress messages made through the Inmarsat distress priority system are sent through the general communication channels on an absolute priority basis to ensure an immediate connection.

Shore-to-ship distress alerting

3.2.22 Shore-to-ship alerting to groups of ships with Inmarsat-A, Inmarsat-B or Inmarsat-C SESs but without International SafetyNET capability can be performed in the following modes:

.1 ''All ships calls'' – Calls to all ships in the ocean region concerned. It should be noted, however, that, due to the large coverage zones of geostationary satellites, such alerting is not very efficient, although it may be justified under exceptional circumstances;

.2 ''Geographical area calls'' – Calls to ships navigating in a defined geographical area. Each satellite coverage region is subdivided into smaller areas, and the boundaries of these areas are based on NAVAREAs each having a unique two-digit area code.* SESs will automatically recognize and accept geographical area calls only if the correct code has been input by the SES operator; the system requires the periodic manual input of appropriate area codes; or

.3 ''Group calls to selected ships'' – This service is provided by a number of CESs in the operator-assisted mode and allows alerting of a predetermined group of vessels. This service could be very useful for alerting, for example, SAR units.

3.2.23 As long as they are not engaged in traffic, SESs accept all incoming messages without any differentiation of priority.

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* See annex 4-1 (WWNWS).

Shore-to-ship distress alerting through the International SafetyNET system

3.2.24 The EGC receiver can be an integral part of an SES or a completely separate unit, and it ensures a very high probability of receiving shore-to-ship distress alert messages. When a distress priority message is received, an audible alarm will sound and it can only be reset manually.

3.2.25 Accessing the International SafetyNET service by RCCs requires arrangements similar to those needed for shore-to-ship distress alerting to a standard SES. Those RCCs unable to obtain a reliable terrestrial connection to a coast earth station can install an Inmarsat SES at the RCC. The RCC would then transmit the distress alert via the SES to a CES, where it would be relayed by means of a broadcast over the International SafetyNET system. See section 3.7 and annex 4-3* for further details of the International SafetyNET system.

Search and rescue co-ordinating communications

3.2.26 For the co-ordination and control of SAR operations, RCCs require communications with the ship in distress as well as with units participating in the operation. The methods and modes of communication (terrestrial, satellite, telephone, telex) used will be governed by the capabilities available on board the ship in distress as well as those on board assisting units. Where those ships are equipped with an SES, the advantages of the Inmarsat system for rapid, reliable communications, including receipt of MSI, can be exploited.

3.2.27 A reliable interlinking of RCCs is important for the GMDSS, in which a distress message may be received by an RCC thousands of miles away from where the assistance is needed and it may not be the RCC best suited to provide the necessary assistance. In this case prompt relay of the distress message to the appropriate RCC is essential and any means of communication, whether land-lines, terrestrial radio networks or satellite links, must be used.

3.2.28 To increase the speed and reliability of inter-RCC communications, some RCCs have installed SESs providing them with the capability of communicating via the Inmarsat system.† These facilities are useful for long-distance interconnection of SAR organizations, especially when dedicated lines or public switched networks are unavailable or unreliable.

On-scene SAR communications

3.2.29 On-scene communications are those between the ship in distress and assisting vessels, and between SAR vessels and the OSC or the CSS, and are normally short-range communications made on the VHF or MF distress and safety frequencies in the GMDSS. However, Inmarsat SES-fitted ships could, if necessary, use satellite communications as a supplement to their VHF and MF facilities.

Promulgation of MSI (via International SafetyNET services)

3.2.30 In the Inmarsat system, promulgation of MSI is performed by means of the International SafetyNET system. Although an Inmarsat-A, Inmarsat-B or Inmarsat-C SES can receive the SafetyNET broadcasts, if uninterrupted receipt of important MSI is required when the SES is engaged for other communications, then it is essential to have a dedicated EGC reception capability for such broadcasts. Alternatively, an EGC receiver can be installed as a separate unit. Details of the International SafetyNET service are given in annex 4-3 (International SafetyNET Manual).

General radiocommunications

3.2.31 The Inmarsat system provides ships at sea with the same types and quality of modern communications as are available ashore. The capability for direct-dial, automatic connection without delay, using high-quality multi-mode communications, is provided by SES. Teleprinters, VDUs and telephone sets, as well as facsimile machines and data equipment, can serve as peripheral equipment to SESs.

3.2.32 The quality and availability of general radiocommunications offered by the Inmarsat system permit a ship's master to rapidly consult and seek assistance on any matter, whether of a safety or commercial nature. High-quality general communications are therefore a valuable asset to safety at sea as well as to the efficient operation of the ship.

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* International SafetyNET Manual.

† See RR N2938 (annex 9-2).

3.2.33 The following are examples of Inmarsat services:

- Telephony
- Direct-printing telegraphy
- Data communications
- Facsimile transmission
- Slow-scan television
- Automatic data collection from ships (see section 3.2.9)

L-Band satellite EPIRBs (Inmarsat-E)

3.2.34 L-Band satellite EPIRBs operating through the Inmarsat system can be used as a means of alerting by ships operating in sea areas A1, A2 and A3 as an alternative to 406 MHz satellite EPIRBs, mentioned in section 3.3.

3.2.35 The basic concept of the Inmarsat L-band satellite EPIRB system is shown in figure 5. The distress signal transmitted from the float-free satellite EPIRB on the dedicated channel in the 1.6 GHz frequency (L band) is relayed by an Inmarsat satellite to CESs equipped with the appropriate receiver and processor equipment.

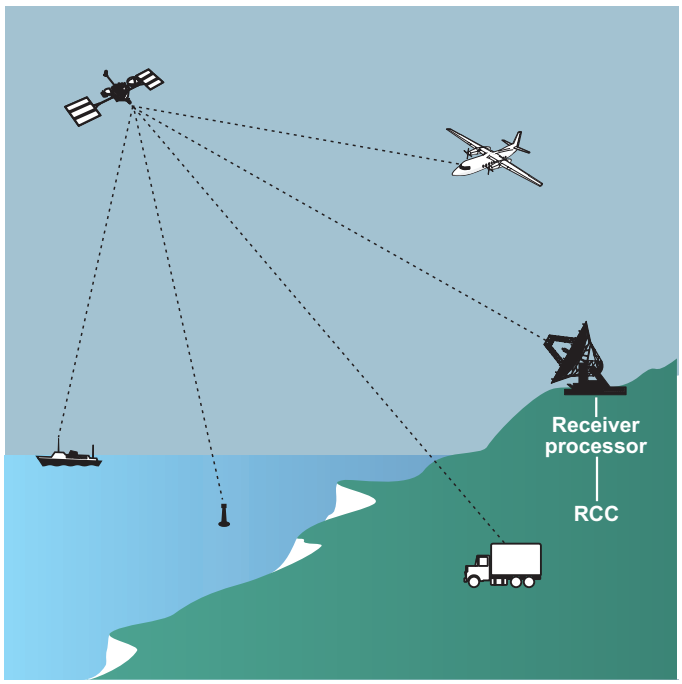


Figure 5 – *Basic concept of the L-band satellite EPIRB system*

3.2.36 The L-band satellite EPIRB provides for rapid distress alerting (in the order of 10 minutes with 1 W output power radiated by an EPIRB), coverage up to latitude 70°N and 70°S, 20 simultaneous alerts within a 10-minute time-frame and the possibility of manual or automatic entry and updating of position information to the satellite EPIRB. The satellite EPIRB can be activated either manually or automatically, by floating free from the sinking ship.

3.2.37 After activation, the satellite EPIRB transmits the distress message containing the ship station identity, position information and additional information which could be used to facilitate rescue. The transmission is repeated on a pre-selected duty cycle. Additionally, unless an integrated electronic position-fixing device is included which provides position updates, a built-in 9 GHz SART is activated for locating purposes. Annexes 3-3-4 and 3-3-5 give detailed technical characteristics of L-band satellite EPIRBs.

3.2.38 After being relayed by the satellite, the distress signal is down-converted at the CES to the specified intermediate frequency to be transferred to the computer-aided multi-channel receiver for satellite EPIRB identification and message decoding.

3.2.39 After the signal channels are identified, they are assigned to processor channels where the incoming signal plus noise is superimposed in the memory. Having accomplished the necessary number of superpositions, which results in 2 to 3 dB improvement of signal-to-noise ratio for every frame, the memory is read out and the usual procedures, such as bit and frame synchronization, evaluation of the error-correcting code and the message print-out, are performed.

3.2.40 The distress message is then forwarded to an associated RCC for appropriate action.

3.3 COSPAS–SARSAT system

Introduction

3.3.1 The COSPAS–SARSAT* system is a satellite-aided SAR system designed to locate distress beacons transmitting on the frequencies 121.5 MHz or 406 MHz.† It is intended to serve all organizations in the world with responsibility for SAR operations whether a distress occurs at sea, in the air or on land.

3.3.2 COSPAS–SARSAT is a joint international satellite-aided SAR system, established by organizations in Canada, France, the United States and the former USSR.‡

3.3.3 The COSPAS–SARSAT system has demonstrated that the detection and location of distress signals can be facilitated by global monitoring based on low-altitude satellites in near-polar orbits. It has been used successfully in a large number of SAR operations world-wide.

3.3.4 Unless, as an alternative, a ship is provided with an L-band satellite EPIRB, the carriage of a float-free satellite EPIRB operating on the frequency 406 MHz in the COSPAS–SARSAT system is mandatory on all SOLAS ships (regulation IV/7.1.6.1).

General concept of the system

3.3.5 The basic COSPAS–SARSAT system concept is given in figure 6. There are at present three types of satellite beacons, namely emergency locator transmitters (ELTs) (airborne), EPIRBs (maritime) and personal locator beacons (PLBs) (on land). These beacons transmit signals that are detected by COSPAS–SARSAT polar-orbiting satellites equipped with suitable receivers/processors. The signals are then relayed to a ground receiving station, called a local user terminal (LUT), which processes the signals to determine the beacon location. An alert is then relayed, together with location data and other information, via a mission control centre (MCC), either to a national RCC, to another MCC or to the appropriate SAR authority to initiate SAR activities.

3.3.6 Doppler shift (using the relative motion between the satellite and the beacon) is used to locate the beacons. The carrier frequency transmitted by the beacon is reasonably stable during the period of mutual beacon–satellite visibility. The frequencies currently in use are 121.5 MHz (international aeronautical emergency frequency) and 406.025 MHz. The 406 MHz beacons are more sophisticated than the 121.5 MHz beacons because of the inclusion of identification codes in the messages, but complexity is kept to a minimum. To optimize Doppler location, a low-altitude near-polar orbit is used.§ The low altitude results in a low uplink power requirement, a pronounced Doppler shift, and short intervals between successive passes. The near-polar orbit results in complete world coverage over a period of time.

3.3.7 The Doppler location concept provides two positions for each beacon: the true position and its mirror image relative to the satellite ground track. This ambiguity is resolved by calculations that take into account the earth's rotation. If the beacon frequency stability is good enough, as with 406 MHz beacons which are designed for this purpose, the true solution is determined over a single pass. In the case of 121.5 MHz beacons, the ambiguity is resolved by the results of the second pass if the first attempt is unsuccessful. The improved performance of 406 MHz satellite EPIRBs is the reason these devices were selected for the GMDSS. The status of the COSPAS–SARSAT system is given in annex 6.

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* COSPAS: Space System for Search of Distress Vessels; SARSAT: Search and Rescue Satellite-Aided Tracking.

† Certain beacons also transmit on 243 MHz, but this signal is relayed only by SARSAT satellites and not all local user terminals are equipped with 243 MHz receivers. This system, therefore, is not described in this publication, but it operates in the same manner as a 121.5 MHz system.

‡ Since 26 December 1991 the membership in IMO of the USSR and its participation in treaty instruments adopted under the auspices of IMO is continued by the Russian Federation.

§ The altitude of the COSPAS satellites' orbit is approximately 1,000 km while that of SARSAT satellites is about 850 km.

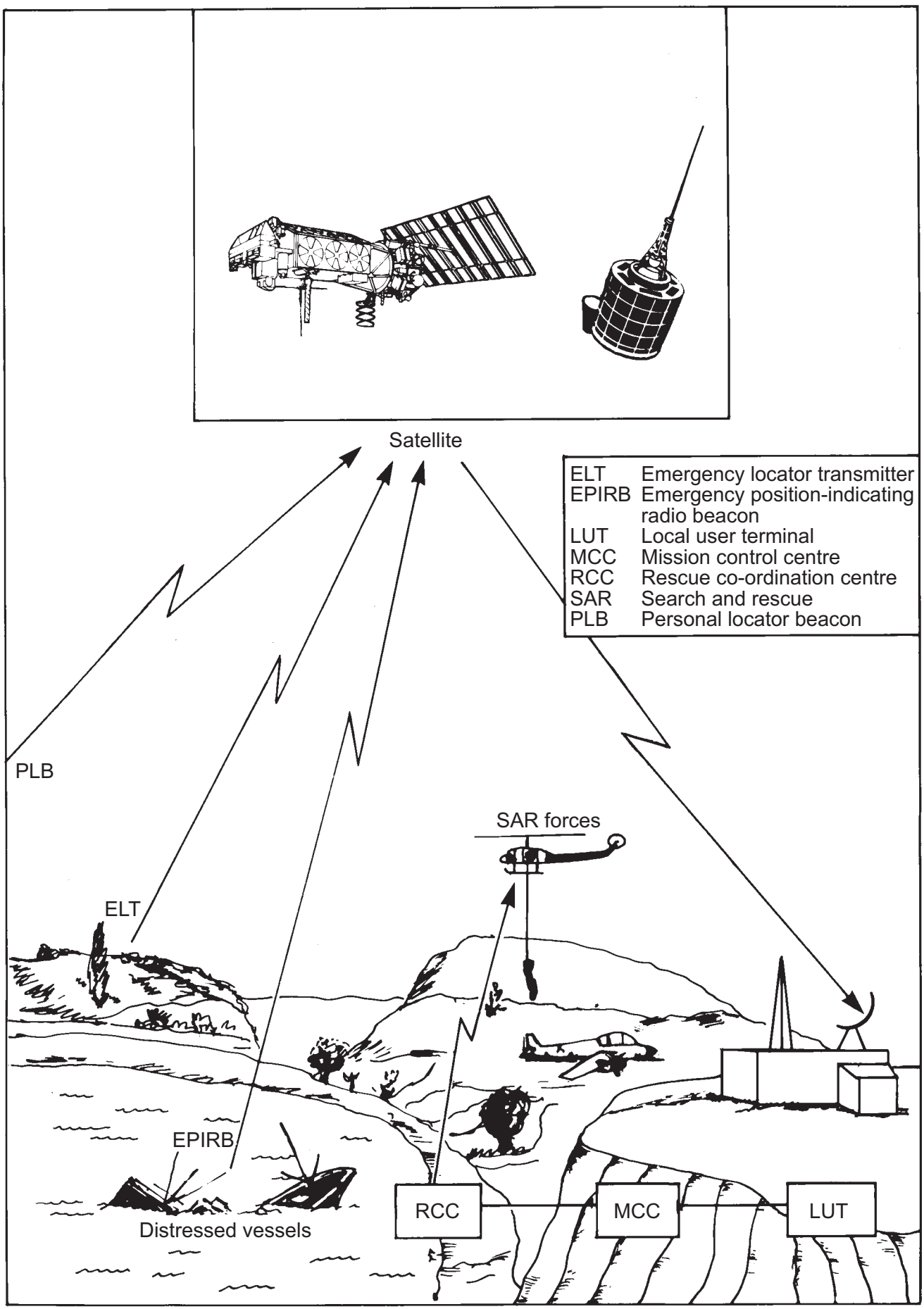


Figure 6 – *Basic concept of the COSPAS–SARSAT system*

Coverage modes

3.3.8 The COSPAS–SARSAT system implements two coverage modes for the detection and location of beacons, namely the real-time mode and the global coverage mode. Both the 121.5 and 406 MHz systems operate in the real-time mode, while only the 406 MHz system operates in the global coverage mode.

121.5 MHz real-time mode

3.3.9 In this mode, an LUT and EPIRBs must be in the same view of the satellite for the 121.5 MHz EPIRB signal to be relayed by a repeater on board the satellite directly to the ground, where it is received and processed. For this reason, world-wide real-time mode coverage is unlikely to be achieved.

406 MHz real-time mode

3.3.10 Once the satellite receives the 406 MHz satellite EPIRB signals, the Doppler shift is measured and the beacon digital data, which include ship's identification, etc., are recovered from the beacon signal. This information is time-tagged, formatted as digital data, and transferred to the downlink repeater for real-time transmission to any LUT in the satellite's view. The data are simultaneously stored in the on-board memory of the satellite for later transmission in the global coverage mode.

406 MHz global coverage mode

3.3.11 The 406 MHz system provides global coverage by storing data on board for later dumping and reception by LUTs. Each satellite EPIRB can therefore be located by all operating LUTs.

121.5 MHz satellite EPIRBs

3.3.12 EPIRBs operating on 121.5 MHz are already in widespread use. They are used on board light aircraft and ships and must meet national specifications based on International Civil Aviation Organization (ICAO) standards. The 121.5 MHz beacon signals also provide for homing by SAR units and overflight monitoring by aircraft.

406 MHz satellite EPIRBs

3.3.13 The development of 406 MHz satellite EPIRBs (figure 7) has been undertaken to overcome certain shortcomings of the 121.5 MHz system. The new EPIRBs were specifically designed for satellite detection and Doppler location and include the following features:

- improved location accuracy and ambiguity resolution;
- increased system capacity, i.e. a greater number of beacons transmitting simultaneously in the field of view of a satellite can be processed;
- global coverage;
- unique identification of each beacon; and
- inclusion of distress information.

Annexes 3-3-1 and 3-3-6 give technical details of the 406 MHz satellite EPIRBs.

3.3.14 The 406 MHz satellite EPIRBs transmit a 5 W radio-frequency (RF) burst of approximately 0.5 s duration every 50 seconds. Improved frequency stability ensures improved location accuracy, while the high peak power increases the probability of detection. The low duty cycle provides good multiple-access capability, with a system capacity of 90 activated beacons simultaneously in view of the satellite, and low mean power consumption.

3.3.15 An important feature of the new satellite EPIRBs is the inclusion of a digitally encoded message, which may provide such information as the country of origin of the unit in distress, identification of the vessel or aircraft, nature of distress and, in addition, for satellite EPIRBs coded in accordance with the maritime location protocol,* the ship's position as determined by its navigation equipment.

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* See annex 3-3-6 (Recommendation ITU-R M.633).



Figure 7 – *Example of 406 MHz COSPAS–SARSAT satellite EPIRB*

3.3.16 Satellite EPIRBs are dual-frequency 121.5/406 MHz beacons. This enables suitably equipped SAR units to home in on the 121.5 MHz transmission and permits overflight monitoring by aircraft.

3.3.17 Depending on the type of beacon (maritime, airborne or land), beacons can be activated either manually or automatically.

Space segment

3.3.18 The SAR instrumentation on board the COSPAS and SARSAT satellites operates in the following modes:

- real-time mode: 121.5 MHz repeater;
- real-time mode: 406.025 MHz data processing and downlink; and
- global coverage mode: 406.025 MHz stored data transmission.

3.3.19 The equipment on board the satellite consists of the following basic sub-assemblies:

- 121.5 MHz receiver;
- 406.025 MHz receiver/processor and memory unit; and
- 1544.5 MHz downlink transmitter.

121.5 MHz receiver

3.3.20 This unit has a bandwidth of 25 kHz. Automatic level control (ALC) is provided to maintain a constant output level.

406.025 MHz receiver/processor

3.3.21 The functions of the receiver/processor are as follows:

- demodulating the digital messages received from beacons;
- measuring the received frequency; and
- time-tagging the measurement.

All these data included in the output signal frame are modulated for downlinking to LUTs. The signal frame is transmitted at 2,400 bits/second in the real-time mode and also stored in memory for later transmission by the global coverage mode. In the global coverage mode, the on-board memory is dumped in the same format and at the same bit rate as real-time data. LUTs thus directly receive the stored beacon messages acquired during an entire orbital revolution. If a new beacon signal is received during the stored memory dump, the dump is interrupted so that the signal can be processed and the resultant message is interleaved with the stored data. Appropriate flag bits indicate whether the data are real-time or stored and the time at which full playback of the stored data was accomplished.

1544.5 MHz downlink transmitter

3.3.22 The 1544.5 MHz downlink transmitter accepts input from the 406 MHz receiver/processor and receiver(s) operating on the other COSPAS–SARSAT band(s) (121.5 MHz and 243 MHz*), adjusts the relative power level in accordance with ground command, phase-modulates a low-frequency carrier with the composite signal, multiplies the frequency to produce 1544.5 MHz, amplifies the power level and drives the satellite downlink antenna.

Local user terminals and mission control centres

3.3.23 The configuration and capabilities of each LUT vary to meet the specific requirements of countries, but the COSPAS and SARSAT satellite downlink signal formats ensure interoperability between the various satellites and all LUTs meeting COSPAS–SARSAT specifications.†

3.3.24 There are two types of LUTs, those which process 121.5 MHz and 406 MHz signals and those which process 406 MHz signals only.

3.3.25 Figure 8 is a block diagram of a typical COSPAS–SARSAT LUT. The antenna and receiving system pick up the signal, which is down-converted to an intermediate frequency (IF) and linearly demodulated to produce the composite baseband spectrum, which is filtered and separated into the various bands of interest. As the signal is received, the processing of each band is accomplished according to the specific capabilities of the LUT. The option for LUT configuration incorporating analogue tape recorders provides a back-up mode in the event of processor failure.

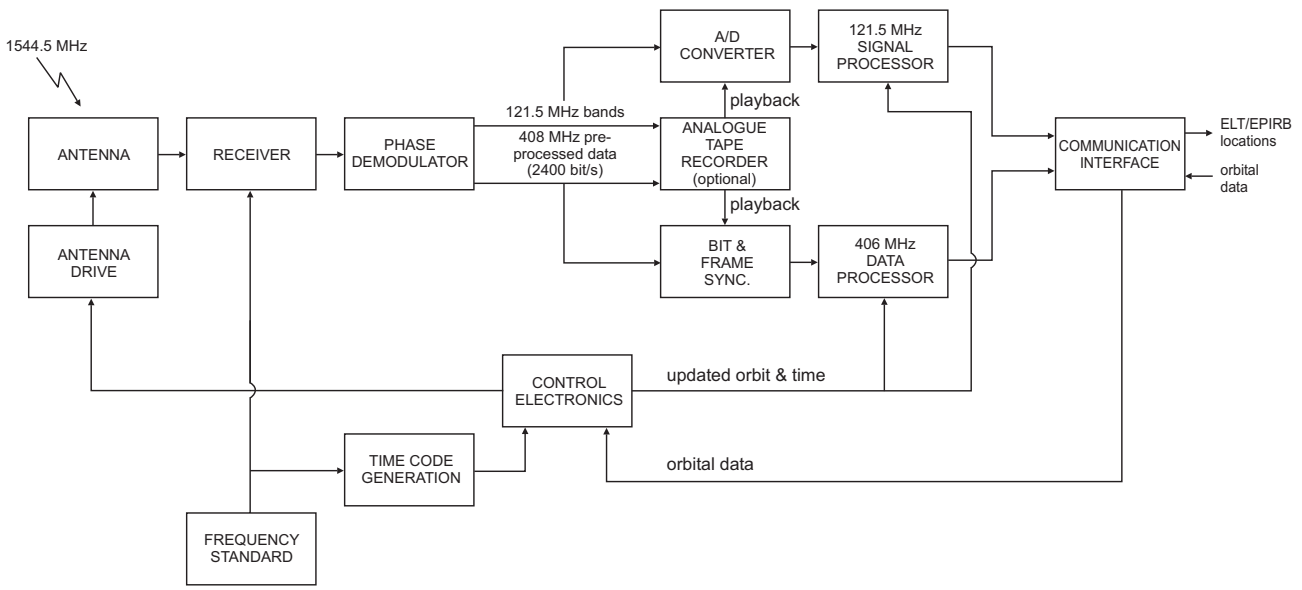


Figure 8 – *Example of a COSPAS–SARSAT LUT functional block diagram*

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* See second footnote to paragraph 3.3.1.

† Refer to the following COSPAS–SARSAT basic documents:

.1 Specification for COSPAS–SARSAT 406 MHz Distress Beacons (C/S T.001);
.2 Local User Terminal (LUT) Performance Specification (C/S T.002);
.3 COSPAS–SARSAT Data Distribution Plan (C/S A.001);
.4 COSPAS–SARSAT MCC Standard Interface Description (C/S A.002).

3.3.26 For the 121.5 MHz signal, each transmission is detected and the Doppler shift is calculated. A beacon location is then determined, using these data. All 406 MHz data received from the satellite memory on each pass can be processed within a few minutes of pass completion. Figures 9 and 10 show a typical LUT and an example of an MCC/RCC.



Figure 9 – *Example of a local user terminal*



Figure 10 – *Example of a mission control centre/rescue co-ordination centre*

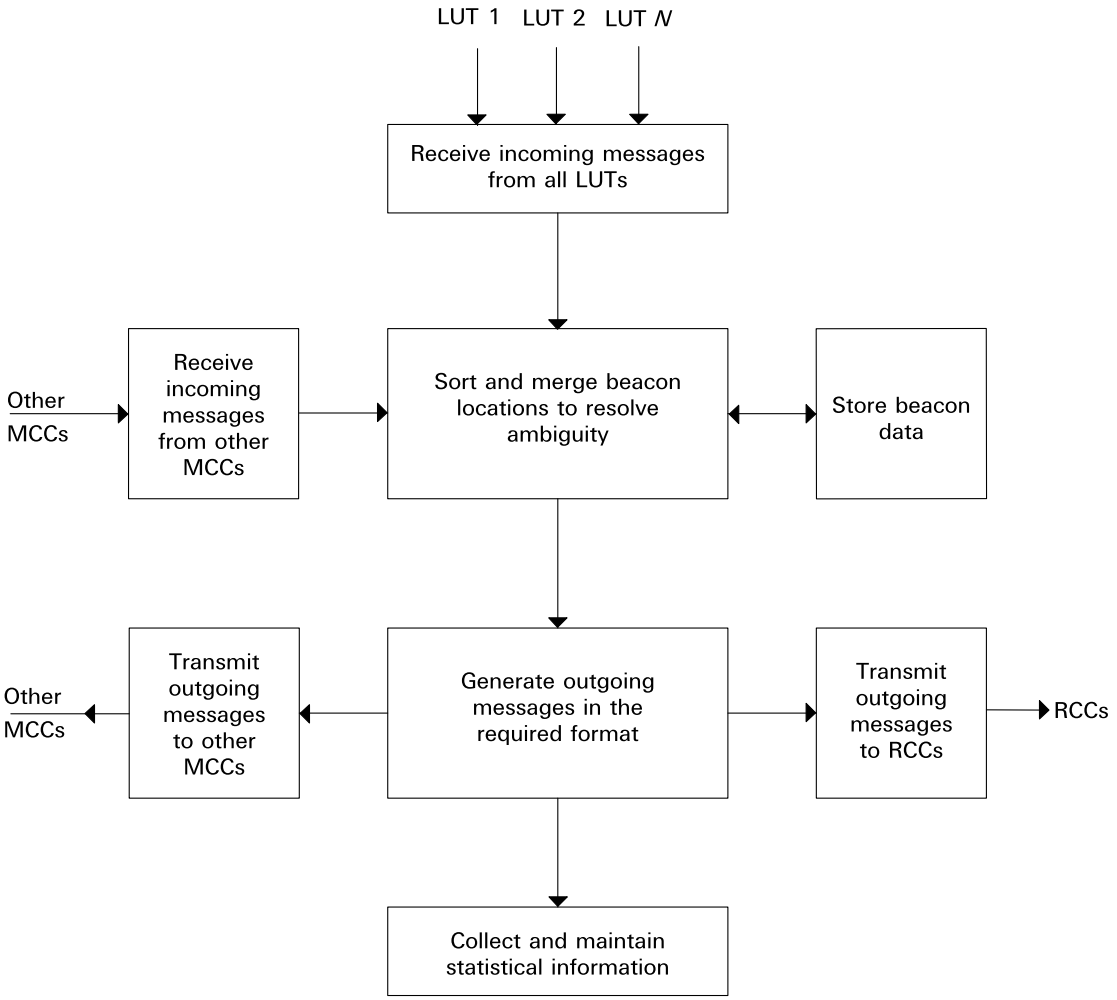


Figure 11 – *Functions of MCCs*

3.3.27 MCCs have been set up in each country operating at least one LUT. Their main functions are to collect, store and sort the data from LUTs and other MCCs, and to provide such data to SAR networks (see figure 11). Most of the data handled consist of the following:

.1 *Alert data* is the generic term for COSPAS–SARSAT 121.5 and 406 MHz data derived from EPIRB information. Alert data comprise the beacon location and (for 406 MHz satellite EPIRBs) other information such as beacon identification data and other coded information.

.2 *System information* is primarily used to maintain efficient operation of the COSPAS–SARSAT system and to provide users with as accurate and timely alert data as possible. It consists of tabulated data (ephemeris and time calibration) used to determine beacon locations, the current status of all sub-systems, and co-ordination messages required to operate the COSPAS–SARSAT system.

3.3.28 The COSPAS mission control centre (CMC) in Moscow is responsible for co-ordinating all COSPAS activities and provides the link via the SARSAT MCCs for all interaction with the SARSAT system. The CMC computes and sends COSPAS satellite ephemeris data to other MCCs and LUTs, and receives, processes and transmits SARSAT ephemeris and time calibration data received from the SARSAT MCC to the COSPAS MCCs and LUTs.

3.3.29 A designated MCC in the United States (USMCC) acts as a focal point for the co-ordination of SARSAT satellite operations. It calculates 406 MHz satellite EPIRB locations, using stored data received from LUTs, distributes ephemeris data, processes time calibration data (required for use of SARSAT 406 MHz data), and forwards the appropriate results to other MCCs. The USMCC acts as the main system operational contact point between the SARSAT system and the CMC.

System performance and operations

Performance parameters

3.3.30 The following parameters are particularly important for the user:

- EPIRB detection probability;
- EPIRB location probability;
- EPIRB location error;
- ambiguity resolution probability;
- capacity;
- coverage; and
- notification time.

.1 *EPIRB detection probability* for the 406 MHz satellite EPIRB is defined as the probability of detection by LUT of at least one message with a correct code-protected section from the first tracked satellite.

.2 *EPIRB location probability* for the 406 MHz satellite EPIRB is defined as the probability of detecting and decoding at least four individual message bursts during a single satellite pass so that a Doppler curve-set estimate can be generated by the LUT. At 121.5 MHz, EPIRB location probability is defined as the probability of location during a satellite pass above 10° elevation with respect to the beacon. EPIRB location probability relates to the two solutions (''true'' and ''mirror'') and not to a single unambiguous result.

.3 *EPIRB location accuracy* is defined as the difference between the location calculated by the system using measured Doppler frequencies and the actual location.

.4 *Ambiguity resolution probability* is defined as the ability of the system to select the ''true'' rather than the ''mirror'' location.

.5 *Capacity* is defined as the number of EPIRBs in common view of the spacecraft which the system can process simultaneously.

.6 *Notification time* is the period from activation of an EPIRB (i.e. first transmission) to reception of a valid alert message by the appropriate RCC.

Performance of the COSPAS–SARSAT system

3.3.31 The system performance characteristics are given in table 1.

Note: Performance at 121.5 MHz is highly sensitive to EPIRB spectral characteristics. The values given below were confirmed by statistical analysis of over 5,000 beacons during the development and experiment phase.

Table 1

Characteristic	**121.5 MHz**	**406 MHz**
Detection probability	(not applicable)	0.98
Location probability	0.9	0.9
Location accuracy	17.2 km	90% within 5 km
Ambiguity resolution probability	0.73	0.96
Capacity	10	90

.1 Coverage: The 121.5 MHz system operates in real time only, while the 406 MHz system operates in both real-time and global modes. The overall coverage provided by the COSPAS–SARSAT system in real-time mode is determined by the number and positions of LUTs, each covering an area with a radius of approximately 2,500 km.

The real-time coverage of LUTs is shown in the COSPAS–SARSAT system status in annex 6. In the global coverage mode, using 406 MHz satellite EPIRBs, complete world coverage is achieved.

.2 Notification time depends on the following parameters:

- satellite constellation;
- LUT configuration;
- beacon location relative to an LUT;
- beacon latitude; and
- ground communication network.

Operational procedures

3.3.32 This section provides a description of alert data and system information and a general description of data flow.

Alert data

3.3.33 *Alert data* users are defined as those responsible for SAR operations; *system information* users are primarily organizations with technical responsibility for the COSPAS–SARSAT system (MCCs, LUT operators, managers of ground-segment facilities).

3.3.34 Alert data are of two types: coded beacon-generated messages and LUT/MCC-generated alert messages. Signals transmitted by activated EPIRBs provide the initial input which triggers the generation of alert messages. Once the incoming coded EPIRB message has been received and processed by the LUTs, the alert data are forwarded to the national MCC for distribution.

3.3.35 Each MCC distributes alert data according to its own requirements and procedures to any country within its service area which has agreed to accept such data. These data are given to SAR authorities so that immediate SAR action can be taken. Additionally, any MCC receiving alert data relating to an EPIRB within another MCC's service area or elsewhere in the world relays that information to the appropriate MCC or SAR authority.

System information

3.3.36 The term *system information* covers five types of system messages – ephemeris messages, time calibration messages, telemetry data, satellite command messages and co-ordination messages:

- Ephemeris or orbit vector information is used to acquire and track the satellite and to compute EPIRB positions.
- Spacecraft time calibration is vital for the accurate determination of EPIRB locations.
- Telemetry data provide information on the status of the on-board SAR instruments.
- Satellite command messages are transmitted on uplink during the post-launch checkout procedure to correct faults or out-of-limit conditions.
- Co-ordination messages are used to communicate general information required for COSPAS–SARSAT system operation.

Communications network

3.3.37 Each MCC transfers alert data and system information to ground-system elements within its service area according to communications network requirements and procedures.

Message formats

3.3.38 Messages between MCCs are sent in a specific format permitting automatic processing and retransmission, while messages between MCCs and their LUTs are formatted in accordance with national requirements. Standard message formats are used to transmit alert data to RCCs outside the COSPAS–SARSAT system.

3.4 Digital selective calling (DSC) system

Introduction

3.4.1 Digital selective calling (DSC) is an integral part of the GMDSS and is used for transmitting distress alerts from ships and for transmitting the associated acknowledgements from coast stations. It is also used by ships and coast stations for relaying distress alerts and for other urgency and safety calls. Trials of DSC systems were co-ordinated by the CCIR Interim Working Party 8/10 during 1982–1986 and included tests of the HF, MF and VHF DSC systems. The distribution of VHF, MF and HF DSC coast stations is given in annex 5 (GMDSS Master Plan).

Basic description of DSC

Technical characteristics

3.4.2 The system is a synchronous system using a ten-unit error-detecting code. The information in the call is presented as a sequence of seven-unit binary combinations.

3.4.3 The classes of emission, frequency shifts and modulation rates are as follows:

- F1B or J2B 170 Hz and 100 baud for use on HF and MF channels. When frequency-shift keying is effected by applying audio signals to the input of single-sideband transmitters (J2B), the centre of the audio-frequency spectrum offered to the transmitter is 1700 Hz.
- Frequency modulation with a pre-emphasis of 6 dB/octave with frequency shift of the modulating sub-carrier for use on VHF channels:
  - the frequency shift is between 1300 Hz and 2100 Hz, the sub-carrier being at 1700 Hz;
  - the frequency tolerance of the 1300 Hz and 2100 Hz tones is ± 10 Hz;
  - the modulation rate is 1,200 baud; and
  - the modulation index is 2.0 $\pm 10\%$.

3.4.4 More detailed technical characteristics of DSC, including signal format, are given in annexes 3-2-1, -2, -3, -4, -5, -6 and -7.

Operational procedures

3.4.5 Recommendation ITU-R M.541* gives operational procedures of the DSC system. The content of a DSC call includes the numerical address of the station (or stations) to which the call is transmitted, the self-identification of the transmitting station and a message which contains several fields of information indicating the purpose of the call.

3.4.6 Various types of DSC calls are available, being broadly either distress and safety-related calls or ''commercial'' calls (to indicate that a commercial communication, e.g. a telephony or telegraphy call, etc., is required). In the case of VHF, automatic connection to the public network can also be established through suitably equipped coast stations.

3.4.7 The receipt of a DSC call by a receiving station is accompanied by a suitable display or print-out of the address, the self-identification of the transmitting station and the content of the DSC message, together with an audible or visual alarm or both for certain categories of calls (e.g. for distress- and safety-related calls).

3.4.8 The transmission speed of a DSC call is 100 baud on MF and HF and 1,200 baud on VHF. Error-correction coding is included, involving the transmission of each character twice together with an overall message-check character. The duration of a single DSC call varies between 6.2 and 7.2 seconds on MF and HF or 0.45 and 0.63 second on VHF, depending on the type of DSC call transmitted.

3.4.9 For distress and safety operation, simplex frequencies are used, there being one frequency in the MF band, five in the HF bands and one in the VHF band (these frequencies are given in annex 9-3). For commercial operation at MF and HF, paired frequencies are used, but at VHF the simplex channel 70 is used for both distress and safety calling and commercial calling.

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* Annex 3-2-8. See also RR Art. N39 (annex 9-4).

3.4.10 In order to increase the probability of a DSC distress call or a DSC distress relay being received, it is repeated several times to form a *distress call attempt*. On MF and HF two types of distress call attempts may be used, either a *single-frequency call attempt** (five consecutive DSC distress calls on one frequency) or a *multi-frequency call attempt** (up to six consecutive DSC distress calls dispersed over any of the six DSC distress frequencies – one on MF and five on HF). On VHF only a single-frequency call attempt is used since there is only one VHF DSC frequency (channel 70). VHF and MF/HF distress calls may be transmitted simultaneously.

3.4.11 The various distress and safety-related calls by DSC are itemized below, together with a description of the content of the message for each type of call. In addition to the message content, each DSC call also contains other information, which is not displayed to the receiving station but which is used to ensure the technical integrity of the DSC system. Signal format in the various DSC calls is specified in Recommendation ITU-R M.493.†

Distress call (alert)

3.4.12 DSC distress calls are transmitted by a ship in distress and will be received by all suitably equipped ships and coast stations within propagation range of the radio frequency used.

3.4.13 A DSC distress call contains various items of information, including the self-identification of the ship in distress, which will be displayed to the receiving station. This information will either be automatically included in the transmitted DSC distress call or will be inserted by the operator prior to transmission. When time does not permit the insertion of any information, ''default'' information will be included automatically.

Distress acknowledgement

3.4.14 Distress acknowledgements by DSC are normally transmitted manually by coast stations in response to a DSC distress call on the same frequency as the distress call was received (RR N3129, N3130‡). However, a distress alert may be acknowledged by ship stations when they believe that no coast station is likely to be able to acknowledge it (RR N3132, N3133 and N3124‡). In this case, the acknowledgement is made by radiotelephony on the associated radiotelephone distress and safety traffic frequency.§

Distress relay

3.4.15 DSC distress relays are transmitted in the following two situations:

.1 By a coast station to alert ships in the area of a distress incident. Such a relay transmission would be addressed, as appropriate, to all ships, to a selected group of ships or to a specific ship (RR N3117‡).

.2 By a ship station to an appropriate coast station if it received a DSC distress call on an HF frequency and it was not acknowledged by a coast station within 3 minutes (RR N3134‡).

3.4.16 The distress relay is transmitted as either a single-frequency or a multi-frequency call attempt.

3.4.17 If a ship receives a DSC distress relay addressed to ships in a particular geographical area,¶ then the display or print-out and alarm will not be activated if geographical co-ordinates inserted manually or by navigational interface into the receiving ship station's DSC equipment processor lie outside the addressed geographical area.

DSC distress call repetitions and acknowledgement transmissions

3.4.18 If no distress acknowledgement is received in response to a DSC distress call transmission, then the ship in distress may repeat the DSC distress call attempt (on different DSC distress frequencies if desired) after a delay of between 3.5 and 4.5 minutes from the beginning of the initial call.|| This delay allows time for any acknowledgement to be received.

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* See Recommendation ITU-R M.541, Annex 1, paragraphs 3.1.3.1 and 3.1.3.2 (annex 3-2-8).
† Annex 3-2-7.
‡ See annex 9-6.
§ Recommendation ITU-R M.541, Annex 1, paragraph 3.3.4 (see annex 3-2-8).
¶ Recommendation ITU-R M.493, Annex 1, paragraph 5.3 (see annex 3-2-7).
|| Recommendation ITU-R M.541, Annex 1, paragraph 3.1.3 (see annex 3-2-8).

3.4.19 A coast station receiving a DSC distress call on MF or HF should transmit a DSC distress acknowledgement after a minimum delay of 1 minute after receipt of the distress call, normally within a maximum delay of 2.75 minutes. On VHF, a DSC distress acknowledgement should be transmitted as soon as practicable.*

Reception of DSC calls

3.4.20 All DSC distress-related calls transmitted on MF and HF contain, at the beginning of each single call, a 200-bit 100-baud (i.e. 2 seconds) dot pattern to allow the use of scanning receivers on board ships. When used, a scanning receiver should be set to scan only the desired DSC distress frequencies, i.e. selected from the one MF frequency and the five HF frequencies.

3.4.21 It is important to ensure that, where a scanning receiver is used, all selected frequencies are scanned within 2 seconds, and the dwell time on each frequency should be adequate to allow detection of the dot pattern. The scan should only stop on detection of a 100-baud dot pattern. It is advisable that coast stations are able to receive more than one DSC distress-related call simultaneously on different frequencies, and scanning receivers should therefore not be used at coast stations.

DSC shipborne equipment

3.4.22 Figure 12 shows an example of a DSC control unit which, together with suitable VHF or MF/HF radio equipment, provides a complete shipborne radio system for automatic or manual operation within the DSC system for use in the maritime mobile services.



Figure 12 – *Example of a DSC control unit*

3.4.23 The unit consists of a modem and a signal coder/decoder for producing DSC signals; it also contains a central processor unit for creating the different call formats, etc.

3.4.24 In addition, the unit includes an interface sub-unit, enabling automatic channel control of the connected VHF radio equipment, hard-copy printing of messages, and data collection from, for example, the navigational equipment on board the ship.

3.4.25 The unit also contains an audio alarm, giving an acoustic alarm when a DSC message is received.

3.4.26 The information contained in the received DSC message is decoded and displayed on the front panel LCD display. This information may be stored in an internal memory.

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* Recommendation ITU-R M.541, Annex 1, paragraph 3.3.2 (see annex 3-2-8).

3.4.27 When receiving DSC messages other than a distress, urgency or safety call, the control unit provides for an automatic transmission acknowledging the call received.

3.4.28 Transmission of a distress call by VHF DSC from the ship in distress can be initiated by simply pushing the distress button on the front panel of the control unit. The control unit also provides a function for including additional information concerning the distress situation in the distress message. Once initiated, the distress call is automatically repeated at intervals of about 4 minutes* until acknowledged by another station or interrupted manually.

3.4.29 By using the keypad on the front panel of the control unit, the operator can compose different types of DSC message. In the case of VHF, the operator may, for individual DSC messages to a coast station, include in the message the telephone number of the land subscriber, thus providing for the use of semi-automatic VHF systems expected to be implemented at coast stations in the future.

3.4.30 The control unit includes an internal register, enabling the operator to store, for example, identity numbers of the coast stations with which the ship often operates. Also, telephone numbers of land subscribers may be stored in the register. These facilities make it possible for the operator to use abbreviated forms when composing DSC messages to coast stations.

3.5 Search and rescue radar transponders (SARTs)

Introduction

3.5.1 Search and rescue radar transponders (SARTs) are the main means in the GMDSS for locating ships in distress or their survival craft, and their carriage on board ships is mandatory (regulations III/6.22 and IV/7.1.3). The SART operates in the 9 GHz frequency band and generates a series of response signals on being interrogated by any ordinary 9 GHz shipborne radar or suitable airborne radar. No modification is needed to a ship's radar equipment for detecting SART signals. SARTs can be either portable, for use on board ship or carrying into any survival craft, installed on the ship and in each survival craft, or so as to operate after floating free from the sinking ship (figure 13). They may also be incorporated into a float-free satellite EPIRB. Technical details of SARTs are given in annexes 3-6-1 and 3-6-8.

Operational and technical characteristics

3.5.2 The SART can be activated manually or automatically when placed into the water so that it will thereafter respond when interrogated.

3.5.3 When activated in a distress situation, the SART responds to radar interrogation by transmitting a swept-frequency signal which generates a line of blip code (figure 14) on a radar screen outward from the SART's position along its line of bearing.† This unique radar signal is easily recognized on the radar screen and the rescue vessel (and aircraft, if equipped with suitable radar) can detect the survivors even in poor visibility or at night.

3.5.4 The SART provides a visual or audible indication of its correct operation and will also inform survivors when it is interrogated by a radar.

3.5.5 The SART will have sufficient battery capacity to operate in the stand-by condition for 96 hours and will be able to operate under ambient temperatures of –20°C to +55°C.

3.5.6 The vertical polar diagram of the antenna and the hydrodynamic characteristics of the device will permit the SART to respond to radars under heavy swell conditions. SART transmission is substantially omnidirectional in the horizontal plane.

3.6 Equipment performance standards

In order to ensure proper operation, radio equipment carried in the GMDSS is required to be type-approved by Administrations in accordance with the performance standards developed by IMO (regulation IV/14). These standards, in addition to requiring the radio equipment to comply with the relevant ITU-R recommendations, define various operational requirements to be met.

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* See Recommendation ITU-R M.541, Annex 1, paragraphs 3.1.3.1 and 3.1.3.2 (see annex 3-2-8).

† See annex 3-6-7.

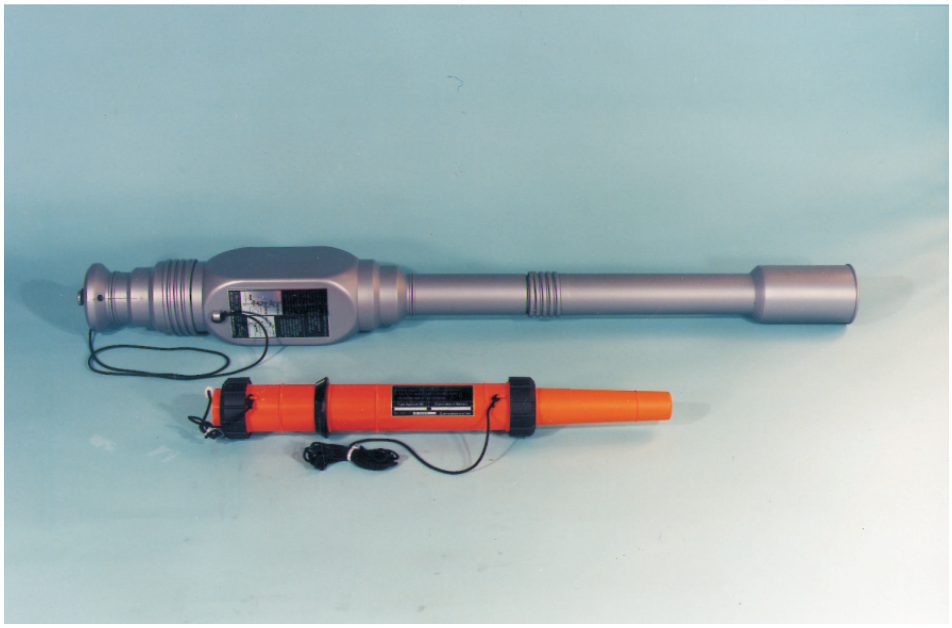


Figure 13 – *Search and rescue radar transponders*

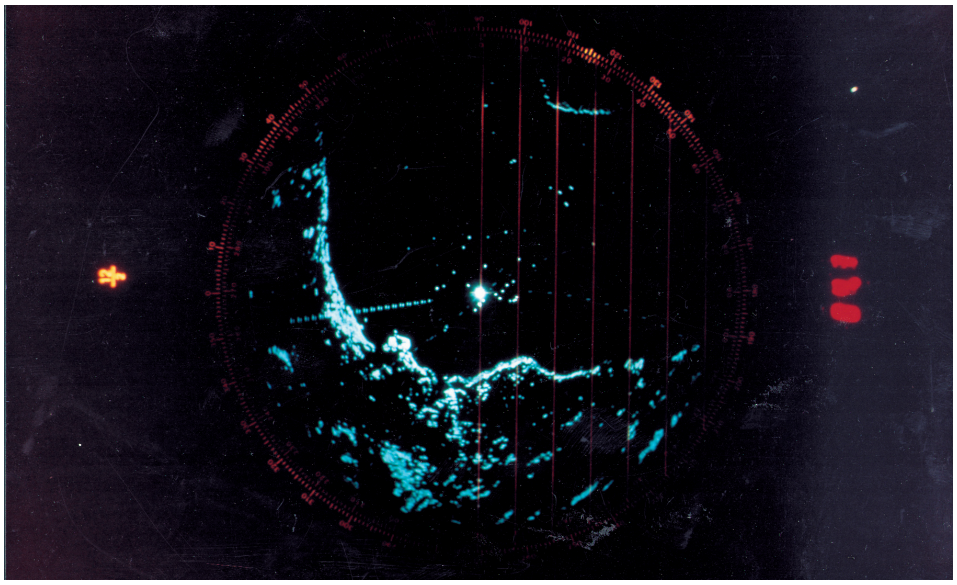


Figure 14 – *SART blip code on a radar screen*

3.7 Maritime safety information (MSI) system

Introduction

3.7.1 The World-Wide Navigational Warning Service (WWNWS) was established by IMO and IHO for the purpose of co-ordinating the transmission of navigational warnings to ships in co-ordinated geographical areas (NAVAREAs*). In the GMDSS, the WWNWS was included in the systems developed for the promulgation of maritime safety information (MSI).

3.7.2 Radio systems to be used internationally for the promulgation of MSI in the GMDSS and for which requirements have been included in SOLAS chapter IV† are:

- the International NAVTEX system;
- the International SafetyNET system; and

* See annex 4-1 (WWNWS).
† See annex 2-13. See also annexes 3-5-3, -4 and -6.

- HF narrow-band direct-printing (NBDP), which may be used to augment these systems (under development)*

3.7.3 The HF Morse telegraphy system which is currently used for broadcasts of NAVAREA warnings will be superseded by the above automated systems during the implementation period of the GMDSS.

3.7.4 Annex 4 gives more details of the co-ordination of various MSI systems.

The International NAVTEX system

3.7.5 This system is an international direct-printing service for promulgation of MSI in the English language, pertaining to coastal waters up to about 400 nautical miles offshore. Unlike NAVAREA warnings, which are tailored for international sea commerce on or near main shipping lanes, NAVTEX carries information relevant to all sizes and types of vessels within a region established for this service. It also carries routine meteorological forecasts and warnings and other urgent safety information to ships. A selective message-rejection feature of the receiver allows the mariner to receive only that safety information pertinent to his requirements.

3.7.6 Procedures to be followed by Administrations and the ITU Radiocommunication Bureau for co-ordination of the planned used of the frequency 518 kHz in the International NAVTEX system are contained in RR Article 14A.

3.7.7 The existing NAVAREAs are used as regions for planning and co-ordination of the International NAVTEX service. To assist such planning and advise IMO on the progress and on solutions to problems of system expansion, IMO has established the NAVTEX Co-ordinating Panel, which reports to the IMO Sub-Committee on Radiocommunications and Search and Rescue (COMSAR). The List of NAVTEX services is given in annex 5 (the GMDSS Master Plan).

3.7.8 NAVTEX is a single-frequency broadcast system; the frequency 518 kHz is used for this purpose.† Mutual interference will be avoided by limiting the transmitter power to that necessary for coverage of the assigned area and by co-ordinating the broadcast schedules. MSI on the International NAVTEX service is broadcast in English. A dedicated receiver/processor (figure 15) is used for the reception of NAVTEX broadcasts. Details of the system are contained in the *NAVTEX Manual,* given in annex 4-2. For the technical characteristics of NAVTEX receivers, see annexes 3-5-1 and 3-5-5.



Figure 15 – *Example of a NAVTEX receiver*

* See annex 3-5-4.
† See RR Art. 14A. N2969 and N2970 (annexes 9-1 and 9-3).

Enhanced group call (EGC) system

3.7.9 The enhanced group call (EGC) (SafetyNET*) system, which was developed by Inmarsat, enables the provision of a unique global automated service capable of addressing messages to pre-determined groups of ships or all vessels in both fixed and variable geographical areas.

3.7.10 The system is able to meet requirements of broadcasting global, regional or local navigational warnings, meteorological warnings and forecasts and shore-to-ship distress alerts to any region within Inmarsat satellite coverage. In addition to covering the mid-ocean areas, the SafetyNET system can also provide an automated service in coastal waters where it may not be feasible to establish the NAVTEX service or where shipping density is too low to warrant its implementation.

3.7.11 A particularly useful feature is the ability to direct a call to a given geographical area. The area may be fixed, as in the case of a NAVAREA or weather forecast area, or it may be uniquely defined. This is useful for messages, such as a local storm warning or a shore-to-ship distress alert, for which it is inappropriate to alert all ships in the satellite coverage area.

3.7.12 SafetyNET messages originate from registered information providers anywhere in the world and are broadcast to the appropriate ocean region via a CES. Messages are transmitted by the CES according to their priority, e.g. distress, urgency, safety and routine.

3.7.13 Aboard ship, SafetyNET messages will be received either via a dedicated receiver (figure 16) or via an optional receiver integrated in Inmarsat SES equipment. Upon reception of messages of distress or urgency category, aural and visual alarms are activated and they can only be reset manually. Performance standards for the EGC receiver are given in annex 3-5-2.

3.7.14 IMO has established the International SafetyNET Co-ordinating Panel for the purpose of co-ordinating the development and the use of the International SafetyNET system for promulgating MSI. More details of the system are contained in the *International SafetyNET Manual,* given in annex 4-3.



Figure 16 – *Inmarsat EGC receiver*

* *Note:* SafetyNET and FleetNET are registered servicemarks of Inmarsat.

Part 4
GMDSS equipment carriage requirements

4.1 All the ships to which the 1974 SOLAS Convention, as amended in 1988, applies are required to carry the GMDSS radio equipment, depending on the sea areas in which they operate, prescribed in the Convention (given in annex 1).

4.2 One of the basic principles on which the GMDSS carriage requirements is based is (as prescribed in regulation IV/4) a functional requirement to ensure the capability of transmitting ship-to-shore distress alerts by at least two separate and independent means. The capability of performing other communications functions is also required. Regulations IV/7 to IV/11 regulate the specific carriage requirements for ships according to the sea area(s) in which they operate.

4.3 Carriage requirements for GMDSS radio equipment can be summarized as follows:

- sea area A1: ships shall carry VHF equipment and either a satellite EPIRB or a VHF EPIRB;
- sea area A2: ships shall carry VHF and MF equipment and a satellite EPIRB;
- sea area A3: ships shall carry VHF, MF, a satellite EPIRB and either HF or satellite communication equipment;
- sea area A4: ships shall carry VHF, MF and HF equipment and a satellite EPIRB; and
- all ships shall carry equipment for receiving MSI broadcasts.

4.4 The 1974 SOLAS Convention, as amended in 1988, sets out the time-frame for installing the GMDSS radio equipment (regulation IV/1), taking into account system amortization, operational continuity, personnel training, etc. To this end, the following transitional approach for the implementation of the GMDSS is given:

- all ships constructed after 1 February 1992 to be fitted with a radar transponder and two-way VHF radiotelephone apparatus for survival craft;
- all ships to be fitted with a NAVTEX receiver and a satellite EPIRB by 1 August 1993;
- all ships constructed before 1 February 1992 to be fitted with a radar transponder and two-way VHF radiotelephone apparatus for survival craft by 1 February 1995;
- all ships constructed after 1 February 1995 to comply with all the appropriate requirements for the GMDSS;
- all ships to be fitted with at least one radar capable of operating in the 9 GHz band by 1 February 1995; and
- all ships to comply with the appropriate requirements for the GMDSS by 1 February 1999.

4.5 Ships which are not required to comply with the 1974 SOLAS Convention are recommended to comply with the guidelines for the participation of non-Convention ships in the GMDSS (MSC/Circ. 803), given in annex 7-8.

4.6 The GMDSS requirements are also included in the following convention and codes:

- Protocol of 1993 relating to the Torremolinos International Convention for the Safety of Fishing Vessels, 1977
- 1991 Amendments to the Code for the Construction and Equipment of Mobile Offshore Drilling Units (MODU Code)
- International Code of Safety for High-Speed Craft

4.7 Amendments to the following instruments are under consideration by IMO for their compatibility with the GMDSS:

- FAO/ILO/IMO Code of Safety for Fishermen and Fishing Vessels;
- FAO/ILO/IMO Voluntary Guidelines for the Design, Construction and Equipment of Small Fishing Vessels; and
- Code on Alarms and Indicators (resolution A.830(19)).

Part 5
Operational procedures for the GMDSS

5.1 Operational procedures for distress, safety and urgency communications in the GMDSS are prescribed in the Radio Regulations, Articles N39 and N40, given in annexes 9-3 and 9-4, respectively.

5.2 The following documents, reproduced in annex 3, give detailed operational procedures for GMDSS radio equipment:

- Operational procedures for the use of digital selective-calling equipment in the maritime mobile service (Recommendation ITU-R M.541 (annex 3-2-8));
- Operational procedures for the use of direct-printing telegraph equipment in the maritime mobile service (Recommendation ITU-R M.492 (annex 3-2-12)); and
- Operational and technical characteristics for an automated direct-printing telegraph system for promulgation of navigational and meteorological warnings and urgent information to ships (Recommendation ITU-R M.540 (annex 3-5-5)).

5.3 Actions to be taken by masters of ships in distress situations are summarized in annex 8-5 (GMDSS operating guidance for masters of ships in distress situations – COM/Circ. 108).

Part 6
Shore-based SAR communication network and operation

6.1 To exploit the full advantages of globally integrated satellite and terrestrial communications, the GMDSS necessitates the establishment of an efficient communication network between RCCs. This will consist of interconnecting links between RCCs in accordance with arrangements made by IMO in support of the 1979 SAR Convention. In addition, each RCC will need rapid and effective communication links with its associated coast stations, Inmarsat CESs and COSPAS–SARSAT MCCs.

6.2 The interconnecting links between RCCs will usually be implemented using the public switched networks or dedicated circuits. Some RCCs, particularly those not having sufficient access to the public switched networks, may use an Inmarsat SES to assist in the rapid exchange of distress and safety information between RCCs (RR N2938*).

6.3 The communications network for the future system and associated SAR procedures will be flexible enough to satisfy many levels of international SAR co-ordination from the ideal of ocean areas where a SAR plan† is operational, through many variations in the designation of search and rescue regions (SRR) and provision of SAR facilities, to the worst cases where no responsibility has been assumed for, nor facilities provided in, a specific area.

6.4 SAR action in response to any distress situation will be achieved through co-operation among SAR Administrations which are able to provide assistance.

6.5 The shore station nearest to the reported distress position should, whenever possible, acknowledge the alert. Other shore stations receiving the alert should acknowledge it if the nearest station does not appear to respond. The shore station which acknowledges the alert must establish and maintain communications with the ship in distress until relieved of this duty.

6.6 The *first RCC,* which is the RCC affiliated with the shore station which first acknowledged the alert, should assume responsibility for all subsequent co-ordination of SAR measures unless and until that responsibility is accepted by another RCC which is in a better position to assist.

6.7 If it is not at once clear which RCC has become the first RCC because more than one shore station has acknowledged the alert, the RCCs concerned should, as soon as possible, agree which is to become the first RCC so that the incident is responded to promptly. Follow-up action by the first RCC to co-ordinate SAR activities or to refer action to a more suitable RCC should also be carried out promptly.

6.8 A flow-chart for communications and procedures, illustrating the actions to be taken by the first RCC, is given in figure 17.

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* See annex 9-2.

† Pursuant to the 1979 SAR Convention, IMO is developing a global SAR plan to co-ordinate search and rescue services in all maritime areas through bilateral or multilateral agreements among coastal States.

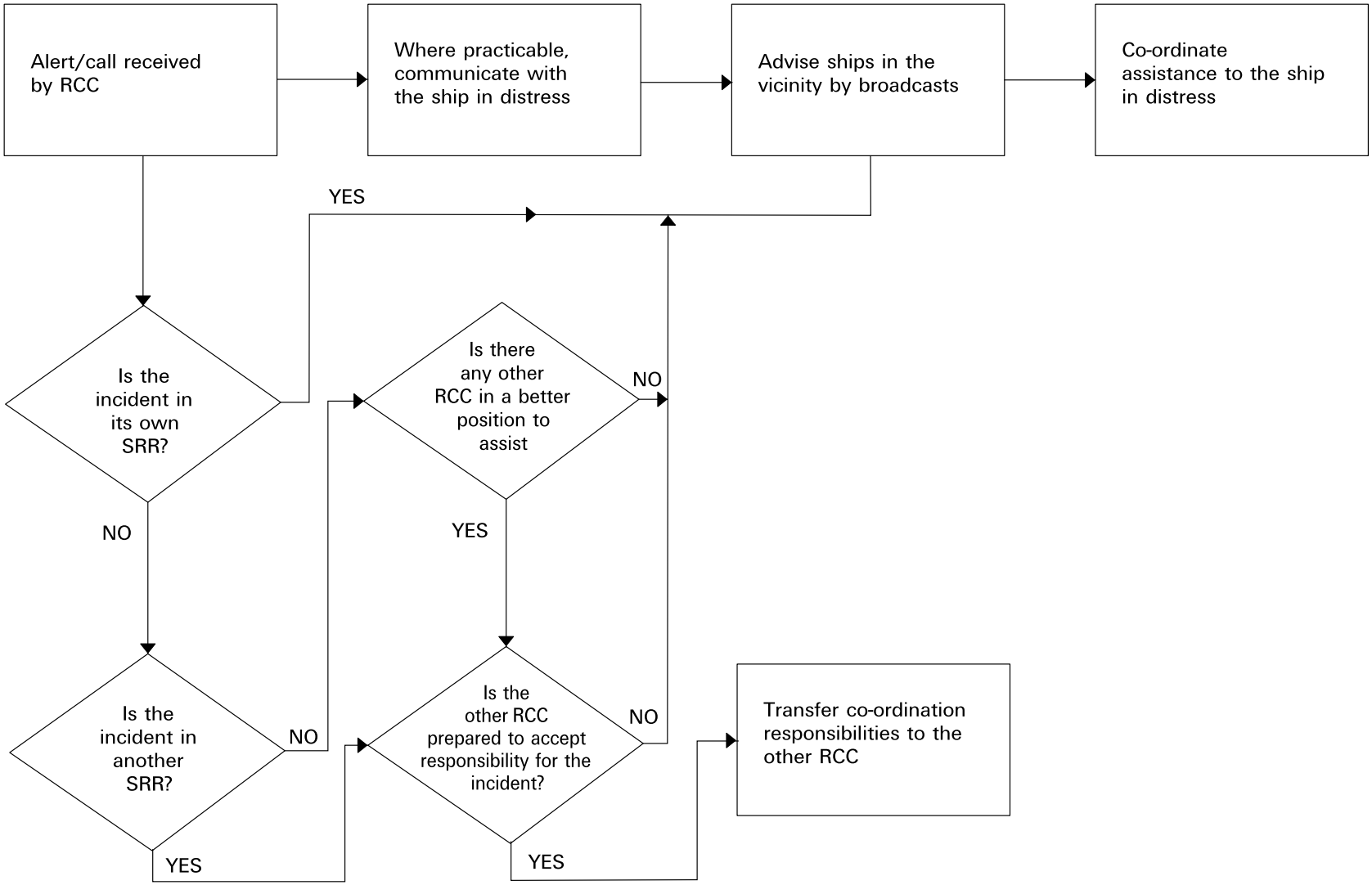


Figure 17 – *Actions by the "First RCC"*

Part 7
Master Plan for the GMDSS

In order to provide information on shore-based facilities for space and terrestrial communication services for the GMDSS, the information provided by Governments in accordance with regulation IV/5.2 of the 1988 SOLAS amendments, in response to MSC/Circ. 684 or revisions thereof, is being included by IMO in the Master Plan for the GMDSS (GMDSS/Circ.8 as it may be revised) given at annex 5.

The Master Plan includes:

Annex 1 – Status of shore-based facilities for the GMDSS

Annex 2 – List of VHF DSC coast stations for sea areas A1

Annex 3 – List of MF DSC coast stations for sea areas A2

Annex 4 – List of HF DSC coast stations for sea areas A3 and A4

Annex 5 – List of Inmarsat coast earth stations

Annex 6 – List of rescue co-ordination centres using ship earth stations

Annex 7 – NAVTEX service

Annex 8 – The International SafetyNET service

Annex 9 – HF NBDP maritime safety information broadcast service

Annex 10 – List of COSPAS–SARSAT Mission Control Centres and Local User Terminals

Annex 11 – Maps of shore-based facilities for the GMDSS

Annex 12 – Satellite EPIRB registration information

Annex 13 – List of 24-hour points of contact for MMSI ship's identification

Annex 14 – Questionnaire on shore-based facilities for the GMDSS (MSC/Circ. 684)

Part 8
Maintenance of equipment in the GMDSS

8.1 In the GMDSS, ships are not necessarily required to carry radio personnel on board for the purpose of the maintenance of equipment. The following are three options which ships may choose as methods to ensure the availability of equipment:

- duplication of equipment;
- shore-based maintenance;
- at-sea electronic maintenance capability (on-board maintenance).

8.2 As prescribed in regulation IV/15.7 of the 1988 SOLAS amendments, for ships which navigate in GMDSS sea areas A1 or A2, availability shall be ensured by using at least one of the three methods; ships which navigate in sea areas A3 and A4 shall employ a combination of at least two of the above three options.

8.3 SOLAS regulation IV/15.7 requires Administrations to take into account the recommendations of IMO when they nationally approve the methods to be employed in order to ensure availability in sea areas A3 and A4.* The recommendations of IMO are given in annex 2-10 (resolution A.702(17)).

* Also see annex 8-3 (COM/Circ.105): ''Clarifications of certain provisions of the 1988 SOLAS amendments for the GMDSS''.

Annex 1
Amendments to the International Convention for the Safety of Life at Sea, 1974, relating to the GMDSS

Resolutions of the Conference of Contracting Governments to the International Convention for the Safety of Life at Sea, 1974, on the GMDSS (adopted on 9 November 1988)

Annex 1-1 – Resolution 1: *Adoption of amendments to the International Convention for the Safety of Life at Sea, 1974, concerning radiocommunications for the global maritime distress and safety system*

Annex: *Amendments to the International Convention for the Safety of Life at Sea, 1974, concerning radiocommunications for the global maritime distress and safety system*

Annex 1-2 – Resolution 2: *Records of Equipment to supplement the SOLAS Passenger Ship Safety Certificate, Cargo Ship Safety Equipment Certificate and Cargo Ship Safety Radio Certificate*

Annex: *Records of Equipment*

Annex 1-3 – Resolution 3: *Recommendation on the early introduction of global maritime distress and safety system (GMDSS) elements*

Annex 1-4 – Resolution 4: *Recommendation on the early introduction of GMDSS radio life-saving appliances*

Annex 1-5 – Resolution 5: *Reviews of the requirements of SOLAS regulation IV/15.7*

Annex 1-6 – Resolution 6: *Recommendation on application of administrative, financial and operational arrangements for the global maritime distress and safety system (GMDSS)*

Annex 1-7 – Resolution 7: *Recommendation on the coding of satellite emergency position-indicating radio beacons operating in the COSPAS–SARSAT system*

Annex 1-8 – Resolution 8: *Promotion of technical co-operation with regard to the GMDSS*

Other resolutions

Annex 1-9 – Resolution MSC.27(61): *Adoption of amendments to the International Convention for the Safety of Life at Sea, 1974 (adopted on 11 December 1992)*

Annex: *Amendments to the International Convention for the Safety of Life at Sea, 1974,*

Annex 1-10 – Resolution 1 of the Conference of Contracting Governments to the International Convention for the Safety of Life at Sea, 1974 (adopted on 29 November 1995): *Adoption of amendments to the annex to the International Convention for the Safety of Life at Sea, 1974*

Annex: *Amendments to the annex to the International Convention for the Safety of Life at Sea, 1974*

Annex 1-11 – Resolution MSC.47(66): *Adoption of amendments to the International Convention for the Safety of Life at Sea, 1974 (adopted on 4 June 1996)*

Annex: *Amendments to the International Convention for the Safety of Life at Sea, 1974*

Annex 1-12 – Resolution MSC.69(69): *Adoption of amendments to the International Convention for the Safety of Life at Sea, 1974, as amended (adopted on 18 May 1998)*

Annex: *Amendments to the International Convention for the Safety of Life at Sea, 1974, as amended*

Annex 1-1
Resolution 1 of the 1988 GMDSS Conference:
Adoption of amendments to the International Convention for the Safety of Life at Sea, 1974, concerning radiocommunications for the global maritime distress and safety system

THE CONFERENCE,

NOTING article VIII(c) of the International Convention for the Safety of Life at Sea, 1974 (hereinafter referred to as "the Convention"), concerning the procedure for amending the Convention by a Conference of Contracting Governments,

HAVING CONSIDERED amendments to the Convention concerning radiocommunications proposed and circulated to the Members of the Organization and all Contracting Governments to the Convention,

1. ADOPTS, in accordance with article VIII(c)(ii) of the Convention, amendments to chapters I, II-1, III, IV, V of, and the appendix to the Convention, the texts of which are given in the annex to the present resolution;

2. DECIDES, in accordance with article VIII(c)(iii), that the amendments shall be deemed to have been accepted and shall enter into force in accordance with the following procedures:

(a) The amendments shall be deemed to have been accepted on 1 February 1990, unless by that date one third of the Contracting Governments, or Contracting Governments the combined merchant fleets of which constitute not less than fifty per cent of the gross tonnage of the world's merchant fleet, notify the Secretary-General of the Organization that they object to the amendments;

(b) The amendments which are deemed to have been accepted in accordance with paragraph (a) shall enter into force with respect to all Contracting Governments except those which have objected to the amendments under paragraph (a) and which have not withdrawn such objections, on 1 February 1992.

Annex to resolution 1
*Amendments to the International Convention for the Safety of Life at Sea, 1974, concerning radiocommunications for the global maritime distress and safety system**

CHAPTER I
General provisions

Part B
Surveys and certificates

Regulation 7
Surveys of passenger ships

(a) A passenger ship shall be subjected to the surveys specified below:

(i) A survey before the ship is put in service.

(ii) A periodical survey once every twelve months.

(iii) Additional surveys, as occasion arises.

* The base text is taken from the 1992 Consolidated Edition of the 1974 SOLAS Convention, which incorporates the 1981, 1983 and 1989 amendments. The 1988 amendments concerning radiocommunications for the GMDSS are indicated by a small hollow triangle at the beginning (▷) and end (◁) of the amended text or, in the case of extensive amendments, by an opening triangle at the beginning of each amended paragraph or page.

(b) The surveys referred to above shall be carried out as follows:

(i) The survey before the ship is put in service shall include a complete inspection of its structure, machinery and equipment, including the outside of the ship's bottom and the inside and outside of the boilers. This survey shall be such as to ensure that the arrangements, material, and scantlings of the structure, boilers and other pressure vessels and their appurtenances, main and auxiliary machinery, electrical installation, ▷radio installations including those used in life-saving appliances, fire protection, fire safety systems and appliances, life-saving appliances and arrangements, shipborne navigational equipment, nautical publications, means of embarkation for pilots and other equipment◁ fully comply with the requirements of the present regulations, and of the laws, decrees, orders and regulations promulgated as a result thereof by the Administration for ships of the service for which it is intended. The survey shall also be such as to ensure that the workmanship of all parts of the ship and its equipment is in all respects satisfactory, and that the ship is provided with the lights, shapes, means of making sound signals and distress signals as required by the provisions of the present regulations and the International Regulations for Preventing Collisions at Sea in force.

(ii) The periodical survey shall include an inspection of the structure, boilers and other pressure vessels, machinery and equipment, including the outside of the ship's bottom. The survey shall be such as to ensure that the ship, as regards the structure, boilers and other pressure vessels and their appurtenances, main and auxiliary machinery, electrical installation, ▷radio installations including those used in life-saving appliances, fire protection, fire safety systems and appliances, life-saving appliances and arrangements, shipborne navigational equipment, nautical publications, means of embarkation for pilots and other equipment,◁ is in satisfactory condition and fit for the service for which it is intended, and that it complies with the requirements of the present regulations, and of the laws, decrees, orders and regulations promulgated as a result thereof by the Administration. The lights, shapes and means of making sound signals and the distress signals carried by the ship shall also be subject to the above-mentioned survey for the purpose of ensuring that they comply with the requirements of the present regulations and of the International Regulations for Preventing Collisions at Sea in force.

(iii) A survey either general or partial, according to the circumstances, shall be made after a repair resulting from investigations prescribed in regulation 11 of this chapter, or whenever any important repairs or renewals are made. The survey shall be such as to ensure that the necessary repairs or renewals have been effectively made, that the material and workmanship of such repairs or renewals are in all respects satisfactory, and that the ship complies in all respects with the provisions of the present regulations and of the International Regulations for Preventing Collisions at Sea in force, and of the laws, decrees, orders and regulations promulgated as a result thereof by the Administration.

(c) (i) The laws, decrees, orders and regulations referred to in paragraph (b) of this regulation shall be in all respects such as to ensure that, from the point of view of safety of life, the ship is fit for the service for which it is intended.

(ii) They shall among other things prescribe the requirements to be observed as to the initial and subsequent hydraulic or other acceptable alternative tests to which the main and auxiliary boilers, connections, steam pipes, high pressure receivers, and fuel tanks for internal combustion engines are to be submitted including the test procedures to be followed and the intervals between two consecutive tests.

Regulation 8

Surveys of life-saving appliances and other equipment of cargo ships

(a) ▷The life-saving appliances and arrangements (except radio installations), the shipborne navigational equipment, the fire safety systems and appliances and the inert gas system of cargo ships of 500 tons gross tonnage and upwards◁ to which chapters II-1, II-2, III and V apply, shall be subject to initial and subsequent surveys as prescribed for passenger ships in regulation 7 of this chapter with the substitution of 24 months for 12 months in subparagraph (a)(ii) of that regulation. The fire control plans in new ships and ▷means of embarkation of pilots, nautical publications,◁ lights, shapes and means of making sound signals carried by new and existing ships shall be included in the surveys for the purpose of ensuring that they comply fully with the requirements of the present regulations and, where applicable, the International Regulations for Preventing Collisions at Sea in force.*

* Refer to the Record of approved cargo ship safety equipment (SLS.14/Circ.1).

(b) Intermediate surveys shall be made for tankers of ten years of age and over, within three months before or after the anniversary date of the Cargo Ship Safety Equipment Certificate, to ensure that equipment specified in paragraph (a) of this regulation has been maintained in accordance with regulation 11 of this chapter and that it is in good working condition. Such intermediate surveys shall be endorsed on the Cargo Ship Safety Equipment Certificate issued in accordance with regulation 12(a)(iii) of this chapter.*

Regulation 9

▷*Surveys of radio installations of cargo ships*

▷The radio installations of cargo ships, including those used in life-saving appliances, to which chapters III and IV apply, shall be subject to initial and subsequent surveys as provided for passenger ships in regulation 7 of this chapter.◁

Regulation 10

Surveys of hull, machinery and equipment of cargo ships

(a) The hull, machinery and equipment (other than items in respect of which Cargo Ship Safety Equipment Certificates ▷or Cargo Ship Safety Radio Certificates◁ are issued) of a cargo ship shall be surveyed on completion and thereafter in such a manner as the Administration may consider necessary in order to ensure that their condition is in all respects satisfactory and at the following intervals:

(i) at intervals specified by the Administration but not exceeding five years (periodical surveys);

(ii) in addition to such periodical surveys a tanker of 10 years of age and over shall undergo a minimum of one intermediate survey during the period of validity of its Cargo Ship Safety Construction Certificate.* In cases where only one such intermediate survey is carried out in any one certificate validity period, it shall be held not before six months prior to, nor later than six months after, the half-way date of the certificate's period of validity.

(b) The initial and periodical survey shall be such as to ensure that the arrangements, material and scantlings of the structure, boilers and other pressure vessels, their appurtenances, main and auxiliary machinery including steering gear and associated control systems, electrical installation and other equipment are in all respects satisfactory for the service for which the ship is intended. Such surveys shall, in the case of tankers, also include inspection of the outside of the ship's bottom, pump-rooms, cargo and bunker piping systems, vent piping, pressure vacuum valves and flame screens.

(c) The intermediate survey of tankers of 10 years of age and over shall include inspection of steering gear equipment and associated control systems, pump-rooms, cargo and bunker piping systems on deck and in pump-rooms, vent piping, pressure vacuum valves and flame screens, the electrical installations in dangerous zones, and the outside of the ship's bottom.† In addition to the visual inspection of the electrical installation, the insulation resistance of the electrical equipment in dangerous zones is to be tested. If, upon examination, there should be any doubt as to the condition of the piping, extra measures, such as pressure tests and thickness determination, shall be taken as necessary. Such intermediate surveys shall be endorsed on the Cargo Ship Safety Construction Certificate issued in accordance with regulation 12(a)(ii) of this chapter.

(d) A survey, either general or partial according to the circumstances, shall be made when required after an investigation prescribed in regulation 11 of this chapter, or whenever any important repairs or renewals are made. The survey shall be such as to ensure that the necessary repairs or renewals have been effectively made, that the material and workmanship of such repairs or renewals are in all respects satisfactory, and that the ship is fit to proceed to sea without danger to the ship or persons on board.

Regulation 12

Issue of certificates

(a) (i) A certificate called a Passenger Ship Safety Certificate shall be issued after inspection and survey to a passenger ship which complies with the requirements of chapters II-1, II-2, III and IV and any other relevant requirements of the present regulations.

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* Refer to the Guidelines on surveys required by the SOLAS Protocol 1978, the International Bulk Chemical Code and the International Gas Carrier Code (resolution A.560(14)).

† Refer to the circular concerning inspection of the outside of the ship's bottom (PSLS.2/Circ.5).

(ii) A certificate called a Cargo Ship Safety Construction Certificate* shall be issued after survey to a cargo ship which satisfies the requirements for cargo ships on survey set out in regulation 10 of this chapter and complies with the applicable requirements of chapters II-1 and II-2 other than those relating to fire-extinguishing appliances and fire control plans.

(iii) A certificate called a Cargo Ship Safety Equipment Certificate* shall be issued after inspection to a cargo ship which complies with the relevant requirements of chapters II-1, II-2 and III and any other relevant requirements of the present regulations.

▷ (iv) A certificate called a Cargo Ship Safety Radio Certificate shall be issued to a cargo ship which complies with the requirements of chapter IV and any other relevant requirements of the present regulations.

▷ (v) The Passenger Ship Safety Certificate, the Cargo Ship Safety Equipment Certificate and the Cargo Ship Safety Radio Certificate, referred to in subparagraphs (i), (iii) and (iv), shall be supplemented by a Record of Equipment adopted by the Conference of Contracting Governments to the International Convention for the Safety of Life at Sea, 1974, on the Global Maritime Distress and Safety System, 1988, by resolution 2 as it may be amended.◁

(vi) When an exemption is granted to a ship under and in accordance with the provisions of the present regulations, a certificate called an Exemption Certificate shall be issued in addition to the certificates prescribed in this paragraph.

(vii) Passenger Ship Safety Certificates, Cargo Ship Safety Construction Certificates, Cargo Ship Safety Equipment Certificates, ▷Cargo Ship Safety Radio Certificates◁ and Exemption Certificates shall be issued either by the Administration or by any person or organization duly authorized by it. In every case, that Administration assumes full responsibility for the certificate.

▷(b) Notwithstanding any other provisions of the present Convention, any certificate which is issued under, and in accordance with, the provisions of the Convention and which is current on 1 February 1992 shall remain valid until it expires.◁

(c) A Contracting Government shall not issue certificates under, and in accordance with, the provisions of the International Convention for the Safety of Life at Sea, 1960, 1948 or 1929, after the date on which acceptance of the present Convention by the Government takes effect.

Regulation 14

Duration and validity of certificates†

(a) Certificates other than the Cargo Ship Safety Construction Certificate, the Cargo Ship Safety Equipment Certificate and any Exemption Certificate shall be issued for a period not exceeding 12 months. The Cargo Ship Safety Construction Certificate shall be issued for a period not exceeding five years. The Cargo Ship Safety Equipment Certificate shall be issued for a period not exceeding 24 months. Exemption Certificates shall not be valid for longer than the period of the certificates to which they refer.

(b) No extension of the five-year period of validity of the Cargo Ship Safety Construction Certificate shall be permitted.

(c) If a survey takes place within two months before the end of the period for which a ▷Cargo Ship Safety Radio Certificate◁ issued in respect of cargo ships of 300 tons gross tonnage and upwards, but less than 500 tons gross tonnage, was originally issued, that certificate may be withdrawn, and a new certificate may be issued which shall expire 12 months after the end of the said period.

(d) If the ship at the time when a certificate, other than that referred to in paragraph (b) of this regulation, expires is not in a port of the State whose flag it is entitled to fly or in which it is to be surveyed, the Administration may extend the certificate, but such extension shall be granted only for the purpose of allowing the ship to complete its voyage to the State whose flag it is entitled to fly or in which it is to be surveyed, and then only in cases where it appears proper and reasonable to do so.

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* Refer to the circular concerning issue of supplements and attachments (PSLS.2/Circ.1).

† Refer to the circular relating to re-validation of certificates issued under SOLAS 1974 as modified by the SOLAS Protocol 1978 (PSLS.2/Circ.7).

(e) No certificate shall be extended under the provisions of paragraph (d) of this regulation for a longer period than five months, and a ship to which an extension is granted shall not, on its arrival in the State whose flag it is entitled to fly or the port in which it is to be surveyed, be entitled by virtue of such extension to leave that port or State without having obtained a new certificate.

(f) A certificate, other than that referred to in paragraph (b) of this regulation, which has not been extended under the foregoing provisions of this regulation, may be extended by the Administration for a period of grace up to one month from the date of expiry stated on it.

(g) A certificate shall cease to be valid:

(i) if the inspections and surveys are not carried out within the periods specified under regulations 7(a), 8, 9 and 10(a) of this chapter or as they may have been extended in accordance with paragraphs (d), (e) or (f) of this regulation, or

(ii) upon transfer of the ship to the flag of another Government. A new certificate shall only be issued when the Government issuing the new certificate is fully satisfied that the ship is in compliance with the requirements of regulation 11(a) and (b) of this chapter. In the case of a transfer between Parties, if requested within three months after the transfer has taken place, the Government of the Party whose flag the ship was formerly entitled to fly shall, as soon as possible, transmit to the Administration copies of the certificates carried by the ship before the transfer and, if available, copies of the relevant survey reports.

CHAPTER II-1
Construction – subdivision and stability, machinery and electrical installations

Part D
Electrical installations

Regulation 42
Emergency source of electrical power in passenger ships

(Paragraphs 2.6.1 and 4.2 of this regulation apply to ships constructed on or after 1 February 1992)

1.1 A self-contained emergency source of electrical power shall be provided.

1.2 The emergency source of electrical power, associated transforming equipment, if any, transitional source of emergency power, emergency switchboard and emergency lighting switchboard shall be located above the uppermost continuous deck and shall be readily accessible from the open deck. They shall not be located forward of the collision bulkhead.

1.3 The location of the emergency source of electrical power and associated transforming equipment, if any, the transitional source of emergency power, the emergency switchboard and the emergency electric lighting switchboards in relation to the main source of electrical power, associated transforming equipment, if any, and the main switchboard shall be such as to ensure to the satisfaction of the Administration that a fire or other casualty in spaces containing the main source of electrical power, associated transforming equipment, if any, and the main switchboard or in any machinery space of category A will not interfere with the supply, control and distribution of emergency electrical power. As far as practicable, the space containing the emergency source of electrical power, associated transforming equipment, if any, the transitional source of emergency electrical power and the emergency switchboard shall not be contiguous to the boundaries of machinery spaces of category A or those spaces containing the main source of electrical power, associated transforming equipment, if any, or the main switchboard.

1.4 Provided that suitable measures are taken for safeguarding independent emergency operation under all circumstances, the emergency generator may be used exceptionally, and for short periods, to supply non-emergency circuits.

2 The electrical power available shall be sufficient to supply all those services that are essential for safety in an emergency, due regard being paid to such services as may have to be operated simultaneously. The emergency source of electrical power shall be capable, having regard to starting currents and the transitory nature of certain loads, of supplying simultaneously at least the following services for the periods specified hereinafter, if they depend upon an electrical source for their operation:

2.1 For a period of 36 h, emergency lighting:

.1 at every muster and embarkation station and over the sides as required by regulations III/11.4 and III/15.7;

.2 in alleyways, stairways and exits giving access to the muster and embarkation stations, as required by regulation III/11.5;

.3 in all service and accommodation alleyways, stairways and exits, personnel lift cars;

.4 in the machinery spaces and main generating stations including their control positions;

.5 in all control stations, machinery control rooms, and at each main and emergency switchboard;

.6 at all stowage positions for firemen's outfits;

.7 at the steering gear; and

.8 at the fire pump, the sprinkler pump and the emergency bilge pump referred to in paragraph 2.4 and at the starting position of their motors.

▷2.2 For a period of 36 h:

▷ .1 the navigation lights and other lights required by the International Regulations for Preventing Collisions at Sea in force; and

▷ .2 on ships constructed on or after 1 February 1995, the VHF radio installation required by regulation IV/7.1.1 and IV/7.1.2; and, if applicable:

▷ .2.1 the MF radio installation required by regulations IV/9.1.1, IV/9.1.2, IV/10.1.2 and IV/10.1.3;

▷ .2.2 the ship earth station required by regulation IV/10.1.1; and

▷ .2.3 the MF/HF radio installation required by regulations IV/10.2.1, IV/10.2.2 and IV/11.1.◁

2.3 For a period of 36 h:

.1 all internal communication equipment required in an emergency;

.2 ▷the shipborne navigational equipment◁ as required by regulation V/12; where such provision is unreasonable or impracticable the Administration may waive this requirement for ships of less than 5,000 tons gross tonnage;

.3 the fire detection and fire alarm system, and the fire door holding and release system; and

.4 for intermittent operation of the daylight signalling lamp, the ship's whistle, the manually operated call points, and all internal signals that are required in an emergency;

unless such services have an independent supply for the period of 36 h from an accumulator battery suitably located for use in an emergency.

2.4 For a period of 36 h:

.1 one of the fire pumps required by regulation II-2/4.3.1 and 4.3.3;

.2 the automatic sprinkler pump, if any; and

.3 the emergency bilge pump and all the equipment essential for the operation of electrically powered remote controlled bilge valves.

2.5 For the period of time required by regulation 29.14 the steering gear if required to be so supplied by that regulation.

2.6 For a period of half an hour:

.1 any watertight doors required by regulation 15 to be power-operated together with their indicators and warning signals;

.2 the emergency arrangements to bring the lift cars to deck level for the escape of persons. The passenger lift cars may be brought to deck level sequentially in an emergency.

2.7 In a ship engaged regularly on voyages of short duration, the Administration if satisfied that an adequate standard of safety would be attained may accept a lesser period than the 36 h period specified in paragraphs 2.1 to 2.5 but not less than 12 h.

3 The emergency source of electrical power may be either a generator or an accumulator battery, which shall comply with the following:

3.1 Where the emergency source of electrical power is a generator, it shall be:

.1 driven by a suitable prime mover with an independent supply of fuel having a flashpoint (closed cup test) of not less than 43°C;

.2 started automatically upon failure of the electrical supply from the main source of electrical power and shall be automatically connected to the emergency switchboard; those services referred to in paragraph 4 shall then be transferred automatically to the emergency generating set. The automatic starting system and the characteristic of the prime mover shall be such as to permit the emergency generator to carry its full rated load as quickly as is safe and practicable, subject to a maximum of 45 s; unless a second independent means of starting the emergency generating set is provided, the single source of stored energy shall be protected to preclude its complete depletion by the automatic starting system; and

.3 provided with a transitional source of emergency electrical power according to paragraph 4.

3.2 Where the emergency source of electrical power is an accumulator battery, it shall be capable of:

.1 carrying the emergency electrical load without recharging while maintaining the voltage of the battery throughout the discharge period within 12% above or below its nominal voltage;

.2 automatically connecting to the emergency switchboard in the event of failure of the main source of electrical power; and

.3 immediately supplying at least those services specified in paragraph 4.

4 The transitional source of emergency electrical power required by paragraph 3.1.3 shall consist of an accumulator battery suitably located for use in an emergency which shall operate without recharging while maintaining the voltage of the battery throughout the discharge period within 12% above or below its nominal voltage and be of sufficient capacity and so arranged as to supply automatically in the event of failure of either the main or emergency source of electrical power at least the following services, if they depend upon an electrical source for their operation:

4.1 For half an hour:

.1 ▷the lighting required by paragraphs 2.1 and 2.2.1;◁

.2 all services required by paragraphs 2.3.1, 2.3.3 and 2.3.4 unless such services have an independent supply for the period specified from an accumulator battery suitably located for use in an emergency.

4.2 Power to operate the watertight doors, as required by regulation 15.7.3.3, but not necessarily all of them simultaneously, unless an independent temporary source of stored energy is provided. Power to the control, indication and alarm circuits as required by regulation 15.7.2 for half an hour.

5.1 The emergency switchboard shall be installed as near as is practicable to the emergency source of electrical power.

5.2 Where the emergency source of electrical power is a generator, the emergency switchboard shall be located in the same space unless the operation of the emergency switchboard would thereby be impaired.

5.3 No accumulator battery fitted in accordance with this regulation shall be installed in the same space as the emergency switchboard. An indicator shall be mounted in a suitable place on the main switchboard or in the machinery control room to indicate when the batteries constituting either the emergency source of electrical power or the transitional source of emergency electrical power referred to in paragraph 3.1.3 or 4 are being discharged.

5.4 The emergency switchboard shall be supplied during normal operation from the main switchboard by an interconnector feeder which is to be adequately protected at the main switchboard against overload and short circuit and which is to be disconnected automatically at the emergency switchboard upon failure of the main source of electrical power. Where the system is arranged for feedback operation, the interconnector feeder is also to be protected at the emergency switchboard at least against short circuit

5.5 In order to ensure ready availability of the emergency source of electrical power, arrangements shall be made where necessary to disconnect automatically non-emergency circuits from the emergency switchboard to ensure that power shall be available to the emergency circuits.

6 The emergency generator and its prime mover and any emergency accumulator battery shall be so designed and arranged as to ensure that they will function at full rated power when the ship is upright and when inclined at any angle of list up to 22.5° or when inclined up to 10° either in the fore or aft direction, or is in any combination of angles within those limits.

7 Provision shall be made for the periodic testing of the complete emergency system and shall include the testing of automatic starting arrangements.

Regulation 43

Emergency source of electrical power in cargo ships

1.1 A self-contained emergency source of electrical power shall be provided.

1.2 The emergency source of electrical power, associated transforming equipment, if any, transitional source of emergency power, emergency switchboard and emergency lighting switchboard shall be located above the uppermost continuous deck and shall be readily accessible from the open deck. They shall not be located forward of the collision bulkhead, except where permitted by the Administration in exceptional circumstances.

1.3 The location of the emergency source of electrical power, associated transforming equipment, if any, the transitional source of emergency power, the emergency switchboard and the emergency lighting switchboard in relation to the main source of electrical power, associated transforming equipment, if any, and the main switchboard shall be such as to ensure to the satisfaction of the Administration that a fire or other casualty in the space containing the main source of electrical power, associated transforming equipment, if any, and the main switchboard, or in any machinery space of category A will not interfere with the supply, control and distribution of emergency electrical power. As far as practicable the space containing the emergency source of electrical power, associated transforming equipment, if any, the transitional source of emergency electrical power and the emergency switchboard shall not be contiguous to the boundaries of machinery spaces of category A or those spaces containing the main source of electrical power, associated transforming equipment, if any, and the main switchboard.

1.4 Provided that suitable measures are taken for safeguarding independent emergency operation under all circumstances, the emergency generator may be used, exceptionally, and for short periods, to supply non-emergency circuits.

2 The electrical power available shall be sufficient to supply all those services that are essential for safety in an emergency, due regard being paid to such services as may have to be operated simultaneously. The emergency source of electrical power shall be capable, having regard to starting currents and the transitory nature of certain loads, of supplying simultaneously at least the following services for the periods specified hereinafter, if they depend upon an electrical source for their operation:

2.1 For a period of 3 h, emergency lighting at every muster and embarkation station and over the sides as required by regulations III/11.4 and III/15.7.

2.2 For a period of 18 h, emergency lighting:

.1 in all service and accommodation alleyways, stairways and exits, personnel lift cars and personnel lift trunks;

.2 in the machinery spaces and main generating stations including their control positions;

.3 in all control stations, machinery control rooms, and at each main and emergency switchboard;

.4 at all stowage positions for firemen's outfits;

.5 at the steering gear; and

.6 at the fire pump referred to in paragraph 2.5, at the sprinkler pump, if any, and at the emergency bilge pump, if any, and at the starting positions of their motors.

▷2.3 For a period of 18 h:

▷ .1 the navigation lights and other lights required by the International Regulations for Preventing Collisions at Sea in force;

▷ .2 on ships constructed on or after 1 February 1995 the VHF radio installation required by regulation IV/7.1.1 and IV/7.1.2; and, if applicable:

▷ .2.1 the MF radio installation required by regulations IV/9.1.1, IV/9.1.2, IV/10.1.2 and IV/10.1.3;

▷ .2.2 the ship earth station required by regulation IV/10.1.1; and

▷ .2.3 the MF/HF radio installation required by regulations IV/10.2.1, IV/10.2.2 and IV/11.1.◁

2.4 For a period of 18 h:

.1 all internal communication equipment as required in an emergency;

.2 ▷the shipborne navigational equipment◁ as required by regulation V/12; where such provision is unreasonable or impracticable the Administration may waive this requirement for ships of less than 5,000 tons gross tonnage;

.3 the fire detection and fire alarm system; and

.4 intermittent operation of the daylight signalling lamp, the ship's whistle, the manually operated call points and all internal signals that are required in an emergency;

unless such services have an independent supply for the period of 18 h from an accumulator battery suitably located for use in an emergency.

2.5 For a period of 18 h one of the fire pumps required by regulation II-2/4.3.1 and 4.3.3 if dependent upon the emergency generator for its source of power.

2.6.1 For the period of time required by regulation 29.14 the steering gear where it is required to be so supplied by that regulation.

2.6.2 In a ship engaged regularly in voyages of short duration, the Administration if satisfied that an adequate standard of safety would be attained may accept a lesser period than the 18 h period specified in paragraphs 2.2 to 2.5 but not less than 12 h.

3 The emergency source of electrical power may be either a generator or an accumulator battery, which shall comply with the following:

3.1 Where the emergency source of electrical power is a generator, it shall be:

.1 driven by a suitable prime mover with an independent supply of fuel, having a flashpoint (closed cup test) of not less than 43°C;

.2 started automatically upon failure of the main source of electrical power supply unless a transitional source of emergency electrical power in accordance with paragraph 3.1.3 is provided; where the emergency generator is automatically started, it shall be automatically connected to the emergency switchboard; those services referred to in paragraph 4 shall then be connected automatically to the emergency generator; and unless a second independent means of starting the emergency generator is provided the single source of stored energy shall be protected to preclude its complete depletion by the automatic starting system; and

.3 provided with a transitional source of emergency electrical power as specified in paragraph 4 unless an emergency generator is provided capable both of supplying the services mentioned in that paragraph and of being automatically started and supplying the required load as quickly as is safe and practicable subject to a maximum of 45 s.

3.2 Where the emergency source of electrical power is an accumulator battery it shall be capable of:

.1 carrying the emergency electrical load without recharging while maintaining the voltage of the battery throughout the discharge period within 12% above or below its nominal voltage;

.2 automatically connecting to the emergency switchboard in the event of failure of the main source of electrical power; and

.3 immediately supplying at least those services specified in paragraph 4.

4 The transitional source of emergency electrical power where required by paragraph 3.1.3 shall consist of an accumulator battery suitably located for use in an emergency which shall operate without recharging while maintaining the voltage of the battery throughout the discharge period within 12% above or below its nominal voltage and be of sufficient capacity and shall be so arranged as to supply automatically in the event of failure of either the main or the emergency source of electrical power for half an hour at least the following services if they depend upon an electrical source for their operation:

.1 ▷the lighting required by paragraphs 2.1, 2.2 and 2.3.1.◁ For this transitional phase, the required emergency electric lighting, in respect of the machinery space and accommodation and service spaces may be provided by permanently fixed, individual, automatically charged, relay operated accumulator lamps; and

.2 all services required by paragraphs 2.4.1, 2.4.3 and 2.4.4 unless such services have an independent supply for the period specified from an accumulator battery suitably located for use in an emergency.

5.1 The emergency switchboard shall be installed as near as is practicable to the emergency source of electrical power.

5.2 Where the emergency source of electrical power is a generator, the emergency switchboard shall be located in the same space unless the operation of the emergency switchboard would thereby be impaired.

5.3 No accumulator battery fitted in accordance with this regulation shall be installed in the same space as the emergency switchboard. An indicator shall be mounted in a suitable place on the main switchboard or in the machinery control room to indicate when the batteries constituting either the emergency source of electrical power or the transitional source of electrical power referred to in paragraph 3.2 or 4 are being discharged.

5.4 The emergency switchboard shall be supplied during normal operation from the main switchboard by an interconnector feeder which is to be adequately protected at the main switchboard against overload and short circuit and which is to be disconnected automatically at the emergency switchboard upon failure of the main source of electrical power. Where the system is arranged for feedback operation, the interconnector feeder is also to be protected at the emergency switchboard at least against short circuit.

5.5 In order to ensure ready availability of the emergency source of electrical power, arrangements shall be made where necessary to disconnect automatically non-emergency circuits from the emergency switchboard to ensure that electrical power shall be available automatically to the emergency circuits.

6 The emergency generator and its prime mover and any emergency accumulator battery shall be so designed and arranged as to ensure that they will function at full rated power when the ship is upright and when inclined at any angle of list up to 22.5° or when inclined up to 10° either in the fore or aft direction, or is in any combination of angles within those limits.

7 Provision shall be made for the periodic testing of the complete emergency system and shall include the testing of automatic starting arrangements.

CHAPTER III
Life-saving appliances and arrangements

Part A
General

Regulation 1
Application

1 Unless expressly provided otherwise, this chapter shall apply to ships the keels of which are laid or which are at a similar stage of construction on or after 1 July 1986.

2 For the purpose of this chapter, the term *a similar stage of construction* means the stage at which:

.1 construction identifiable with a specific ship begins; and

.2 assembly of that ship has commenced comprising at least 50 tonnes or 1% of the estimated mass of all structural material, whichever is less.

3 For the purpose of this chapter:

.1 the expression *ships constructed* means ships the keels of which are laid or which are at a similar stage of construction;

.2 the expression *all ships* means ships constructed before, on or after 1 July 1986; the expressions *all passenger ships* and *all cargo ships* shall be construed accordingly;

.3 a cargo ship, whenever built, which is converted to a passenger ship shall be treated as a passenger ship constructed on the date on which such a conversion commences.

4 For ships constructed before 1 July 1986, the Administration shall:

.1 ensure that, subject to the provisions of paragraph 4.2 and 4.3, the requirements which are applicable under chapter III of the International Convention for the Safety of Life at Sea, 1974, in force prior to 1 July 1986 to new or existing ships as prescribed by that chapter are complied with;

.2 consider the life-saving appliances and arrangements in ships which do not comply with the requirements referred to in paragraph 4.1, with a view to securing, so far as this is reasonable and practicable and as early as possible, substantial compliance with those requirements;

.3 ensure that when life-saving appliances or arrangements on such ships are replaced or such ships undergo repairs, alterations or modifications of a major character which involve replacement of, or any addition to, their existing life-saving appliances or arrangements, such life-saving appliances or arrangements, in so far as is reasonable and practicable, comply with the requirements of this chapter. However, if a survival craft is replaced without replacing its launching appliance, or vice versa, the survival craft or launching appliance may be of the same type as that replaced;

.4 approve the life-saving appliances to be provided in compliance with paragraph 6. The Administration may permit those life-saving appliances provided on board ships prior to 1 July 1991 not to comply fully with the requirements of this chapter as long as they remain in a satisfactory condition;

.5 except as provided for survival craft and launching appliances referred to in paragraph 4.3, ensure that life-saving appliances replaced or installed on or after 1 July 1991 are evaluated, tested and approved in accordance with the requirements of regulations 4 and 5.

▷5 With respect to ships constructed before 1 July 1986, the requirements of regulations 8, 9, 10, 18, 21.3, 21.4, 25, 26.3, 27.2, 27.3 and 30.2.7 and, to the extent prescribed therein, regulation 19 shall apply.

▷6 With respect to ships constructed before 1 February 1992, regulation 6.2 shall apply not later than 1 February 1995.◁

Part B

Ship requirements

SECTION I – PASSENGER SHIPS AND CARGO SHIPS

Regulation 6
Communications

▷1 Paragraph 2 applies to all passenger ships and to all cargo ships of 300 tons gross tonnage and upwards. With respect to ships constructed before 1 February 1992, paragraph 2 shall apply not later than 1 February 1995. However, ships other than cargo ships of 300 tons gross tonnage and upwards but less than 500 tons gross tonnage which do not comply with paragraph 2 shall comply with all applicable requirements* of chapter III of the International Convention for the Safety of Life at Sea, 1974, in force prior to 1 February 1992.◁

▷2 Radio life-saving appliances

▷2.1 *Two-way VHF radiotelephone apparatus*

▷2.1.1 At least three two-way VHF radiotelephone apparatus shall be provided on every passenger ship and on every cargo ship of 500 tons gross tonnage and upwards. At least two two-way VHF radiotelephone apparatus shall be provided on every cargo ship of 300 tons gross tonnage and upwards but less than 500 tons gross tonnage. Such apparatus shall conform to performance standards not inferior to those adopted by the Organization.† If a fixed two-way VHF radiotelephone apparatus is fitted in a survival craft it shall conform to performance standards not inferior to those adopted by the Organization.†

▷2.1.2 Two-way VHF radiotelephone apparatus provided on board ships prior to 1 February 1992 and not complying fully with the performance standards adopted by the Organization may be accepted by the Administration until 1 February 1999 provided the Administration is satisfied that they are compatible with approved two-way VHF radiotelephone apparatus.

▷2.2 *Radar transponders*

▷At least one radar transponder shall be carried on each side of every passenger ship and of every cargo ship of 500 tons gross tonnage and upwards. At least one radar transponder shall be carried on every cargo ship of 300 tons gross tonnage and upwards but less than 500 tons gross tonnage. Such radar transponders shall conform to performance standards not inferior to those adopted by the Organization.‡ The radar transponders§ shall be stowed in such locations that they can be rapidly placed in any survival craft other than the liferaft or liferafts required by regulation 26.1.4. Alternatively, one radar transponder shall be stowed in each survival craft other than those required by regulation 26.1.4.◁

3 Distress flares

Not less than 12 rocket parachute flares, complying with the requirements of regulation 35, shall be carried and be stowed on or near the navigating bridge.

4 On-board communications and alarm systems

4.1 An emergency means comprising either fixed or portable equipment or both shall be provided for two-way communications between emergency control stations, muster and embarkation stations and strategic positions on board.

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* Regulations III/6.2.3 and 6.2.4 and, as applicable, regulations III/6.2.1, 6.2.2, 10.6, 38.3.2, 41.7.8 and 42.5 in force prior to 1 February 1992 (1983 SOLAS amendments). See also resolution 4 of the 1988 GMDSS Conference (see annex 1-4).

† Refer to the Recommendation on Performance Standards for Survival Craft Portable Two-Way VHF Radiotelephone Apparatus, adopted by the Organization by resolution A.809(19) (see annex 3-6-2).

‡ Refer to the Recommendation on Performance Standards for Survival Craft Radar Transponders for Use in Search and Rescue Operations, adopted by the Organization by resolution A.802(19) (see annex 3-6-1).

§ One of these radar transponders may be the radar transponder required by regulation IV/7.1.3.

4.2 A general emergency alarm system complying with the requirements of regulation 50 shall be provided and shall be used for summoning passengers and crew to muster stations and to initiate the actions included in the muster list. The system shall be supplemented by either a public address system or other suitable means of communication.

Regulation 10
Manning of survival craft and supervision

1 This regulation applies to all ships.

2 There shall be a sufficient number of trained persons on board for mustering and assisting untrained persons.

3 There shall be a sufficient number of crew members, who may be deck officers or certificated persons, on board for operating the survival craft and launching arrangements required for abandonment by the total number of persons on board.

4 A deck officer or certificated person shall be placed in charge of each survival craft to be used. However, the Administration, having due regard to the nature of the voyage, the number of persons on board and the characteristics of the ship, may permit persons practised in the handling and operation of liferafts to be placed in charge of liferafts in lieu of persons qualified as above. A second-in-command shall also be nominated in the case of lifeboats.

5 The person in charge of the survival craft shall have a list of the survival craft crew and shall see that the crew under his command are acquainted with their duties. In lifeboats the second-in-command shall also have a list of the lifeboat crew.

▷6◁ Every motorized survival craft shall have a person assigned who is capable of operating the engine and carrying out minor adjustments.

▷7◁ The master shall ensure the equitable distribution of persons referred to in paragraphs 2, 3 and 4 among the ship's survival craft.

Part C
Life-saving appliance requirements

SECTION IV – SURVIVAL CRAFT

Regulation 38
General requirements for liferafts

(. . .)

3 Liferaft fittings

3.1 Lifelines shall be securely becketed around the inside and outside of the liferaft.

▷3.2◁ The liferaft shall be fitted with an efficient painter of length equal to not less than twice the distance from the stowed position to the waterline in the lightest seagoing condition or 15 m whichever is the greater.

4 Davit-launched liferafts

4.1 In addition to the above requirements, a liferaft for use with an approved launching appliance shall:

.1 when the liferaft is loaded with its full complement of persons and equipment, be capable of withstanding a lateral impact against the ship's side at an impact velocity of not less than 3.5 m/s and also a drop into the water from a height of not less than 3 m without damage that will affect its function;

.2 be provided with means for bringing the liferaft alongside the embarkation deck and holding it securely during embarkation.

4.2 Every passenger ship davit-launched liferaft shall be so arranged that it can be rapidly boarded by its full complement of persons.

4.3 Every cargo ship davit-launched liferaft shall be so arranged that it can be boarded by its full complement of persons in not more than 3 min from the time the instruction to board is given.

5 Equipment

5.1 The normal equipment of every liferaft shall consist of:

.1 one buoyant rescue quoit, attached to not less than 30 m of buoyant line;

.2 one knife of the non-folding type having a buoyant handle and lanyard attached and stowed in a pocket on the exterior of the canopy near the point at which the painter is attached to the liferaft. In addition, a liferaft which is permitted to accommodate 13 persons or more shall be provided with a second knife which need not be of the non-folding type;

.3 for a liferaft which is permitted to accommodate not more than 12 persons, one buoyant bailer. For a liferaft which is permitted to accommodate 13 persons or more, two buoyant bailers;

.4 two sponges;

.5 two sea-anchors each with a shock-resistant hawser and tripping line, one being spare and the other permanently attached to the liferaft in such a way that when the liferaft inflates or is waterborne it will cause the liferaft to lie oriented to the wind in the most stable manner. The strength of each sea-anchor and its hawser and tripping line shall be adequate for all sea conditions. The sea-anchors shall be fitted with a swivel at each end of the line and shall be of a type which is unlikely to turn inside-out between its shroud lines;

.6 two buoyant paddles;

.7 three tin-openers (safety knives containing special tin-opener blades are satisfactory for this requirement);

.8 one first-aid outfit in a waterproof case capable of being closed tightly after use;

.9 one whistle or equivalent sound signal;

.10 four rocket parachute flares complying with the requirements of regulation 35;

.11 six hand flares complying with the requirements of regulation 36;

.12 two buoyant smoke signals complying with the requirements of regulation 37;

.13 one waterproof electric torch suitable for Morse signalling, together with one spare set of batteries and one spare bulb in a waterproof container;

▷ .14 an efficient radar reflector, unless a survival craft radar transponder is stowed in the liferaft;◁

.15 one daylight signalling mirror with instructions on its use for signalling to ships and aircraft;

.16 one copy of the life-saving signals referred to in regulation V/16 on a waterproof card or in a waterproof container;

.17 one set of fishing tackle;

.18 a food ration totalling not less than 10,000 kJ for each person the liferaft is permitted to accommodate; these rations shall be kept in airtight packaging and be stowed in a watertight container;

.19 watertight receptacles containing a total of 1.5 *l* of fresh water for each person the liferaft is permitted to accommodate, of which 0.5 *l* per person may be replaced by a de-salting apparatus capable of producing an equal amount of fresh water in 2 days;

.20 one rustproof graduated drinking vessel;

.21 six doses of anti-seasickness medicine and one seasickness bag for each person the liferaft is permitted to accommodate;

.22 instructions on how to survive;

.23 instructions for immediate action;

.24 thermal protective aids complying with the requirements of regulation 34 sufficient for 10% of the number of persons the liferaft is permitted to accommodate or two, whichever is the greater.

5.2 The marking required by regulations 39.7.3.5 and 40.7.7 on liferafts equipped in accordance with paragraph 5.1 shall be SOLAS A PACK in block capitals of the Roman alphabet.

5.3 In the case of passenger ships engaged on short international voyages of such a nature and duration that, in the opinion of the Administration, not all the items specified in paragraph 5.1 are necessary, the Administration may allow the liferafts carried on any such ships to be provided with the equipment specified in paragraphs 5.1.1 to 5.1.6 inclusive, 5.1.8, 5.1.9, 5.1.13 to 5.1.16 inclusive and 5.1.21 to 5.1.24 inclusive and one half of the equipment specified in paragraphs 5.1.10 to 5.1.12 inclusive. The marking required by regulations 39.7.3.5 and 40.7.7 on such liferaft shall be SOLAS B PACK in block capitals of the Roman alphabet.

5.4 Where appropriate the equipment shall be stowed in a container which, if it is not an integral part of, or permanently attached to, the liferaft, shall be stowed and secured inside the liferaft and be capable of floating in water for at least 30 min without damage to its contents.

(. . .)

Regulation 41
General requirements for lifeboats

(. . .)

7 Lifeboat fittings

7.1 All lifeboats shall be provided with at least one drain valve fitted near the lowest point in the hull, which shall automatically open to drain water from the hull when the lifeboat is not waterborne and shall automatically close to prevent entry of water when the lifeboat is waterborne. Each drain valve shall be provided with a cap or plug to close the valve, which shall be attached to the lifeboat by a lanyard, a chain, or other suitable means. Drain valves shall be readily accessible from inside the lifeboat and their position shall be clearly indicated.

7.2 All lifeboats shall be provided with a rudder and tiller. When a wheel or other remote steering mechanism is also provided, the tiller shall be capable of controlling the rudder in case of failure of the steering mechanism. The rudder shall be permanently attached to the lifeboat. The tiller shall be permanently installed on, or linked to, the rudder stock; however, if the lifeboat has a remote steering mechanism, the tiller may be removable and securely stowed near the rudder stock. The rudder and tiller shall be so arranged as not to be damaged by operation of the release mechanism or the propeller.

7.3 Except in the vicinity of the rudder and propeller, a buoyant lifeline shall be becketed around the outside of the lifeboat.

7.4 Lifeboats which are not self-righting when capsized shall have suitable handholds on the underside of the hull to enable persons to cling to the lifeboat. The handholds shall be fastened to the lifeboat in such a way that, when subjected to an impact sufficient to cause them to break away from the lifeboat, they break away without damaging the lifeboat.

7.5 All lifeboats shall be fitted with sufficient watertight lockers or compartments to provide for the storage of the small items of equipment, water and provisions required by paragraph 8. Means shall be provided for the storage of collected rainwater.

7.6 Every lifeboat to be launched by a fall or falls shall be fitted with a release mechanism complying with the following requirements:

.1 The mechanism shall be so arranged that all hooks are released simultaneously.

.2 The mechanism shall have two release capabilities as follows:

.2.1 a normal release capability which will release the lifeboat when it is waterborne or when there is no load on the hooks;

.2.2 an on-load release capability which will release the lifeboat with a load on the hooks. This release shall be so arranged as to release the lifeboat under any conditions of loading from no-load with the lifeboat waterborne to a load of 1.1 times the total mass of the lifeboat when loaded with its full

complement of persons and equipment. This release capability shall be adequately protected against accidental or premature use.

.3 The release control shall be clearly marked in a colour that contrasts with its surroundings.

.4 The mechanism shall be designed with a factor of safety of 6 based on the ultimate strength of the materials used, assuming the mass of the lifeboat is equally distributed between the falls.

7.7 Every lifeboat shall be fitted with a release device to enable the forward painter to be released when under tension.

▷7.8 Every lifeboat which is fitted with a fixed two-way VHF radiotelephone apparatus with an antenna which is separately mounted shall be provided with arrangements for siting and securing the antenna effectively in its operating position.◁

7.9 Lifeboats intended for launching down the side of a ship shall have skates and fenders as necessary to facilitate launching and prevent damage to the lifeboat.

7.10 A manually controlled lamp visible on a dark night with a clear atmosphere at a distance of at least 2 miles for a period of not less than 12 h shall be fitted to the top of the cover or enclosure. If the light is a flashing light, it shall initially flash at a rate of not less than 50 flashes per minute over the first 2 h of operation of the 12 h operating period.

7.11 A lamp or source of light shall be fitted inside the lifeboat to provide illumination for not less than 12 h to enable reading of survival and equipment instructions; however, oil lamps shall not be permitted for this purpose.

7.12 Unless expressly provided otherwise, every lifeboat shall be provided with effective means of bailing or be automatically self-bailing.

7.13 Every lifeboat shall be so arranged that an adequate view forward, aft and to both sides is provided from the control and steering position for safe launching and manoeuvring.

8 Lifeboat equipment

All items of lifeboat equipment, whether required by this paragraph or elsewhere in this chapter, with the exception of boat-hooks which shall be kept free for fending off purposes, shall be secured within the lifeboat by lashings, storage in lockers or compartments, storage in brackets or similar mounting arrangements or other suitable means. The equipment shall be secured in such a manner as not to interfere with any abandonment procedures. All items of lifeboat equipment shall be as small and of as little mass as possible and shall be packed in a suitable and compact form. Except where otherwise stated, the normal equipment of every lifeboat shall consist of:

.1 sufficient buoyant oars to make headway in calm seas. Thole pins, crutches or equivalent arrangements shall be provided for each oar provided. Thole pins or crutches shall be attached to the boat by lanyards or chains;

.2 two boat-hooks;

.3 a buoyant bailer and two buckets;

.4 a survival manual;

.5 a binnacle containing an efficient compass which is luminous or provided with suitable means of illumination. In a totally enclosed lifeboat, the binnacle shall be permanently fitted at the steering position; in any other lifeboat, it shall be provided with suitable mounting arrangements;

.6 a sea-anchor of adequate size fitted with a shock-resistant hawser and a tripping line which provides a firm hand grip when wet. The strength of the sea-anchor, hawser and tripping line shall be adequate for all sea conditions;

.7 two efficient painters of a length equal to not less than twice the distance from the stowage position of the lifeboat to the waterline in the lightest seagoing condition or 15 m, whichever is the greater. One painter attached to the release device required by regulation 41.7.7 shall be placed at the forward end of the lifeboat and the other shall be firmly secured at or near the bow of the lifeboat ready for use;

.8 two hatchets, one at each end of the lifeboat;

.9 watertight receptacles containing a total of 3 *l* of fresh water for each person the lifeboat is permitted to accommodate, of which 1 *l* per person may be replaced by a de-salting apparatus capable of producing an equal amount of fresh water in 2 days;

.10 a rustproof dipper with lanyard;

.11 a rustproof graduated drinking vessel;

.12 a food ration totalling not less than 10,000 kJ for each person the lifeboat is permitted to accommodate; these rations shall be kept in airtight packaging and be stowed in a watertight container;

.13 four rocket parachute flares complying with the requirements of regulation 35;

.14 six hand flares complying with the requirements of regulation 36;

.15 two buoyant smoke signals complying with the requirements of regulation 37;

.16 one waterproof electric torch suitable for Morse signalling, together with one spare set of batteries and one spare bulb in a waterproof container;

.17 one daylight signalling mirror with instructions for its use for signalling to ships and aircraft;

.18 one copy of the life-saving signals referred to in regulation V/16 on a waterproof card or in a waterproof container;

.19 one whistle or equivalent sound signal;

.20 a first-aid outfit in a waterproof case capable of being closed tightly after use;

.21 six doses of anti-seasickness medicine and one seasickness bag for each person;

.22 a jack-knife to be kept attached to the boat by a lanyard;

.23 three tin-openers;

.24 two buoyant rescue quoits, attached to not less than 30 m of buoyant line;

.25 a manual pump;

.26 one set of fishing tackle;

.27 sufficient tools for minor adjustments to the engine and its accessories;

.28 portable fire-extinguishing equipment suitable for extinguishing oil fires;

.29 a searchlight capable of effectively illuminating a light-coloured object at night having a width of 18 m at a distance of 180 m for a total period of 6 h and of working for not less than 3 h continuously;

▷ .30 an efficient radar reflector, unless a survival craft radar transponder is stowed in the lifeboat;◁

.31 thermal protective aids complying with the requirements of regulation 34 sufficient for 10% of the number of persons the lifeboat is permitted to accommodate or two, whichever is the greater;

.32 in the case of ships engaged on voyages of such a nature and duration that, in the opinion of the Administration, the items specified in paragraphs 8.12 and 8.26 are unnecessary, the Administration may allow these items to be dispensed with.

9 Lifeboat markings

9.1 The dimensions of the lifeboat and the number of persons which it is permitted to accommodate shall be marked on it in clear permanent characters.

9.2 The name and port of registry of the ship to which the lifeboat belongs shall be marked on each side of the lifeboat's bow in block capitals of the Roman alphabet.

9.3 Means of identifying the ship to which the lifeboat belongs and the number of the lifeboat shall be marked in such a way that they are visible from above.

Regulation 42
Partially enclosed lifeboats

1 Partially enclosed lifeboats shall comply with the requirements of regulation 41 and in addition shall comply with the requirements of this regulation.

2 Every partially enclosed lifeboat shall be provided with effective means of bailing or be automatically self-bailing.

3 Partially enclosed lifeboats shall be provided with permanently attached rigid covers extending over not less than 20% of the length of the lifeboat from the stem and not less than 20% of the length of the lifeboat from the aftermost part of the lifeboat. The lifeboat shall be fitted with a permanently attached foldable canopy which together with the rigid covers completely encloses the occupants of the lifeboat in a weatherproof shelter and protects them from exposure. The canopy shall be so arranged that:

.1 it is provided with adequate rigid sections or battens to permit erection of the canopy;

.2 it can be easily erected by not more than two persons;

.3 it is insulated to protect the occupants against heat and cold by means of not less than two layers of material separated by an air gap or other equally efficient means; means shall be provided to prevent accumulation of water in the air gap;

.4 its exterior is of a highly visible colour and its interior is of a colour which does not cause discomfort to the occupants;

.5 it has entrances at both ends and on each side, provided with efficient adjustable closing arrangements which can be easily and quickly opened and closed from inside or outside so as to permit ventilation but exclude seawater, wind and cold; means shall be provided for holding the entrances securely in the open and closed position;

.6 with the entrances closed, it admits sufficient air for the occupants at all times;

.7 it has means for collecting rainwater;

.8 the occupants can escape in the event of the lifeboat capsizing.

4 The interior of the lifeboat shall be of a highly visible colour.

▷5 If a fixed two-way VHF radiotelephone apparatus is fitted in the lifeboat, it shall be installed in a cabin large enough to accommodate both the equipment and the person using it. No separate cabin is required if the construction of the lifeboat provides a sheltered space to the satisfaction of the Administration.◁

CHAPTER IV
▷Radiocommunications

Part A
General

Regulation 1
Application

1 This chapter applies to all ships to which the present regulations apply and to cargo ships of 300 tons gross tonnage and upwards.

2 This chapter does not apply to ships to which the present regulations would otherwise apply while such ships are being navigated within the Great Lakes of North America and their connecting and tributary waters as far east as the lower exit of the St Lambert Lock at Montreal in the Province of Quebec, Canada.*

* Such ships are subject to special requirements relative to radio for safety purposes, as contained in the relevant agreement between Canada and the United States of America.

▷3 For the purpose of this chapter:

.1 the expression *ships constructed* means ships the keels of which are laid or which are at a similar stage of construction;

.2 the expression *a similar stage of construction* means the stage at which:

.2.1 construction identifiable with a specific ship begins; and

.2.2 assembly of that ship has commenced comprising at least 50 tonnes or 1% of the estimated mass of all structural material, whichever is less.

4 Every ship shall comply with regulations 7.1.4 (NAVTEX) and 7.1.6 (satellite EPIRB) not later than 1 August 1993.

5 Subject to the provisions of paragraph 4, the Administration shall ensure that every ship constructed before 1 February 1995:

.1 during the period between 1 February 1992 and 1 February 1999:

.1.1 either complies with all applicable requirements of this chapter; or

.1.2 complies with all applicable requirements of chapter IV of the International Convention for the Safety of Life at Sea, 1974, in force prior to 1 February 1992; and

.2 after 1 February 1999, complies with all the applicable requirements of this chapter.

6 Every ship constructed on or after 1 February 1995 shall comply with all the applicable requirements of this chapter.

7 No provision in this chapter shall prevent the use by any ship, survival craft or person in distress, of any means at their disposal to attract attention, make known their position and obtain help.

Regulation 2
Terms and definitions

1 For the purpose of this chapter, the following terms shall have the meanings defined below:

.1 *Bridge-to-bridge communications* means safety communications between ships from the position from which the ships are normally navigated.

.2 *Continuous watch* means that the radio watch concerned shall not be interrupted other than for brief intervals when the ship's receiving capability is impaired or blocked by its own communications or when the facilities are under periodical maintenance or checks.

.3 *Digital selective calling (DSC)* means a technique using digital codes which enables a radio station to establish contact with, and transfer information to, another station or group of stations, and complying with the relevant recommendations of the International Radio Consultative Committee (CCIR).

.4 *Direct-printing telegraphy* means automated telegraphy techniques which comply with the relevant recommendations of the International Radio Consultative Committee (CCIR).

.5 *General radiocommunications* means operational and public correspondence traffic, other than distress, urgency and safety messages, conducted by radio.

.6 *INMARSAT* means the Organization established by the Convention on the International Maritime Satellite Organization (INMARSAT) adopted on 3 September 1976.

.7 *International NAVTEX service* means the co-ordinated broadcast and automatic reception on 518 kHz of maritime safety information by means of narrow-band direct-printing telegraphy using the English language.*

.8 *Locating* means the finding of ships, aircraft, units or persons in distress.

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* Refer to the NAVTEX Manual approved by the Organization (see annex 4-2).

▷ .9 *Maritime safety information* means navigational and meteorological warnings, meteorological forecasts and other urgent safety related messages broadcast to ships.

.10 *Polar orbiting satellite service* means a service which is based on polar orbiting satellites which receive and relay distress alerts from satellite EPIRBs and which provides their position.

.11 *Radio Regulations* means the Radio Regulations annexed to, or regarded as being annexed to, the most recent International Telecommunication Convention which is in force at any time.

.12 *Sea area A1* means an area within the radiotelephone coverage of at least one VHF coast station in which continuous DSC alerting is available, as may be defined by a Contracting Government.*

.13 S*ea area A2* means an area, excluding sea area A1, within the radiotelephone coverage of at least one MF coast station in which continous DSC alerting is available, as may be defined by a Contracting Government.**

.14 *Sea area A3* means an area, excluding sea areas A1 and A2, within the coverage of an INMARSAT geostationary satellite in which continuous alerting is available.

.15 *Sea area A4* means an area outside sea areas A1, A2 and A3.

2 All other terms and abbreviations which are used in this chapter and which are defined in the Radio Regulations shall have the meanings as defined in those Regulations.

Regulation 3
Exemptions

1 The Contracting Governments consider it highly desirable not to deviate from the requirements of this chapter; nevertheless the Administration may grant partial or conditional exemptions to individual ships from the requirements of regulations 7 to 11 provided:

.1 such ships comply with the functional requirements of regulation 4; and

.2 the Administration has taken into account the effect such exemptions may have upon the general efficiency of the service for the safety of all ships.

2 An exemption may be granted under paragraph 1 only:

.1 if the conditions affecting safety are such as to render the full application of regulations 7 to 11 unreasonable or unnecessary;

.2 in exceptional circumstances, for a single voyage outside the sea area or sea areas for which the ship is equipped; or

.3 prior to 1 February 1999, when the ship will be taken permanently out of service within two years of a date prescribed by regulation 1 for the application of a requirement of this chapter.

3 Each Administration shall submit to the Organization, as soon as possible after the first of January in each year, a report showing all exemptions granted under paragraphs 1 and 2 during the previous calendar year and giving the reasons for granting such exemptions.

Regulation 4
Functional requirements

1 Every ship, while at sea, shall be capable:

.1 except as provided in regulations 8.1.1 and 10.1.4.3, of transmitting ship-to-shore distress alerts by at least two separate and independent means, each using a different radiocommunication service;

.2 of receiving shore-to-ship distress alerts;

.3 of transmitting and receiving ship-to-ship distress alerts;

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* Refer to resolution A.801(19) concerning the provision of radio services for the global maritime distress and safety system (GMDSS), adopted by the Organization (see annex 2-16).

▷ .4 of transmitting and receiving search and rescue co-ordinating communications;

.5 of transmitting and receiving on-scene communications;

.6 of transmitting and, as required by regulation V/12(g) and (h), receiving signals for locating;*

.7 of transmitting and receiving† maritime safety information;

.8 of transmitting and receiving general radiocommunications to and from shore-based radio systems or networks subject to regulation 15.8; and

.9 of transmitting and receiving bridge-to-bridge communications.

Part B

Undertakings by Contracting Governments‡

Regulation 5

Provision of radiocommunication services

1 Each Contracting Government undertakes to make available, as it deems practical and necessary either individually or in co-operation with other Contracting Governments, appropriate shore-based facilities for space and terrestrial radiocommunication services having due regard to the recommendations of the Organization.§ These services are:

.1 a radiocommunication service utilizing geostationary satellites in the maritime mobile-satellite service;

.2 a radiocommunication service utilizing polar orbiting satellites in the mobile-satellite service;

.3 the maritime mobile service in the bands between 156 MHz and 174 MHz;

.4 the maritime mobile service in the bands between 4,000 kHz and 27,500 kHz; and

.5 the maritime mobile service in the bands between 415 kHz and 535 kHz and between 1,605 kHz and 4,000 kHz.

2 Each Contracting Government undertakes to provide the Organization with pertinent information concerning the shore-based facilities in the maritime mobile service, mobile-satellite service and maritime mobile-satellite service, established for sea areas which it has designated off its coasts.

Part C

Ship requirements

Regulation 6

Radio installations

1 Every ship shall be provided with radio installations capable of complying with the functional requirements prescribed by regulation 4 throughout its intended voyage and, unless exempted under regulation 3, complying with the requirements of regulation 7 and, as appropriate for the sea area or areas through which it will pass during its intended voyage, the requirements of either regulation 8, 9, 10 or 11.

2 Every radio installation shall:

.1 be so located that no harmful interference of mechanical, electrical or other origin affects its proper use, and so as to ensure electromagnetic compatibility and avoidance of harmful interaction with other equipment and systems;

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* Refer to resolution A.614(15) concerning carriage of radar operating in the frequency band 9,300–9,500 MHz adopted by the Organization (see annex 2-4).

† It should be noted that ships may have a need for reception of certain maritime safety information while in port.

‡ 1 Each Contracting Government is not required to provide all radiocommunication services.
2 The requirements should be specified for shore-based facilities to cover the various sea areas.

§ Refer to resolution A.801(19) concerning the provision of radio services for the global maritime distress and safety system (GMDSS) adopted by the Organization (see annex 2-16).

▷ .2 be so located as to ensure the greatest possible degree of safety and operational availability;

.3 be protected against harmful effects of water, extremes of temperature and other adverse environmental conditions;

.4 be provided with reliable, permanently arranged electrical lighting, independent of the main and emergency sources of electrical power, for the adequate illumination of the radio controls for operating the radio installation; and

.5 be clearly marked with the call sign, the ship station identity and other codes as applicable for the use of the radio installation.

3 Control of the VHF radiotelephone channels, required for navigational safety, shall be immediately available on the navigating bridge convenient to the conning position and, where necessary, facilities should be available to permit radiocommunications from the wings of the navigating bridge. Portable VHF equipment may be used to meet the latter provision.

Regulation 7

Radio equipment: General

1 Every ship shall be provided with:

.1 a VHF radio installation capable of transmitting and receiving:

.1.1 DSC on the frequency 156.525 MHz (channel 70). It shall be possible to initiate the transmission of distress alerts on channel 70 from the position from which the ship is normally navigated;* and

.1.2 radiotelephony on the frequencies 156.300 MHz (channel 6), 156.650 MHz (channel 13) and 156.800 MHz (channel 16);

.2 a radio installation capable of maintaining a continuous DSC watch on VHF channel 70 which may be separate from, or combined with, that required by subparagraph 1.1;*

.3 a radar transponder capable of operating in the 9 GHz band, which:

.3.1 shall be so stowed that it can be easily utilized; and

.3.2 may be one of those required by regulation III/6.2.2 for a survival craft;

.4 a receiver capable of receiving international NAVTEX service broadcasts if the ship is engaged on voyages in any area in which an international NAVTEX service is provided;

.5 a radio facility for reception of maritime safety information by the INMARSAT enhanced group calling system if the ship is engaged on voyages in any area of INMARSAT coverage but in which an international NAVTEX service is not provided. However, ships engaged exclusively on voyages in areas where an HF direct-printing telegraphy maritime safety information service is provided and fitted with equipment capable of receiving such service, may be exempt from this requirement.†

.6 subject to the provisions of regulation 8.3, a satellite emergency position-indicating radio beacon (satellite EPIRB) which shall be:

.6.1 capable of transmitting a distress alert either through the polar orbiting satellite service operating in the 406 MHz band or, if the ship is engaged only on voyages within INMARSAT coverage, through the INMARSAT geostationary satellite service operating in the 1.6 GHz band;‡

.6.2 installed in an easily accessible position;

.6.3 ready to be manually released and capable of being carried by one person into a survival craft;

.6.4 capable of floating free if the ship sinks and of being automatically activated when afloat; and

.6.5 capable of being activated manually.

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* Certain ships may be exempted from this requirement (see regulation 9.4).

† Refer to resolution A.705(17) concerning promulgation of maritime safety information, adopted by the Organization (see annex 2-12).

‡ Subject to the availability of appropriate receiving and processing ground facilities for each ocean region covered by INMARSAT satellites (see annex 5 – GMDSS Master Plan).

▷2 Until 1 February 1999 or until such other date as may be determined by the Maritime Safety Committee, every ship shall, in addition, be fitted with a radio installation consisting of a radiotelephone distress frequency watch receiver capable of operating on 2,182 kHz.

3 Until 1 February 1999, every ship shall, unless the ship is engaged on voyages in sea area A1 only, be fitted with a device for generating the radiotelephone alarm signal on the frequency 2,182 kHz.

4 The Administration may exempt ships constructed on or after 1 February 1997 from the requirements prescribed by paragraphs 2 and 3.

Regulation 8

Radio equipment – Sea area A1

1 In addition to meeting the requirements of regulation 7, every ship engaged on voyages exclusively in sea area A1 shall be provided with a radio installation capable of initiating the transmission of ship-to-shore distress alerts from the position from which the ship is normally navigated, operating either:

.1 on VHF using DSC; this requirement may be fulfilled by the EPIRB prescribed by paragraph 3, either by installing the EPIRB close to, or by remote activation from, the position from which the ship is normally navigated; or

.2 through the polar orbiting satellite service on 406 MHz; this requirement may be fulfilled by the satellite EPIRB, required by regulation 7.1.6, either by installing the satellite EPIRB close to, or by remote activation from, the position from which the ship is normally navigated; or

.3 if the ship is engaged on voyages within coverage of MF coast stations equipped with DSC, on MF using DSC; or

.4 on HF using DSC; or

.5 through the INMARSAT geostationary satellite service; this requirement may be fulfilled by:

.5.1 an INMARSAT ship earth station;* or

.5.2 the satellite EPIRB, required by regulation 7.1.6, either by installing the satellite EPIRB close to, or by remote activation from, the position from which the ship is normally navigated.

2 The VHF radio installation, required by regulation 7.1.1, shall also be capable of transmitting and receiving general radiocommunications using radiotelephony.

3 Ships engaged on voyages exclusively in sea area A1 may carry, in lieu of the satellite EPIRB required by regulation 7.1.6, an EPIRB which shall be:

.1 capable of transmitting a distress alert using DSC on VHF channel 70 and providing for locating by means of a radar transponder operating in the 9 GHz band;

.2 installed in an easily accessible position;

.3 ready to be manually released and capable of being carried by one person into a survival craft;

.4 capable of floating free if the ship sinks and being automatically activated when afloat; and

.5 capable of being activated manually.

Regulation 9

Radio equipment – Sea areas A1 and A2

1 In addition to meeting the requirements of regulation 7, every ship engaged on voyages beyond sea area A1, but remaining within sea area A2, shall be provided with:

.1 an MF radio installation capable of transmitting and receiving, for distress and safety purposes, on the frequencies:

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* This requirement can be met by INMARSAT ship earth stations capable of two-way communications, such as Inmarsat-A or Inmarsat-C ship earth stations. Unless otherwise specified, this footnote applies to all requirements for an INMARSAT ship earth station prescribed by this chapter (see annexes 3-4-1 and 3-4-2).

▷ .1.1 2,187.5 kHz using DSC; and

.1.2 2,182 kHz using radiotelephony;

.2 a radio installation capable of maintaining a continuous DSC watch on the frequency 2,187.5 kHz which may be separate from, or combined with, that required by subparagraph .1.1; and

.3 means of initiating the transmission of ship-to-shore distress alerts by a radio service other than MF operating either:

.3.1 through the polar orbiting satellite service on 406 MHz; this requirement may be fulfilled by the satellite EPIRB, required by regulation 7.1.6, either by installing the satellite EPIRB close to, or by remote activation from, the position from which the ship is normally navigated; or

.3.2 on HF using DSC; or

.3.3 through the INMARSAT geostationary satellite service; this requirement may be fulfilled by:

.3.3.1 the equipment specified in paragraph 3.2; or

.3.3.2 the satellite EPIRB, required by regulation 7.1.6, either by installing the satellite EPIRB close to, or by remote activation from, the position from which the ship is normally navigated.

2 It shall be possible to initiate transmission of distress alerts by the radio installations specified in paragraphs 1.1 and 1.3 from the position from which the ship is normally navigated.

3 The ship shall, in addition, be capable of transmitting and receiving general radiocommunications using radiotelephony or direct-printing telegraphy by either:

.1 a radio installation operating on working frequencies in the bands between 1,605 kHz and 4,000 kHz or between 4,000 kHz and 27,500 kHz. This requirement may be fulfilled by the addition of this capability in the equipment required by paragraph 1.1; or

.2 an INMARSAT ship earth station.

4 The Administration may exempt ships constructed before 1 February 1997, which are engaged exclusively on voyages within sea area A2, from the requirements of regulations 7.1.1.1 and 7.1.2 provided such ships maintain, when practicable, a continuous listening watch on VHF channel 16. This watch shall be kept at the position from which the ship is normally navigated.

Regulation 10

Radio equipment – Sea areas A1, A2 and A3

1 In addition to meeting the requirements of regulation 7, every ship engaged on voyages beyond sea areas A1 and A2, but remaining within sea area A3, shall, if it does not comply with the requirements of paragraph 2, be provided with:

.1 an INMARSAT ship earth station capable of:

.1.1 transmitting and receiving distress and safety communications using direct-printing telegraphy;

.1.2 initiating and receiving distress priority calls;

.1.3 maintaining watch for shore-to-ship distress alerts, including those directed to specifically defined geographical areas;

.1.4 transmitting and receiving general radiocommunications, using either radiotelephony or direct-printing telegraphy; and

.2 an MF radio installation capable of transmitting and receiving, for distress and safety purposes, on the frequencies:

.2.1 2,187.5 kHz using DSC; and

.2.2 2,182 kHz using radiotelephony; and

.3 a radio installation capable of maintaining a continuous DSC watch on the frequency 2,187.5 kHz which may be separate from, or combined with, that required by subparagraph .2.1; and

▷ .4 means of initiating the transmission of ship-to-shore distress alerts by a radio service operating either:

.4.1 through the polar orbiting satellite service on 406 MHz; this requirement may be fulfilled by the satellite EPIRB, required by regulation 7.1.6, either by installing the satellite EPIRB close to, or by remote activation from, the position from which the ship is normally navigated; or

.4.2 on HF using DSC; or

.4.3 through the INMARSAT geostationary satellite service, by an additional ship earth station or by the satellite EPIRB required by regulation 7.1.6, either by installing the satellite EPIRB close to, or by remote activation from, the position from which the ship is normally navigated.

2 In addition to meeting the requirements of regulation 7, every ship engaged on voyages beyond sea areas A1 and A2, but remaining within sea area A3, shall, if it does not comply with the requirements of paragraph 1, be provided with:

.1 an MF/HF radio installation capable of transmitting and receiving, for distress and safety purposes, on all distress and safety frequencies in the bands between 1,605 kHz and 4,000 kHz and between 4,000 kHz and 27,500 kHz:

.1.1 using DSC;

.1.2 using radiotelephony; and

.1.3 using direct-printing telegraphy; and

.2 equipment capable of maintaining DSC watch on 2,187.5 kHz, 8,414.5 kHz and on at least one of the distress and safety DSC frequencies 4,207.5 kHz, 6,312 kHz, 12,577 kHz or 16,804.5 kHz; at any time, it shall be possible to select any of these DSC distress and safety frequencies. This equipment may be separate from, or combined with, the equipment required by subparagraph .1; and

.3 means of initiating the transmission of ship-to-shore distress alerts by a radiocommunication service other than HF operating either:

.3.1 through the polar orbiting satellite service on 406 MHz; this requirement may be fulfilled by the satellite EPIRB, required by regulation 7.1.6, either by installing the satellite EPIRB close to, or by remote activation from, the position from which the ship is normally navigated; or

.3.2 through the INMARSAT geostationary satellite service; this requirement may be fulfilled by:

.3.2.1 an INMARSAT ship earth station; or

.3.2.2 the satellite EPIRB, required by regulation 7.1.6, either by installing the satellite EPIRB close to, or by remote activation from, the position from which the ship is normally navigated; and

.4 in addition, ships shall be capable of transmitting and receiving general radiocommunications using radiotelephony or direct-printing telegraphy by an MF/HF radio installation operating on working frequencies in the bands between 1,605 kHz and 4,000 kHz and between 4,000 kHz and 27,500 kHz. This requirement may be fulfilled by the addition of this capability in the equipment required by subparagraph .1.

3 It shall be possible to initiate transmission of distress alerts by the radio installations specified in sub-paragraphs 1.1, 1.2, 1.4, 2.1 and 2.3 from the position from which the ship is normally navigated.

4 The Administration may exempt ships constructed before 1 February 1997, and engaged exclusively on voyages within sea areas A2 and A3, from the requirements of regulations 7.1.1.1 and 7.1.2 provided such ships maintain, when practicable, a continuous listening watch on VHF channel 16. This watch shall be kept at the position from which the ship is normally navigated.

▷ Regulation 11
Radio equipment – Sea areas A1, A2, A3 and A4

1 In addition to meeting the requirements of regulation 7, ships engaged on voyages in all sea areas shall be provided with the radio installations and equipment required by regulation 10.2, except that the equipment required by regulation 10.2.3.2 shall not be accepted as an alternative to that required by regulation 10.2.3.1, which shall always be provided. In addition, ships engaged on voyages in all sea areas shall comply with the requirements of regulation 10.3.

2 The Administration may exempt ships constructed before 1 February 1997, and engaged exclusively on voyages within sea areas A2, A3 and A4, from the requirements of regulations 7.1.1.1 and 7.1.2 provided such ships maintain, when practicable, a continuous listening watch on VHF channel 16. This watch shall be kept at the position from which the ship is normally navigated.

Regulation 12
Watches

1 Every ship, while at sea, shall maintain a continuous watch:

.1 on VHF DSC channel 70, if the ship, in accordance with the requirements of regulation 7.1.2, is fitted with a VHF radio installation;

.2 on the distress and safety DSC frequency 2,187.5 kHz, if the ship, in accordance with the requirements of regulation 9.1.2 or 10.1.3, is fitted with an MF radio installation;

.3 on the distress and safety DSC frequencies 2,187.5 kHz and 8,414.5 kHz and also on at least one of the distress and safety DSC frequencies 4,207.5 kHz, 6,312 kHz, 12,577 kHz or 16,804.5 kHz, appropriate to the time of day and the geographical position of the ship, if the ship, in accordance with the requirements of regulation 10.2.2 or 11.1, is fitted with an MF/HF radio installation. This watch may be kept by means of a scanning receiver;

.4 for satellite shore-to-ship distress alerts, if the ship, in accordance with the requirements of regulation 10.1.1, is fitted with an INMARSAT ship earth station.

2 Every ship, while at sea, shall maintain a radio watch for broadcasts of maritime safety information on the appropriate frequency or frequencies on which such information is broadcast for the area in which the ship is navigating.

3 Until 1 February 1999 or until such other date as may be determined by the Maritime Safety Committee, every ship while at sea shall maintain, when practicable, a continuous listening watch on VHF channel 16. This watch shall be kept at the position from which the ship is normally navigated.

4 Until 1 February 1999 or until such other date as may be determined by the Maritime Safety Committee, every ship required to carry a radiotelephone watch receiver shall maintain, while at sea, a continuous watch on the radiotelephone distress frequency 2,182 kHz. This watch shall be kept at the position from which the ship is normally navigated.

Regulation 13
Sources of energy

1 There shall be available at all times, while the ship is at sea, a supply of electrical energy sufficient to operate the radio installations and to charge any batteries used as part of a reserve source or sources of energy for the radio installations.

2 A reserve source or sources of energy shall be provided on every ship, to supply radio installations, for the purpose of conducting distress and safety radiocommunications, in the event of failure of the ship's main and emergency sources of electrical power. The reserve source or sources of energy shall be capable of simultaneously operating the VHF radio installation required by regulation 7.1.1 and, as appropriate for the sea area or sea areas for which the ship is equipped, either the MF radio installation required by regulation 9.1.1, the MF/HF radio installation required by regulation 10.2.1 or 11.1, or the INMARSAT ship earth station required by regulation 10.1.1 and any of the additional loads mentioned in paragraphs 4, 5 and 8 for a period of at least:

.1 one hour, on ships constructed on or after 1 February 1995;

▷ .2 one hour, on ships constructed before 1 February 1995, if the emergency source of electrical power complies fully with all relevant requirements of regulation II-1/42 or 43 including the requirements to supply the radio installations; and

.3 six hours, on ships constructed before 1 February 1995, if the emergency source of electrical power is not provided or does not comply fully with all relevant requirements of regulation II-1/42 or 43 including the requirements to supply the radio installations.*

The reserve source or sources of energy need not supply independent HF and MF radio installations at the same time.

3 The reserve source or sources of energy shall be independent of the propelling power of the ship and the ship's electrical system.

4 Where, in addition to the VHF radio installation, two or more of the other radio installations, referred to in paragraph 2, can be connected to the reserve source or sources of energy, they shall be capable of simultaneously supplying, for the period specified, as appropriate, in paragraph 2.1, 2.2 or 2.3, the VHF radio installation and:

.1 all other radio installations which can be connected to the reserve source or sources of energy at the same time; or

.2 whichever of the other radio installations will consume the most power, if only one of the other radio installations can be connected to the reserve source or sources of energy at the same time as the VHF radio installation.

5 The reserve source or sources of energy may be used to supply the electrical lighting required by regulation 6.2.4.

6 Where a reserve source of energy consists of a rechargeable accumulator battery or batteries:

.1 a means of automatically charging such batteries shall be provided which shall be capable of recharging them to minimum capacity requirements within 10 hours; and

.2 the capacity of the battery or batteries shall be checked, using an appropriate method,† at intervals not exceeding 12 months, when the ship is not at sea.

7 The siting and installation of accumulator batteries which provide a reserve source of energy shall be such as to ensure:

.1 the highest degree of service;

.2 a reasonable lifetime;

.3 reasonable safety;

.4 that battery temperatures remain within the manufacturer's specifications whether under charge or idle; and

.5 that when fully charged, the batteries will provide at least the minimum required hours of operation under all weather conditions.

8 If an uninterrupted input of information from the ship's navigational or other equipment to a radio installation required by this chapter is needed to ensure its proper performance, means shall be provided to ensure the continuous supply of such information in the event of failure of the ship's main or emergency source of electrical power.

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* For guidance, the following formula is recommended for determining the electrical load to be supplied by the reserve source of energy for each radio installation required for distress conditions: 1/2 of the current consumption necessary for transmission + the current consumption necessary for reception + current consumption of any additional loads.

† One method of checking the capacity of an accumulator battery is to fully discharge and recharge the battery, using normal operating current and period (e.g. 10 h). Assessment of the charge condition can be made at any time, but it should be done without significant discharge of the battery when the ship is at sea.

▷ Regulation 14
Performance standards

1 All equipment to which this chapter applies shall be of a type approved by the Administration. Subject to paragraph 2, such equipment shall conform to appropriate performance standards not inferior to those adopted by the Organization.*

2 Equipment installed prior to the dates of application prescribed by regulation 1 may be exempted from full compliance with the appropriate performance standards at the discretion of the Administration, provided that the equipment is compatible with equipment complying with the performance standards, having due regard to the criteria which the Organization may adopt in connection with such standards.

Regulation 15
Maintenance requirements

1 Equipment shall be so designed that the main units can be replaced readily, without elaborate recalibration or readjustment.

2 Where applicable, equipment shall be so constructed and installed that it is readily accessible for inspection and on-board maintenance purposes.

3 Adequate information shall be provided to enable the equipment to be properly operated and maintained, taking into account the recommendations of the Organization.†

4 Adequate tools and spares shall be provided to enable the equipment to be maintained.

5 The Administration shall ensure that radio equipment required by this chapter is maintained to provide the availability of the functional requirements specified in regulation 4 and to meet the recommended performance standards of such equipment.

6 On ships engaged on voyages in sea areas A1 and A2, the availability shall be ensured by using such methods as duplication of equipment, shore-based maintenance or at-sea electronic maintenance capability, or a combination of these, as may be approved by the Administration.

7 On ships engaged on voyages in sea areas A3 and A4, the availability shall be ensured by using a combination of at least two methods such as duplication of equipment, shore-based maintenance or at-sea electronic maintenance capability, as may be approved by the Administration, taking into account the recommendations of the Organization.

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* Refer to the following performance standards adopted by the Assembly of the Organization:
.1 Narrow-band direct-printing telegraph equipment for the reception of navigational and meteorological warnings and urgent information to ships (resolution A.525(13)) (see annex 3-5-1);
.2 General requirements for shipborne radio equipment forming part of the global maritime distress and safety system (GMDSS) and for electronic navigational aids (resolution A.694(17)) (see annex 3-1-1);
.3 Ship earth stations capable of two-way communications (resolution A.808(19)) (see annex 3-4-1);
.4 VHF radio installations capable of voice communication and digital selective calling (resolution A.803(19)) (see annexes 3-2-1 and 3-2-2);
.5 Shipborne MF radio installations capable of voice communication and digital selective calling (resolution A.804(19)) (see annexes 3-2-3 and 3-2-4);
.6 Shipborne MF/HF radio installations capable of voice communication, narrow-band direct-printing and digital selective calling (resolution A.806(19)) (see annexes 3-2-5 and 3-2-6);
.7 Float-free satellite emergency position-indicating radio beacons (EPIRBs) operating on 406 MHz (resolution A.810(19)) (see annexes 3-3-1 and 3-3-2);
.8 Survival craft radar transponders for use in search and rescue operations (resolution A.802(19)) (see annex 3-6-1);
.9 Float-free VHF emergency position-indicating radio beacons (resolution A.805(19)) (see annex 3-3-3);
.10 INMARSAT Standard-C ship earth stations capable of transmitting and receiving direct-printing communications (resolution A.807(19)) (see annex 3-4-2);
.11 Enhanced group call equipment (resolution A.664(16)) (see annex 3-5-2);
.12 Float-free satellite emergency position-indicating radio beacons operating through the geostationary INMARSAT satellite system on 1.6 GHz (resolution A.812(19)) (see annex 3-3-4);
.13 Float-free release and activation arrangements for emergency radio equipment (resolution A.662(16)) (see annex 3-6-5);
.14 System performance standard for the promulgation and co-ordination of maritime safety information using high-frequency narrow-band direct printing (resolution A.699(17)) (see annex 3-5-3);
.15 Narrow-band direct-printing telegraph equipment for the reception of navigational and meteorological warnings and urgent information to ships (MSI) by HF (resolution A.700(17)) (see annex 3-5-4).

† Refer to the Recommendation on General Requirements for Shipborne Radio Equipment Forming Part of the Global Maritime Distress and Safety System (GMDSS) and for Electronic Navigational Aids (Assembly resolution A.694(17)) (see annex 3-1-1).

8 While all reasonable steps shall be taken to maintain the equipment in efficient working order to ensure compliance with all the functional requirements specified in regulation 4, malfunction of the equipment for providing the general radiocommunications required by regulation 4.8 shall not be considered as making a ship unseaworthy or as a reason for delaying the ship in ports where repair facilities are not readily available, provided the ship is capable of performing all distress and safety functions.

Regulation 16
Radio personnel

Every ship shall carry personnel qualified for distress and safety radiocommunication purposes to the satisfaction of the Administration. The personnel shall be holders of certificates specified in the Radio Regulations as appropriate, any one of whom shall be designated to have primary responsibility for radiocommunications during distress incidents.

Regulation 17
Radio records

A record shall be kept, to the satisfaction of the Administration and as required by the Radio Regulations, of all incidents connected with the radiocommunication service which appear to be of importance to safety of life at sea.◁

CHAPTER V
Safety of navigation

Regulation 12
Shipborne navigational equipment

(a) For the purpose of this regulation *constructed* in respect of a ship means a stage of construction where:

(i) the keel is laid; or

(ii) construction identifiable with a specific ship begins; or

(iii) assembly of that ship has commenced comprising at least 50 tonnes or 1% of the estimated mass of all structural material, whichever is less.

(b) (i) Ships of 150 tons gross tonnage and upwards shall be fitted with:

(1) a standard magnetic compass, except as provided in subparagraph (iv);

(2) a steering magnetic compass, unless heading information provided by the standard compass required under (1) is made available and is clearly readable by the helmsman at the main steering position;

(3) adequate means of communication between the standard compass position and the normal navigation control position to the satisfaction of the Administration; and

(4) means for taking bearings as nearly as practicable over an arc of the horizon of 360°.

(ii) Each magnetic compass referred to in subparagraph (i) shall be properly adjusted and its table or curve of residual deviations shall be available at all times.

(iii) A spare magnetic compass, interchangeable with the standard compass, shall be carried, unless the steering compass mentioned in subparagraph (i)(2) or a gyro-compass is fitted.

(iv) The Administration, if it considers it unreasonable or unnecessary to require a standard magnetic compass, may exempt individual ships or classes of ships from these requirements if the nature of the voyage, the ship's proximity to land or the type of ship does not warrant a standard compass, provided that a suitable steering compass is in all cases carried.

(c) Ships of less than 150 tons gross tonnage shall, as far as the Administration considers it reasonable and practicable, be fitted with a steering compass and have means for taking bearings.

(d) Ships of 500 tons gross tonnage and upwards constructed on or after 1 September 1984 shall be fitted with a gyro-compass complying with the following requirements:

(i) the master gyro-compass or a gyro repeater shall be clearly readable by the helmsman at the main steering position;

(ii) on ships of 1,600 tons gross tonnage and upwards a gyro repeater or gyro repeaters shall be provided and shall be suitably placed for taking bearings as nearly as practicable over an arc of the horizon of 360°.

(e) Ships of 1,600 tons gross tonnage and upwards, constructed before 1 September 1984 when engaged on international voyages, shall be fitted with a gyro-compass complying with the requirements of paragraph (d).

▷(f) Ships with emergency steering positions shall at least be provided with a telephone or other means of communication for relaying heading information to such positions. In addition, ships of 500 tons gross tonnage and upwards constructed on or after 1 February 1992 shall be provided with arrangements for supplying visual compass readings to the emergency steering position.

▷(g) Ships of 500 tons gross tonnage and upwards constructed on or after 1 September 1984 and ships of 1,600 tons gross tonnage and upwards constructed before 1 September 1984 shall be fitted with a radar installation. From 1 February 1995, the radar installation shall be capable of operating in the 9 GHz frequency band. In addition, after 1 February 1995, passenger ships irrespective of size and cargo ships of 300 tons gross tonnage and upwards when engaged on international voyages shall be fitted with a radar installation capable of operating in the 9 GHz frequency band. Passenger ships of less than 500 tons gross tonnage and cargo ships of 300 tons gross tonnage and upwards but less than 500 tons gross tonnage may be exempted from compliance with the requirements of paragraph (r) at the discretion of the Administration, provided that the equipment is fully compatible with the radar transponder for search and rescue.

▷(h) Ships of 10,000 tons gross tonnage and upwards shall be fitted with two radar installations, each capable of being operated independently* of the other. From 1 February 1995, at least one of the radar installations shall be capable of operating in the 9 GHz frequency band.◁

(i) Facilities for plotting radar readings shall be provided on the navigating bridge of ships required by paragraph (g) or (h) to be fitted with a radar installation. In ships of 1,600 tons gross tonnage and upwards constructed on or after 1 September 1984 the plotting facilities shall be at least as effective as a reflection plotter.

(j) (i) An automatic radar plotting aid shall be fitted on:

(1) ships of 10,000 tons gross tonnage and upwards, constructed on or after 1 September 1984;

(2) tankers constructed before 1 September 1984 as follows:

(aa) if of 40,000 tons gross tonnage and upwards by 1 January 1985;

(bb) if of 10,000 tons gross tonnage and upwards but less than 40,000 tons gross tonnage, by 1 January 1986;

(3) ships constructed before 1 September 1984, that are not tankers, as follows:

(aa) if of 40,000 tons gross tonnage and upwards by 1 September 1986;

(bb) if of 20,000 tons gross tonnage and upwards, but less than 40,000 tons gross tonnage, by 1 September 1987;

(cc) if of 15,000 tons gross tonnage and upwards, but less than 20,000 tons gross tonnage, by 1 September 1988.

(ii) Automatic radar plotting aids fitted prior to 1 September 1984 which do not fully conform to the performance standards adopted by the Organization† may, at the discretion of the Administration, be retained until 1 January 1991.

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* Refer to section 4 of the Recommendation on Performance Standards for Radar Equipment, adopted by the Organization by resolution A.477(XII).

† Refer to the Performance Standards for Automatic Radar Plotting Aids (ARPA), adopted by the Organization by resolution A.823(19).

(iii) The Administration may exempt ships from the requirements of this paragraph, in cases where it considers it unreasonable or unnecessary for such equipment to be carried, or when the ships will be taken permanently out of service within two years of the appropriate implementation date.

(k) When engaged on international voyages ships of 1,600 tons gross tonnage and upwards constructed before 25 May 1980 and ships of 500 tons gross tonnage and upwards constructed on or after 25 May 1980 shall be fitted with an echo-sounding device.

(l) When engaged on international voyages ships of 500 tons gross tonnage and upwards constructed on or after 1 September 1984 shall be fitted with a device to indicate speed and distance. Ships required by paragraph (j) to be fitted with an automatic radar plotting aid shall be fitted with a device to indicate speed and distance through the water.

(m) Ships of 1,600 tons gross tonnage and upwards constructed before 1 September 1984 and all ships of 500 tons gross tonnage and upwards constructed on or after 1 September 1984 shall be fitted with indicators showing the rudder angle, the rate of revolution of each propeller and in addition, if fitted with variable pitch propellers or lateral thrust propellers, the pitch and operational mode of such propellers. All these indicators shall be readable from the conning position.

(n) Ships of 100,000 tons gross tonnage and upwards constructed on or after 1 September 1984 shall be fitted with a rate-of-turn indicator.

(o) Except as provided in regulations I/7(b)(ii), I/8 and I/9, while all reasonable steps shall be taken to maintain the apparatus referred to in paragraphs (d) to (n) in efficient working order, malfunctions of the equipment shall not be considered as making a ship unseaworthy or as a reason for delaying the ship in ports where repair facilities are not readily available.

▷(p) When engaged on international voyages, ships of 1,600 tons gross tonnage and upwards shall be fitted with a radio direction-finding apparatus. The Administration may exempt a ship from this requirement if it considers it unreasonable or unnecessary for such apparatus to be carried or if the ship is provided with other radionavigation equipment suitable for use throughout its intended voyages.

▷(q) Until 1 February 1999, ships of 1,600 tons gross tonnage and upwards constructed on or after 25 May 1980 and before 1 February 1995, when engaged on international voyages, shall be fitted with radio equipment for homing on the radiotelephone distress frequency.◁

(r) All equipment fitted in compliance with this regulation shall be of a type approved by the Administration. Equipment installed on board ships on or after 1 September 1984 shall conform to appropriate performance standards not inferior to those adopted by the Organization.* Equipment fitted prior to the adoption of related performance standards may be exempted from full compliance with those standards at the discretion of the Administration, having due regard to the recommended criteria which the Organization might adopt in connection with the standards concerned.

(s) A rigidly connected composite unit of a pushing vessel and associated pushed vessel, when designed as a dedicated and integrated tug and barge combination, shall be regarded as a single ship for the purpose of this regulation.

(t) If the application of the requirements of this regulation necessitates structural alterations to a ship constructed before 1 September 1984, the Administration may allow extension of the time limit for fitting the required equipment not later than 1 September 1989, taking into account the first scheduled dry-docking of such a ship required by the present regulations.

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* Refer to the following recommendations adopted by the Organization by the resolutions indicated:
Recommendation on General Requirements for Shipborne Radio Equipment forming Part of the GMDSS and for Electronic Navigational Aids (resolution A.694(17)) (see annex 3-1-1);
Recommendation on Performance Standards for Magnetic Compasses (resolution A.382(X));
Recommendation on Performance Standards for Gyro-Compasses (resolution A.424(XI));
Recommendation on Performance Standards for Radar Equipment (resolutions A.477(XII) and A.278(VIII));
Performance Standards for Automatic Radar Plotting Aids (ARPA) (resolution A.422(XI));
Recommendation on Performance Standards for Echo-Sounding Equipment (resolution A.224(VII));
Recommendation on Performance Standards for Devices to Indicate Speed and Distance (resolution A.478(XII));
Performance Standards for Rate-of-Turn Indicators (resolution A.526(13));
Recommendation on Unification of Performance Standards for Navigational Equipment (resolution A.575(14));
Performance Standards for Radio Direction-Finding Systems (resolution A.665(16)) (see annex 3-6-6);
Recommendation on Performance Standards for Shipborne Receivers for Use with Differential OMEGA (resolution A.479(XII));
Recommendation on methods of measuring noise levels at listening posts (resolution A.343(IX));
Regarding unification of ARPA signals, see MSC/Circ. 563 and IEC Publication 872.

(u) Except as provided elsewhere in this regulation, the Administration may grant to individual ships exemptions of a partial or conditional nature, when any such ship is engaged on a voyage where the maximum distance of the ship from the shore, the length and nature of the voyage, the absence of general navigation hazards, and other conditions affecting safety are such as to render the full application of this regulation unreasonable or unnecessary. When deciding whether or not to grant exemptions to an individual ship, the Administration shall have regard to the effect that an exemption may have upon the safety of all other ships.

Regulation 14
Aids to navigation

▷The Contracting Governments undertake to arrange for the establishment and maintenance of such aids to navigation as, in their opinion, the volume of traffic justifies and the degree of risk requires, and to arrange for information relating to these aids to be made available to all concerned.◁

Regulation 21
International Code of Signals

▷All ships which, in accordance with the present Convention, are required to carry radio installations shall carry the International Code of Signals. This publication shall also be carried by any other ship which, in the opinion of the Administration, has a need to use it.◁

▷

APPENDIX
Form of Safety Certificate for Passenger Ships

PASSENGER SHIP SAFETY CERTIFICATE

This Certificate shall be supplemented by a Record of Equipment (Form P)

(Official seal) *(State)*

for $\frac{\text{an}}{\text{a short}}$[1] international voyage

Issued under the provisions of the

INTERNATIONAL CONVENTION FOR THE SAFETY OF LIFE AT SEA, 1974, as amended

under the authority of the Government of

_____

(name of the State)

by _____

(person or organization authorized)

Particulars of ship[2]

Name of ship . . . . . .

Distinctive number or letters . . . . . .

Port of registry . . . . . .

Gross tonnage . . . . . .

Sea areas in which ship is certified to operate (regulation IV/2) . . . . . .

IMO Number[3] . . . . . .

Date on which keel was laid or ship was at a similar stage of construction or, where applicable, date on which work for a conversion or an alteration or modification of a major character was commenced . . . . . .

[1] Delete as appropriate.
[2] Alternatively, the particulars of the ship may be placed horizontally in boxes.
[3] In accordance with the IMO Ship Identification Number Scheme, adopted by the Organization by resolution A.600(15)

▷THIS IS TO CERTIFY:

1 That the ship has been surveyed in accordance with the requirements of regulation I/7 of the Convention.

2 That the survey showed that:

2.1 the ship complied with the requirements of the Convention as regards:

.1 the structure, main and auxiliary machinery, boilers and other pressure vessels;

.2 the watertight subdivision arrangements and details;

.3 the following subdivision load lines:

Subdivision load lines assigned and marked on the ship's side at amidships (regulation II-1/13)	Freeboard	To apply when the spaces in which passengers are carried include the following alternative spaces
C.1	. . . . .	. . . . .
C.2	. . . . .	. . . . .
C.3	. . . . .	. . . . .

2.2 the ship complied with the requirements of the Convention as regards structural fire protection, fire safety systems and appliances and fire control plans;

2.3 the life-saving appliances and the equipment of the lifeboats, liferafts and rescue boats were provided in accordance with the requirements of the Convention;

2.4 the ship was provided with a line-throwing appliance and radio installations used in life-saving appliances in accordance with the requirements of the Convention;

2.5 the ship complied with the requirements of the Convention as regards radio installations;

2.6 the functioning of the radio installations used in life-saving appliances complied with the requirements of the Convention;

2.7 the ship complied with the requirements of the Convention as regards shipborne navigational equipment, means of embarkation for pilots and nautical publications;

2.8 the ship was provided with lights, shapes, means of making sound signals and distress signals, in accordance with the requirements of the Convention and the International Regulations for Preventing Collisions at Sea in force;

2.9 in all other respects the ship complied with the relevant requirements of the Convention.

3 That an Exemption Certificate has/has not[4] been issued.

This certificate is valid until . . . . . .

Issued at . . . . . .
(Place of issue of certificate)

. . . . . .

▷

Form of Safety Construction Certificate for Cargo Ships

CARGO SHIP SAFETY CONSTRUCTION CERTIFICATE

(Official seal) *(State)*

Issued under the provisions of the

INTERNATIONAL CONVENTION FOR THE SAFETY OF LIFE AT SEA, 1974, as amended

under the authority of the Government of

_____

(name of the State)

by _____

(person or organization authorized)

Particulars of ship[1]

Name of ship . . . . . .

Distinctive number or letters . . . . . .

Port of registry . . . . . .

Gross tonnage . . . . . .

Deadweight of ship (metric tons)[2] . . . . . .

IMO Number[3] . . . . . .

Type of ship[4]

Oil tanker

Chemical tanker

Gas carrier

Cargo ship other than any of the above

Date on which keel was laid or ship was at a similar stage of construction or, where applicable, date on which work for a conversion or an alteration or modification of a major character was commenced . . . . . .

[1] Alternatively, the particulars of the ship may be placed horizontally in boxes.
[2] For oil tankers, chemical tankers and gas carriers only.
[3] In accordance with the IMO Ship Identification Number Scheme, adopted by the Organization by resolution A.600(15).
[4] Delete as appropriate.

▷THIS IS TO CERTIFY:

1 That the ship has been surveyed in accordance with the requirements of regulation I/10 of the Convention.

2 That the survey showed that the condition of the structure, machinery and equipment as defined in the above regulation was satisfactory and the ship complied with the relevant requirements of chapters II-1 and II-2 of the Convention (other than those relating to fire safety systems and appliances and fire control plans).

3 That an Exemption Certificate has/has not[5] been issued.

This certificate is valid until . . . . . .

Issued at . . . . . .
(Place of issue of certificate)

. . . . . .

▷ # Form of Safety Equipment Certificate for Cargo Ships

CARGO SHIP SAFETY EQUIPMENT CERTIFICATE

This Certificate shall be supplemented by a Record of Equipment (Form E)

(Official seal) *(State)*

Issued under the provisions of the

INTERNATIONAL CONVENTION FOR THE SAFETY OF LIFE
AT SEA, 1974, as amended

under the authority of the Government of

_____

(name of the State)

by _____

(person or organization authorized)

Particulars of ship[1]

Name of ship . . . . . .

Distinctive number or letters . . . . . .

Port of registry . . . . . .

Gross tonnage . . . . . .

Deadweight of ship (metric tons)[2] . . . . . .

Length of ship (regulation III/3.10). . . . . .

IMO Number[3]. . . . . .

Type of ship[4]

Oil tanker

Chemical tanker

Gas carrier

Cargo ship other than any of the above

Date on which keel was laid or ship was at a similar stage of construction or, where applicable, date on which work for a conversion or an alteration or modification of a major character was commenced. . . . . .

[1] Alternatively, the particulars of the ship may be placed in boxes.
[2] For oil tankers, chemical tankers and gas carriers only.
[3] In accordance with the IMO Ship Identification Number Scheme, adopted by the Organization by resolution A.600(15).
[4] Delete as appropriate.

▷THIS IS TO CERTIFY:

1 That the ship has been surveyed in accordance with the requirements of regulation I/8 of the Convention.

2 That the survey showed that:

2.1 the ship complied with the requirements of the Convention as regards fire safety systems and appliances and fire control plans;

2.2 the life-saving appliances and the equipment of the lifeboats, liferafts and rescue boats were provided in accordance with the requirements of the Convention;

2.3 the ship was provided with a line-throwing appliance and radio installations used in life-saving appliances in accordance with the requirements of the Convention;

2.4 the ship complied with the requirements of the Convention as regards shipborne navigational equipment, means of embarkation for pilots and nautical publications;

2.5 the ship was provided with lights, shapes, means of making sound signals and distress signals, in accordance with the requirements of the Convention and the International Regulations for Preventing Collisions at Sea in force;

2.6 in all other respects the ship complied with the relevant requirements of the Convention.

3 That the ship operates in accordance with regulation III/26.1.1.1 within the limits of the trade area . . . . .

4 That an Exemption Certificate has/has not[5] been issued.

This certificate is valid until . . . . . .

Issued at. . . . . .
(Place of issue of certificate)

. . . . . .

▷

Form of Safety Radio Certificate for Cargo Ships

CARGO SHIP SAFETY RADIO CERTIFICATE

This Certificate shall be supplemented by a Record of Equipment of Radio Facilities (Form R)

(Official seal) *(State)*

Issued under the provisions of the

INTERNATIONAL CONVENTION FOR THE SAFETY OF LIFE AT SEA, 1974, as amended

under the authority of the Government of

_____

(name of the State)

by _____

(person or organization authorized)

Particulars of ship[1]

Name of ship . . . . . .

Distinctive number or letters . . . . . .

Port of registry . . . . . .

Gross tonnage . . . . . .

Sea areas in which ship is certified to operate (regulation IV/2) . . . . . .

IMO Number[2] . . . . . .

Date on which keel was laid or ship was at a similar stage of construction or, where applicable, date on which work for a conversion or an alteration or modification of a major character was commenced . . . . . .

THIS IS TO CERTIFY:

1 That the ship has been surveyed in accordance with the requirements of regulation I/9 of the Convention.

2 That the survey showed that:

2.1 the ship complied with the requirements of the Convention as regards radio installations;

2.2 the functioning of the radio installations used in life-saving appliances complied with the requirements of the Convention.

[1] Alternatively, the particulars of the ship may be placed horizontally in boxes.
[2] In accordance with the IMO Ship Identification Number Scheme, adopted by the Organization by resolution A.600(15)

▷3 That an Exemption Certificate has/has not[3] been issued.

This certificate is valid until . . . . . .

Issued at. . . . . .
(Place of issue of certificate)

. . . . . .

▷

Form of Exemption Certificate

EXEMPTION CERTIFICATE

(Official seal) *(State)*

Issued under the provisions of the

INTERNATIONAL CONVENTION FOR THE SAFETY OF LIFE AT SEA, 1974, as amended

under the authority of the Government of

_____

(name of the State)

by _____

(person or organization authorized)

Particulars of ship[1]

Name of ship . . . . . .

Distinctive number or letters . . . . . .

Port of registry . . . . . .

Gross tonnage . . . . . .

IMO Number[2] . . . . . .

THIS IS TO CERTIFY:

That the ship is, under the authority conferred by regulation . . . . . .
of the Convention, exempted from the requirements of . . . . . .
. . . . . of the Convention.

Conditions, if any, on which the Exemption Certificate is granted:

. . . . . .
. . . . . .
. . . . . .

Voyages, if any, for which the Exemption Certificate is granted:

. . . . . .
. . . . . .
. . . . . .

[1] Alternatively, the particulars of the ship may be placed horizontally in boxes.
[2] In accordance with the IMO Ship Identification Number Scheme, adopted by the Organization by resolution A.600(15).

▷This certificate is valid until . . . . . subject to the . . . . . Certificate, to which this certificate is attached, remaining valid.

Issued at. . . . . .
(Place of issue of certificate)

. . . . . .

Annex 1-2
Resolution 2 of the 1988 GMDSS Conference:
Records of Equipment to supplement the SOLAS Passenger Ship Safety Certificate, Cargo Ship Safety Equipment Certificate and Cargo Ship Safety Radio Certificate

THE CONFERENCE,

HAVING ADOPTED amendments to the International Convention for the Safety of Life at Sea, 1974 (SOLAS Convention) (hereinafter referred to as "the Convention") concerning radiocommunications for the global maritime distress and safety system (GMDSS), including revised forms of the Passenger Ship Safety Certificate, Cargo Ship Safety Equipment Certificate and Cargo Ship Safety Radio Certificate,

NOTING regulation I/12(a)(v) of the Convention, as amended, which prescribes that the said safety certificates shall be supplemented by Records of Equipment adopted by this Conference,

HAVING CONSIDERED the proposed forms of the Records of Equipment prepared by the Maritime Safety Committee at its fifty-fifth session,

1. ADOPTS the forms of the Records of Equipment to supplement the SOLAS Passenger Ship Safety Certificate, Cargo Ship Safety Equipment Certificate and Cargo Ship Safety Radio Certificate, set out in the annex to this resolution;

2. DECIDES that the Records of Equipment annexed to this resolution shall be subject to amendment in accordance with the procedures prescribed in article VIII of the Convention, applicable to amendments to the annex of the Convention other than chapter I.

Annex to resolution 2
Records of equipment

Record of Equipment for the Passenger Ship Safety Certificate (Form P)

This Record shall be permanently attached to the Passenger Ship Safety Certificate

RECORD OF EQUIPMENT FOR COMPLIANCE WITH THE INTERNATIONAL CONVENTION FOR THE SAFETY OF LIFE AT SEA, 1974, AS AMENDED IN 1988

1 *Particulars of ship*

Name of ship . . . . . .

Distinctive number or letters . . . . . .

Number of passengers for which certified . . . . . .

Minimum number of persons with required qualifications to operate the radio installations . . . . . .

2 *Details of life-saving appliances*

1	Total number of persons for which life-saving appliances are provided	. . . . .	
		Port side	Starboard side
2	Total number of lifeboats	. . . . .	. . . . .
2.1	Total number of persons accommodated by them	. . . . .	. . . . .
2.2	Number of partially enclosed lifeboats (regulation III/42)	. . . . .	. . . . .
2.3	Number of self-righting partially enclosed lifeboats (regulation III/43)	. . . . .	. . . . .
2.4	Number of totally enclosed lifeboats (regulation III/44)	. . . . .	. . . . .
2.5	Other lifeboats		
2.5.1	Number	. . . . .	. . . . .
2.5.2	Type	. . . . .	. . . . .

3	Number of motor lifeboats (included in the total lifeboats shown above)	. . . . .
3.1	Number of lifeboats fitted with searchlights	. . . . .
4	Number of rescue boats	. . . . .
4.1	Number of boats which are included in the total lifeboats shown above	. . . . .
5	Liferafts	
5.1	Those for which approved launching appliances are required:	. . . . .
5.1.1	Number of liferafts	. . . . .
5.1.2	Number of persons accommodated by them	. . . . .

5.2	Those for which approved launching appliances are not required:	
5.2.1	Number of liferafts	. . . . .
5.2.2	Number of persons accommodated by them	. . . . .
6	Buoyant apparatus	
6.1	Number of apparatus	. . . . .
6.2	Number of persons capable of being supported	. . . . .
7	Number of lifebuoys	. . . . .
8	Number of lifejackets	. . . . .
9	Immersion suits	
9.1	Total number	. . . . .
9.2	Number of suits complying with the requirements for lifejackets	. . . . .
10	Number of thermal protective aids[1]	. . . . .
11	Radio installations used in life-saving appliances	
11.1	Number of radar transponders	. . . . .
11.2	Number of two-way VHF radiotelephone apparatus	. . . . .

3 *Details of radio facilities*

Item		Actual provision
1	Primary systems	
1.1	VHF radio installation:	
1.1.1	DSC encoder	. . . . .
1.1.2	DSC watch receiver	. . . . .
1.1.3	Radiotelephony	. . . . .
1.2	MF radio installation:	
1.2.1	DSC encoder	. . . . .
1.2.2	DSC watch receiver	. . . . .
1.2.3	Radiotelephony	. . . . .
1.3	MF/HF radio installation:	
1.3.1	DSC encoder	. . . . .
1.3.2	DSC watch receiver	. . . . .
1.3.3	Radiotelephony	. . . . .
1.3.4	Direct-printing radiotelegraphy	. . . . .
1.4	INMARSAT ship earth station	. . . . .
2	Secondary means of alerting	. . . . .
3	Facilities for reception of maritime safety information	
3.1	NAVTEX receiver	. . . . .
3.2	EGC receiver	. . . . .
3.3	HF direct-printing radiotelegraph receiver	. . . . .
4	Satellite EPIRB	
4.1	COSPAS–SARSAT	. . . . .
4.2	INMARSAT	. . . . .
5	VHF EPIRB	. . . . .
6	Ship's radar transponder	. . . . .
7	Radiotelephone distress frequency watch receiver on 2,182 kHz[2]	. . . . .
8	Device for generating the radiotelephone alarm signal on 2,182 kHz[3]	. . . . .

[1] Excluding those required by regulations III/38.5.1.24, III/41.8.31 and III/47.2.2.13.

[2] Unless another date is determined by the Maritime Safety Committee, this item need not be reproduced on the record attached to certificates issued after 1 February 1999.

[3] This item need not be reproduced on the record attached to certificates issued after 1 February 1999.

4 *Methods used to ensure availability of radio facilities* (regulations IV/15.6 and 15.7)

4.1 Duplication of equipment. . . . . .

4.2 Shore-based maintenance . . . . . .

4.3 At-sea maintenance capability . . . . . .

5 *Ships constructed before 1 February 1995 which do not comply with all the applicable requirements of chapter IV of the Convention as amended in 1988*[4]

	Requirements of regulations	Actual provision
Hours of listening by operator	. . . . .	. . . . .
Number of operators	. . . . .	. . . . .
Whether auto alarm fitted	. . . . .	. . . . .
Whether main installation fitted	. . . . .	. . . . .
Whether reserve installation fitted	. . . . .	. . . . .
Whether main and reserve transmitters electrically separated or combined	. . . . .	. . . . .

6 *Ships constructed before 1 February 1992 which do not fully comply with the applicable requirements of chapter III of the Convention as amended in 1988*[5]

	Actual provision
Radiotelegraph installation for lifeboat	. . . . .
Portable radio apparatus for survival craft	. . . . .
Survival craft EPIRB (121.5 MHz and 243.0 MHz)	. . . . .
Two-way radiotelephone apparatus	. . . . .

THIS IS TO CERTIFY that this Record is correct in all respects

Issued at . . . . . .
(Place of issue of the Record)

. . . . . .

Record of Equipment for the Cargo Ship Safety Equipment Certificate (Form E)

This Record shall be permanently attached to the Cargo Ship Safety Equipment Certificate

RECORD OF EQUIPMENT FOR COMPLIANCE WITH THE INTERNATIONAL CONVENTION FOR THE SAFETY OF LIFE AT SEA, 1974, AS AMENDED IN 1988

1 *Particulars of ship*

Name of ship . . . . . .

Distinctive number or letters . . . . . .

2 *Details of life-saving appliances*

1	Total number of persons for which life-saving appliances are provided	. . . . .	
		Port side	Starboard side
2	Total number of lifeboats	. . . . .	. . . . .
2.1	Total number of persons accommodated by them	. . . . .	. . . . .
2.2	Number of self-righting partially enclosed lifeboats (regulation III/43)	. . . . .	. . . . .
2.3	Number of totally enclosed lifeboats (regulation III/44)	. . . . .	. . . . .
2.4	Number of lifeboats with a self-contained air support system (regulation III/45)	. . . . .	. . . . .
2.5	Number of fire-protected lifeboats (regulation III/46)	. . . . .	. . . . .
2.6	Other lifeboats		
2.6.1	Number	. . . . .	. . . . .
2.6.2	Type	. . . . .	. . . . .
2.7	Number of free-fall lifeboats		
2.7.1	Totally enclosed (regulation III/44)	. . . . .	
2.7.2	Self-contained (regulation III/45)	. . . . .	
2.7.3	Fire-protected (regulation III/46)	. . . . .	

3	Number of motor lifeboats (included in the total lifeboats shown above)	. . . . .
3.1	Number of lifeboats fitted with searchlights	. . . . .
4	Number of rescue boats	. . . . .
4.1	Number of boats which are included in the total lifeboats shown above	. . . . .
5	Liferafts	
5.1	Those for which approved launching appliances are required:	
5.1.1	Number of liferafts	. . . . .
5.1.2	Number of persons accommodated by them	. . . . .
5.2	Those for which approved launching appliances are not required:	
5.2.1	Number of liferafts	. . . . .
5.2.2	Number of persons accommodated by them	. . . . .

5.3	Number of liferafts required by regulation III/26.1.4	. . . . .
6	Number of lifebuoys	. . . . .
7	Number of lifejackets	. . . . .
8	Immersion suits	
8.1	Total number	. . . . .
8.2	Number of suits complying with the requirements for lifejackets	. . . . .
9	Number of thermal protective aids[1]	. . . . .
10	Radio installations used in life-saving appliances	
10.1	Number of radar transponders	. . . . .
10.2	Number of two-way VHF radiotelephone apparatus	. . . . .

3 *Ships constructed before 1 February 1992 which do not fully comply with the applicable requirements of chapter III of the Convention as amended in 1988*[2]

	Actual provision
Radiotelegraph installation for lifeboat	. . . . .
Portable radio apparatus for survival craft	. . . . .
Survival craft EPIRB (121.5 MHz and 243.0 MHz)	. . . . .
Two-way radiotelephone apparatus	. . . . .

THIS IS TO CERTIFY that this Record is correct in all respects

Issued at . . . . . .
(Place of issue of the Record)

. . . . . .

Record of Equipment for the Cargo Ship Safety Radio Certificate (Form R)

This Record shall be permanently attached to the Cargo Ship Safety Radio Certificate

RECORD OF EQUIPMENT OF RADIO FACILITIES FOR COMPLIANCE WITH THE INTERNATIONAL CONVENTION FOR THE SAFETY OF LIFE AT SEA, 1974, AS AMENDED IN 1988

1 *Particulars of ship*

Name of ship . . . . . .

Distinctive number or letters . . . . . .

Minimum number of persons with required qualifications to operate the radio installations . . . . . .

2 *Details of radio facilities*

Item		Actual provision
1	Primary systems	
1.1	VHF radio installation:	
1.1.1	DSC encoder	. . . . .
1.1.2	DSC watch receiver	. . . . .
1.1.3	Radiotelephony	. . . . .
1.2	MF radio installation:	
1.2.1	DSC encoder	. . . . .
1.2.2	DSC watch receiver	. . . . .
1.2.3	Radiotelephony	. . . . .
1.3	MF/HF radio installation:	
1.3.1	DSC encoder	. . . . .
1.3.2	DSC watch receiver	. . . . .
1.3.3	Radiotelephony	. . . . .
1.3.4	Direct-printing telegraphy	. . . . .
1.4	INMARSAT ship earth station	. . . . .
2	Secondary means of alerting	. . . . .
3	Facilities for reception of maritime safety information	
3.1	NAVTEX receiver	. . . . .
3.2	EGC receiver	. . . . .
3.3	HF direct-printing radiotelegraph receiver	. . . . .
4	Satellite EPIRB	
4.1	COSPAS–SARSAT	. . . . .
4.2	INMARSAT	. . . . .
5	VHF EPIRB	. . . . .
6	Ship's radar transponder	. . . . .
7	Radiotelephone distress frequency watch receiver on 2,182 kHz[1]	. . . . .
8	Device for generating the radiotelephone alarm signal on 2,182 kHz[2]	. . . . .

[1] Unless another date is determined by the Maritime Safety Committee, this item need not be reproduced on the record attached to certificates issued after 1 February 1999.

[2] This item need not be reproduced on the record attached to certificates after 1 February 1999.

3 *Methods used to ensure availability of radio facilities (regulations IV/15.6 and 15.7)*

3.1 Duplication of equipment. . . . . .

3.2 Shore-based maintenance . . . . . .

3.3 At-sea maintenance capability . . . . . .

4 *Ships constructed before 1 February 1995 which do not comply with all the applicable requirements of chapter IV of the Convention as amended in 1988*[3]

4.1 For ships required to be fitted with radiotelegraphy in accordance with the Convention in force prior to 1 February 1992.

	Requirements of regulations	Actual provision
Hours of listening by operator	. . . . .	. . . . .
Number of operators	. . . . .	. . . . .
Whether auto alarm fitted	. . . . .	. . . . .
Whether main installation fitted	. . . . .	. . . . .
Whether reserve installation fitted	. . . . .	. . . . .
Whether main and reserve transmitters electrically separated or combined	. . . . .	. . . . .

4.2 For ships required to be fitted with radiotelephony in accordance with the Convention in force prior to 1 February 1992.

	Requirements of regulations	Actual provision
Hours of listening	. . . . .	. . . . .
Number of operators	. . . . .	. . . . .

THIS IS TO CERTIFY that this Record is correct in all respects

Issued at . . . . . .
(Place of issue of the Record)

. . . . . .

Annex 1-3
Resolution 3 of the 1988 GMDSS Conference:
Recommendation on the early introduction of global maritime distress and safety system (GMDSS) elements

THE CONFERENCE,

HAVING ADOPTED the amendments to the International Convention for the Safety of Life at Sea, 1974 (SOLAS Convention) concerning radiocommunications for the global maritime distress and safety system (GMDSS),

NOTING resolution A.617(15)* – Implementation of the NAVTEX system as a component of the world-wide navigational warning service, which, inter alia, invites Member Governments to commence NAVTEX broadcasts as soon as practicable,

NOTING ALSO that the use of ship earth stations (SES) is provided for in the Guidelines on equivalents for equipment to introduce elements of the future GMDSS (MSC/Circ. 417),

NOTING FURTHER that the draft Assembly resolution on the carriage of satellite emergency position-indicating radio beacons (EPIRBs), approved by the Maritime Safety Committee at its fifty-fifth session, recommends that Administrations encourage the early fitting of float-free satellite EPIRBs prior to the date of entry into force of the requirements of chapter IV of the 1988 SOLAS Amendments for the carriage of satellite EPIRBs on ships,

NOTING IN PARTICULAR that the ITU World Administrative Radio Conference for the Mobile Services, 1987 adopted new provisions of the Radio Regulations and adopted Resolution No. 331† – Relating to the Introduction of Provisions for the Global Maritime Distress and Safety System (GMDSS) and Continuation of the existing Distress and Safety Provisions and revised Resolution No. 322 – Relating to Coast Stations and Coast Earth Stations Assuming Watchkeeping Responsibilities on Certain Frequencies in Connection with the Implementation of Distress and Safety Communications for the Global Maritime Distress and Safety System (GMDSS),

BEARING IN MIND that digital selective calling (DSC) for all ships and HF direct-printing telegraphy (NBDP) carriage requirements for ships of 300 tons gross tonnage and over but less than 1,600 tons gross tonnage are subject to review in accordance with resolution A.606(15)‡concerning review and evaluation of the GMDSS,

BEING OF THE OPINION that such elements of the GMDSS as the NAVTEX system, SES, satellite EPIRBs, DSC and HF NBDP are of major benefit to the safety of life at sea,

1. RECOMMENDS that the NAVTEX, satellite EPIRB and SES elements of the GMDSS be introduced as early as possible;

2. INVITES the Maritime Safety Committee to keep these matters under review and take appropriate steps to promote their early introduction;

3. URGES the Maritime Safety Committee to complete the review of DSC for all ships and HF NBDP in accordance with resolution A.606(15) by 1 February 1992, including the possible use of HF NBDP as an alternative to HF DSC.

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* See annex 2-6.
† See annex 10-12.
‡ See annex 2-3.

Annex 1-4
Resolution 4 of the 1988 GMDSS Conference:
Recommendation on the early introduction of GMDSS radio life-saving appliances

THE CONFERENCE,

HAVING ADOPTED the amendments to the International Convention for the Safety of Life at Sea, 1974 (SOLAS Convention) concerning radiocommunications for the global maritime distress and safety system (GMDSS),

NOTING that the amendments will enter into force on 1 February 1992 and that these amendments include new equipment requirements for radio life-saving appliances,

NOTING FURTHER that the radio life-saving appliances fitted before 1 February 1992 in accordance with the 1983 Amendments to the SOLAS Convention will have to be replaced by 1 February 1995 with regard to survival craft EPIRBs and portable two-way VHF radiotelephone apparatus,

RECOGNIZING the need for ships' equipment to have as long an amortization period as possible,

RECOGNIZING FURTHER that the early carriage of GMDSS radio life-saving appliances will improve safety at sea,

BEARING IN MIND that the carriage of new equipment required for survival craft in the GMDSS does not include any capability of alerting prior to the introduction of satellite EPIRBs,

1 RECOMMENDS Administrations to encourage:

(a) the early implementation of the GMDSS provisions with respect to radio life-saving appliances instead of the provisions in the 1983 Amendments to the 1974 SOLAS Convention;

(b) ships to carry a satellite EPIRB or ensure that they comply with the requirements of, as appropriate, regulations III/6.2.1 or 6.2.2 or both of the 1983 SOLAS Amendments;

2 FURTHER RECOMMENDS that, where a means of transmitting signals for locating is provided on board a ship, Administrations accept a satellite EPIRB as equivalent to the survival craft EPIRBs required by regulation III/6.2.3 of the 1983 Amendments to the 1974 SOLAS Convention.

Annex 1-5
Resolution 5 of the 1988 GMDSS Conference:
Reviews of the requirements of SOLAS regulation IV/15.7

THE CONFERENCE,

HAVING ADOPTED the amendments to the International Convention for the Safety of Life at Sea, 1974 (SOLAS Convention) concerning radiocommunications for the global maritime distress and safety system (GMDSS),

RECOGNIZING that the operation of the GMDSS is dependent upon implementation of the GMDSS by Contracting Governments in an effective manner,

RECOGNIZING FURTHER that Contracting Governments will be required to continually assess the requirements and means of attaining the goals and objectives of the GMDSS,

NOTING regulation IV/15.7 which refers to recommendations concerning the methods of equipment maintenance which are to be developed by the Organization,

1. REQUESTS the Maritime Safety Committee to periodically review the requirements of regulation IV/15.7 in the light of experience gained;

2. FURTHER requests the Secretary-General to circulate the results of these periodic reviews to Member Governments for their consideration.

Annex 1-6
Resolution 6 of the 1988 GMDSS Conference:
Recommendation on application of administrative, financial and operational arrangements for the global maritime distress and safety system (GMDSS)

THE CONFERENCE,

HAVING ADOPTED the amendments to the International Convention for the Safety of Life at Sea, 1974 (SOLAS Convention) concerning radiocommunications for the global maritime distress and safety system (GMDSS),

NOTING Assembly resolution A.607(15) on the administrative, financial and operational arrangements related to the GMDSS which requests the Maritime Safety Committee to resolve issues of substance prior to this Conference,

NOTING ALSO Assembly resolution A.523(13)[1] on charges for distress, urgency and safety messages through the INMARSAT system,

NOTING FURTHER that the Council of the International Maritime Satellite Organization (INMARSAT) decided at its tenth session that no space segment charges shall be levied for distress messages as they are defined in the Radio Regulations and that a number of coast earth stations already accept free of charge certain types of safety related traffic such as medical advice, meteorological reports, navigation danger reports,

BEARING IN MIND that the INMARSAT Council has not yet taken any decision on the costs for implementing all the types of satellite communications related to distress and safety communications of the GMDSS including, *inter alia,* distress alerts in some circumstances, search and rescue co-ordinating transmissions, meteorological reports and ship reporting systems, as described in the Charging Principles developed by the Second Meeting of Experts on the Funding of International Distress and Safety Satellite Communications,

BEING OF THE OPINION that the funding arrangements for all distress and safety satellite communications must be finalized as soon as possible,

1. INVITES the INMARSAT Council to agree to the charging principles recommended by the Second Meeting of Experts, as well as operational arrangements that may facilitate the use by Administrations of those INMARSAT facilities that will be important elements of the GMDSS;

2. REQUESTS the Secretary-General to bring this resolution to the attention of:

   (a) INMARSAT and invite its Director General to communicate the INMARSAT Council's decision on this matter to the Organization;

   (b) the International Telecommunication Union (ITU) and invite its Secretary-General to request the appropriate bodies of the Union to consider, as a matter of urgency, tariff and charging principles to be applied for use of the public telecommunication networks in relation to the GMDSS;

3. REQUESTS the Maritime Safety Committee to review the funding arrangements prior to the implementation date of the GMDSS.

[1] This has been superseded by resolution A.707(17) (see annex 2-14).

Annex 1-7
Resolution 7 of the 1988 GMDSS Conference:
Recommendation on the coding of satellite emergency position-indicating radio beacons operating in the COSPAS–SARSAT system

THE CONFERENCE,

HAVING ADOPTED the amendments to the International Convention for the Safety of Life at Sea, 1974 (SOLAS Convention), concerning radiocommunications for the global maritime distress and safety system (GMDSS),

NOTING that the Conference resolution recommending the early introduction of GMDSS elements refers *inter alia* to satellite emergency position-indicating radio beacons (satellite EPIRBs),

NOTING FURTHER that the COSPAS–SARSAT system allows the use of different protocols for coding satellite EPIRBs and that, in particular, identification can be achieved either by a serial number or by using identification in the maritime mobile service as defined by the Radio Regulations of the International Telecommunication Union (ITU),

BEING OF THE OPINION that positive and reliable identification of ships in distress makes a decisive contribution to the effective conduct of search and rescue operations,

1. INVITES the Maritime Safety Committee to undertake the study of this matter both on operational and technical levels and to take measures to ensure that the protocol used for coding EPIRBs makes it possible to identify ships in distress with the greatest possible certainty;

2. INVITES the COSPAS–SARSAT Council to study the matter urgently in consultation with ITU with respect to CCIR recommendations and to assist the Maritime Safety Committee in making its decision.

Annex 1-8
Resolution 8 of the 1988 GMDSS Conference:
Promotion of technical co-operation with regard to the GMDSS

THE CONFERENCE,

HAVING adopted the amendments to the International Convention for the Safety of Life at Sea, 1974 (SOLAS Convention), concerning radiocommunications for the global maritime distress and safety system (GMDSS),

BEING AWARE of the importance of modern radiocommunication techniques with a view to improving both the safety of life at sea and international co-operation in technical and scientific resources,

BEING AWARE ALSO of the imperative and immediate need to redress the imbalance in the availability of telecommunication technology and services between developed and developing countries,

RECOGNIZING that Contracting Governments to the SOLAS Convention, as amended in 1988, will be called upon to make arrangements to ensure the effective operation of the GMDSS and to assume full responsibility for such arrangements,

BEING CONVINCED that the promotion of technical co-operation at intergovernmental level will expedite the implementation of the SOLAS Convention, as amended in 1988, by Contracting Governments that do not as yet possess the necessary technical and scientific resources,

NOTING with satisfaction that the International Maritime Organization has accorded, in its overall programme, a high priority to technical co-operation,

1. RECORDS its appreciation of the Organization's assistance to developing countries to enhance their maritime capabilities in conformity with global technical standards including radiocommunication standards;

2. URGES Contracting Governments, in consultation with, and assisted by, the International Maritime Organization, to promote and provide on reasonable commercial terms and conditions, support to States requesting technical assistance for:

   (a) the training of the required personnel; and

   (b) the provision of the equipment and facilities necessary for the introduction of the GMDSS;

3. ALSO URGES Contracting Governments to implement the above-mentioned measures without awaiting the entry into force of the amendments adopted;

4. INVITES the Organization, in consultation or association with other United Nations specialized agencies as appropriate, particularly the International Telecommunication Union and the World Meteorological Organization, to pursue the aforesaid efforts and, as necessary, to seek the collaboration of the International Hydrographic Organization, the International Maritime Satellite Organization, the COSPAS–SARSAT Council and the World Maritime University;

5. REQUESTS the Secretary-General to seek ways and means of securing the necessary funds to assist States which request assistance for the implementation of the amendments adopted.

Annex 1-9
Resolution MSC.27(61):
Adoption of amendments to the International Convention for the Safety of Life at Sea, 1974 (adopted on 11 December 1992)

THE MARITIME SAFETY COMMITTEE,

RECALLING Article 28(b) of the Convention on the International Maritime Organization concerning the functions of the Committee,

RECALLING FURTHER article VIII(b) of the International Convention for the Safety of Life at Sea, 1974, hereinafter referred to as "the Convention", concerning the procedures for amending the annex to the Convention, other than the provisions of chapter I thereof,

HAVING CONSIDERED, at its sixty-first session, amendments to the Convention proposed and circulated in accordance with article VIII(b)(i) thereof,

1. ADOPTS, in accordance with article VIII(b)(iv) of the Convention, the amendments to the Convention, the text of which is set out in the annex* to the present resolution;

2. DETERMINES, in accordance with article VIII(b)(vi)(2)(bb) of the Convention, that the amendments shall be deemed to have been accepted on 1 April 1994 unless, prior to the date, more than one third of the Contracting Governments to the Convention, or Contracting Governments the combined merchant fleets of which constitute not less than 50% of the gross tonnage of the world's merchant fleet, have notified their objections to the amendments;

3. INVITES Contracting Governments to note that, in accordance with Article VIII(b)(vii)(2) of the Convention, the amendments shall enter into force on 1 October 1994 upon their acceptance in accordance with paragraph 2 above:

4. REQUESTS the Secretary-General, in conformity with article VIII(b)(v) of the Convention, to transmit certified copies of the present resolution and the text of the amendments contained in the annex to all Contracting Governments to the Convention;

5. FURTHER REQUESTS the Secretary-General to transmit copies of the resolution to Members of the Organization which are not Contracting Governments to the Convention.

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* Only the amendments relevant to the GMDSS have been reproduced.

Annex to resolution MSC.27(61)
Amendments to the International Convention for the Safety of Life at Sea, 1974

[. . .]

CHAPTER IV
Radiocommunications

Regulation 13
Sources of energy

62 *Replace the existing text of paragraphs 2.1 to 2.3 by:*

"".1 1 hour on ships provided with an emergency source of electrical power, if such source of power complies fully with all relevant provisions of regulation II-1/42 or 43, including the supply of such power to the radio installations; and

.2 6 hours on ships not provided with an emergency source of electrical power complying fully with all relevant provisions of regulation II-1/42 or 43, including the supply of such power to the radio installations."

63 *Delete the reference in regulation IV/13.4 to paragraph 2.3.*

Regulation 14
Performance standards

64 *Replace "*by prescribed*" in paragraph 2 with "*prescribed by*".*

Annex 1-10
Resolution 1 of the Conference of Contracting Governments to the International Convention for the Safety of Life at Sea, 1974:
Adoption of amendments to the annex to the International Convention for the Safety of Life at Sea, 1974 (adopted on 29 November 1995)

THE CONFERENCE,

RECALLING article VIII(c) of the International Convention for the Safety of Life at Sea, 1974 (hereinafter referred to as "the Convention") concerning the procedure for amending the Convention by a Conference of Contracting Governments,

NOTING resolution A.596(15) adopted by the Assembly of the International Maritime Organization (IMO), concerning the safety of ro–ro ships,

NOTING FURTHER resolutions MSC.11(55), MSC.12(56), MSC.24(60), MSC.26(60) and MSC.27(61) by which amendments to the Convention were adopted by the Maritime Safety Committee of IMO aimed at enhancing the safety of new and existing ro–ro passenger ships, as appropriate,

EXPRESSING ITS CONCERN that, since the adoption of the aforementioned amendments, a number of ro–ro passenger ships have been involved in casualties, one of which has resulted in severe loss of life,

RECOGNIZING the urgent need to further improve the safety standards in all aspects of the design, equipment and operation of ro–ro passenger ships to avoid recurrence of such casualties,

HAVING CONSIDERED amendments to the annex to the Convention proposed and circulated to all Members of the International Maritime Organization and all Contracting Governments to the Convention,

1. ADOPTS, in accordance with article VIII(c)(ii) of the Convention, amendments to the annex to the Convention the text of which is set out in the annex* to the present resolution;

2. DETERMINES, in accordance with article VIII(b)(vi)(2)(bb) of the Convention, that the amendments shall be deemed to have been accepted on 1 January 1997, unless, prior to this date, more than one third of Contracting Governments to the Convention or Contracting Governments the combined merchant fleets of which constitute not less than 50% of the gross tonnage of the world's merchant fleet, have notified their objections to the amendments;

3. INVITES Contracting Governments to note that, in accordance with article VIII(b)(vii)(2) of the Convention, the amendments shall enter into force on 1 July 1997 upon their acceptance in accordance with paragraph 2 above.

* Only amendments relevant to the GMDSS have been reproduced.

Annex to resolution 1
Amendments to the annex to the International Convention for the Safety of Life at Sea, 1974

[. . .]

CHAPTER III
Life-Saving Appliances and Arrangements

Regulation 3
Definitions

22 *The following new paragraph 19 is added after existing paragraph 18:*

"19 *Ro–ro passenger ship* means a passenger ship with ro–ro cargo spaces or special category spaces as defined in regulation II-2/3."

Regulation 6
Communications

23 *The following new paragraph 5 is added after existing paragraph 4:*

"5 Public address systems on passenger ships

5.1 In addition to the requirements of regulation II-2/40.5 or regulation II-2/41-2, as appropriate, and of paragraph 4.2, all passenger ships shall be fitted with a public address system. With respect to passenger ships constructed before 1 July 1997 the requirements of paragraphs 5.2, 5.3 and 5.5, subject to the provisions of paragraph 5.6, shall apply not later than the date of the first periodical survey after 1 July 1997.

5.2 The public address system shall be one complete system consisting of a loudspeaker installation which enables simultaneous broadcast of messages to all spaces where crew members or passengers, or both, are normally present and to assembly stations. The public address system shall provide for the broadcast of messages from the navigation bridge and such other places on board as the Administration deems necessary.

5.3 The public address system shall be protected against unauthorized use and be clearly audible above the ambient noise in all spaces, prescribed by paragraph 5.2, and shall be provided with an override function controlled from one location on the navigation bridge and such other places on board as the Administration deems necessary, so that all emergency messages will be broadcast if any loudspeaker in the spaces concerned has been switched off, its volume has been turned down or the public address system is used for other purposes.

5.4 On passenger ships constructed on or after 1 July 1997:

.1 the public address system shall have at least two loops which shall be sufficiently separated throughout their length and have two separate and independent amplifiers; and

.2 the public address system and its performance standards shall be approved by the Administration having regard to the recommendations adopted by the Organization.*†

5.5 The public address system shall be connected to the emergency source of power.

5.6 Ships constructed before 1 July 1997 which are already fitted with the public address system approved by the Administration which comply substantially with those required by paragraph 5.2, 5.3 and 5.5 are not required to change their system.

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* Refer to the Code on Alarms and Indicators, 1995, adopted by the Organization by resolution A.830(19).
† Refer to performance standards for public address systems, to be developed by the Organization."

24 *The following new regulations 24-1 to 24-4 are added after existing regulation 24:*

Regulation 24–1
Requirements for ro–ro passenger ships

1 This regulation applies to all ro–ro passenger ships. Ro–ro passenger ships constructed:

.1 on or after 1 July 1998 shall comply with the requirements of paragraphs 2.3, 2.4, 3.1, 3.2, 3.3, 4 and 5;

.2 on or after 1 July 1986 and before 1 July 1998 shall comply with paragraph 5 not later than the first periodical survey after 1 July 1998 and with paragraphs 2.3, 2.4, 3 and 4 not later than the first periodical survey after 1 July 2000; and

.3 before 1 July 1986 shall comply with paragraph 5 not later than the first periodical survey after 1 July 1998 and with paragraphs 2.1, 2.2, 2.3, 2.4, 3 and 4 not later than the first periodical survey after 1 July 2000.

[. . .]

CHAPTER IV
Radiocommunications

Regulation 1
Application

25 *In paragraph 5, the reference to "*paragraph 4*" is replaced by "*paragraphs 4 and 7*".*

26 *At the end of paragraph 5.1.2, after the existing date "*1992*"* the phrase *"*; however, passenger ships irrespective of size shall not be granted any exemption from the requirements of regulation 3 of chapter IV of that Convention*" is added.*

27 *The following new paragraph 7 is added after existing paragraph 6:*

"7 Passenger ships constructed before 1 July 1997 shall, as appropriate, comply with the requirements of regulations 6.4, 6.5, 6.6 and 7.5 not later than the date of the first periodical survey after 1 July 1997."

28 *Existing paragraph 7 is renumbered as paragraph 8.*

Regulation 6
Radio installations

29 *The following new paragraphs 4, 5 and 6 are added after existing paragraph 3:*

"4 In passenger ships, a distress panel shall be installed at the conning position. This panel shall contain either one single button which, when pressed, initiates a distress alert using all radiocommunication installations required on board for that purpose or one button for each individual installation. The panel shall clearly and visually indicate whenever any button or buttons have been pressed. Means shall be provided to prevent inadvertent activation of the button or buttons. If the satellite EPIRB is used as the secondary means of distress alerting and is not remotely activated, it shall be acceptable to have an additional EPIRB installed in the wheelhouse near the conning position.

5 In passenger ships, information on the ship's position shall be continuously and automatically provided to all relevant radiocommunication equipment to be included in the initial distress alert when the button or buttons on the distress panel is pressed.

6 In passenger ships, a distress alarm panel shall be installed at the conning position. The distress alarm panel shall provide visual and aural indication of any distress alert or alerts received on board and shall also indicate through which radiocommunication service the distress alerts have been received."

Regulation 7
Radio equipment: General

30 *The following new paragraph 5 is added after existing paragraph 4:*

"5 Every passenger ship shall be provided with means for two-way on-scene radiocommunications for search and rescue purposes using the aeronautical frequencies 121.5 MHz and 123.1 MHz from the position from which the ship is normally navigated."

Regulation 16
Radio personnel

31 *The existing paragraph is numbered as paragraph 1.*

32 *The following new paragraph 2 is added after the renumbered paragraph 1:*

"2 In passenger ships, at least one person qualified in accordance with paragraph 1 shall be assigned to perform only radiocommunication duties during distress incidents."

Annex 1-11
Resolution MSC.47(66):
Adoption of amendments to the International Convention for the Safety of Life at Sea, 1974 (adopted on 4 June 1996)

THE MARITIME SAFETY COMMITTEE,

RECALLING Article 28(b) of the Convention on the International Maritime Organization concerning the functions of the Committee,

RECALLING FURTHER article VIII(b) of the International Convention for the Safety of Life at Sea (SOLAS), 1974, hereinafter referred to as ''the Convention'', concerning the procedures for amending the annex to the Convention, other than the provisions of chapter I thereof,

HAVING CONSIDERED, at its sixty-sixth session, amendments to the Convention proposed and circulated in accordance with article VIII(b)(i) thereof,

1. ADOPTS, in accordance with article VIII(b)(iv) of the Convention, amendments to the Convention the text of which is set out in the annex* to the present resolution;

2. DETERMINES, in accordance with article VIII(b)(vi)(2)(bb) of the Convention, that the amendments shall be deemed to have been accepted on 1 January 1998, unless, prior to that date, more than one third of the Contracting Governments to the Convention or Contracting Governments the combined merchant fleets of which constitute not less than 50% of the gross tonnage of the world's merchant fleet, have notified their objections to the amendments;

3. INVITES Contracting Governments to note that, in accordance with article VIII(b)(vii)(2) of the Convention, the amendments shall enter into force on 1 July 1998 upon their acceptance in accordance with paragraph 2 above;

4. REQUESTS the Secretary-General, in conformity with article VIII(b)(v) of the Convention, to transmit certified copies of the present resolution and the text of the amendments contained in the annex to all Contracting Governments to the Convention;

5. FURTHER REQUESTS the Secretary-General to transmit copies of this resolution and its annex to Members of the Organization, which are not Contracting Governments to the Convention.

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* Only the amendments relevant to the GMDSS have been reproduced.

Annex to resolution MSC.47(66)
Amendments to the International Convention for the Safety of Life at Sea, 1974

[. . .]

8 *The existing text of chapter III is replaced by the following:*

"CHAPTER III
Life-Saving Appliances and Arrangements

[. . .]

Part B
Requirements for ships and life-saving appliances

SECTION I – PASSENGER SHIPS AND CARGO SHIPS

Regulation 6
Communications

1 Paragraph 2 applies to all passenger ships and to all cargo ships of 300 gross tonnage and upwards.

2 Radio life-saving appliances

2.1 *Two-way VHF radiotelephone apparatus*

2.1.1 At least three two-way VHF radiotelephone apparatus shall be provided on every passenger ship and on every cargo ship of 500 gross tonnage and upwards. At least two two-way VHF radiotelephone apparatus shall be provided on every cargo ship of 300 gross tonnage and upwards but less than 500 gross tonnage. Such apparatus shall conform to performance standards not inferior to those adopted by the Organization.* If a fixed two-way VHF radiotelephone apparatus is fitted in a survival craft it shall conform to performance standards not inferior to those adopted by Organization.*

2.1.2 Two-way VHF radiotelephone apparatus provided on board ships prior to 1 February 1992 and not complying fully with the performance standards adopted by the Organization may be accepted by the Administration until 1 February 1999 provided the Administration is satisfied that they are compatible with approved two-way VHF radiotelephone apparatus.

2.2 *Radar transponders*

At least one radar transponder shall be carried on each side of every passenger ship and of every cargo ship of 500 gross tonnage and upwards. At least one radar transponder shall be carried on every cargo ship of 300 gross tonnage and upwards but less than 500 gross tonnage. Such radar transponders shall conform to performance standards not inferior to those adopted by the Organization.† The radar transponders‡ shall be stowed in such locations that they can be rapidly placed in any survival craft other than the liferaft or liferafts required by regulation 31.1.4. Alternatively one radar transponder shall be stowed in each survival craft other than those required by regulation 31.1.4. On ships carrying at least two radar transponders and equipped with free-fall lifeboats one of the radar transponders shall be stowed in a free-fall lifeboat and the other located in the immediate vicinity of the navigation bridge so that it can be utilized on board and ready for transfer to any of the other survival craft.

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* Refer to the Performance standards for survival craft two-way VHF radiotelephone apparatus adopted by the Organization by resolution A.809(19), as it may be amended, annex 1 or annex 2 as applicable.

† Refer to the Performance standards for survival craft radar transponders for use in search and rescue operations adopted by the Organization by resolution A.802(19), as it may be amended.

‡ One of these radar transponders may be the radar transponder required by regulation IV/7.1.3.

3 Distress flares

Not less than 12 rocket parachute flares, complying with the requirements of section 3.1 of the Code, shall be carried and be stowed on or near the navigation bridge.

4 On-board communications and alarm systems

4.1 An emergency means comprised of either fixed or portable equipment or both shall be provided for two-way communications between emergency control stations, muster and embarkation stations and strategic positions on board.

4.2 A general emergency alarm system complying with the requirements of paragraph 7.2.1 of the Code shall be provided and shall be used for summoning passengers and crew to muster stations and to initiate the actions included in the muster list. The system shall be supplemented by either a public address system complying with the requirements of paragraph 7.2.2 of the Code or other suitable means of communication. Entertainment sound systems shall automatically be turned off when the general emergency alarm system is activated.

4.3 On passenger ships the general emergency alarm system shall be audible on all open decks.

4.4 On ships fitted with a marine evacuation system communication between the embarkation station and the platform or the survival craft shall be ensured.

5 Public address systems on passenger ships

5.1 In addition to the requirements of regulation II-2/40.5 or regulation II-2/41.2, as appropriate, and of paragraph 6.4.2, all passenger ships shall be fitted with a public address system. With respect to passenger ships constructed before 1 July 1997 the requirements of paragraphs 5.2 and 5.4, subject to the provisions of paragraph 5.5, shall apply not later than the date of the first periodical survey after 1 July 1997.

5.2 The public address system shall be clearly audible above the ambient noise in all spaces, prescribed by paragraph 7.2.2.1 of the Code, and shall be provided with an override function controlled from one location on the navigation bridge and such other places on board as the Administration deems necessary, so that all emergency messages will be broadcast if any loudspeaker in the spaces concerned has been switched off, its volume has been turned down or the public address system is used for other purposes.

5.3 On passenger ships constructed on or after 1 July 1997:

.1 the public address system shall have at least two loops which shall be sufficiently separated throughout their length and have two separate and independent amplifiers; and

.2 the public address system and its performance standards shall be approved by the Administration having regard to the recommendations adopted by the Organization.*†

5.4 The public address system shall be connected to the emergency source of electrical power required by regulation II-1/42.2.2.

5.5 Ships constructed before 1 July 1997 which are already fitted with the public address system approved by the Administration which complies substantially with those required by sections 5.2 and 5.4 and paragraph 7.2.2.1 of the Code are not required to change their system.

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* Refer to the Code on Alarms and Indicators, 1995, adopted by the Organization by resolution A.830(19).
† Refer to performance standards for public address systems, to be developed by the Organization."

[. . .]

Annex 1-12
Resolution MSC.69(69):
Adoption of amendments to the International Convention for the Safety of Life at Sea, 1974, as amended (adopted on 18 May 1998)

THE MARITIME SAFETY COMMITTEE,

RECALLING Article 28(b) of the Convention on the International Maritime Organization concerning the functions of the Committee,

RECALLING FURTHER article VIII(b) of the International Convention for the Safety of Life at Sea (SOLAS), 1974, hereinafter referred to as "the Convention", concerning the procedures for amending the annex to the Convention other than chapter I,

HAVING CONSIDERED, at its sixty-ninth session, amendments to the Convention proposed and circulated in accordance with article VIII(b)(i) thereof,

1. ADOPTS, in accordance with article VIII(b)(iv) of the Convention, amendments to the Convention the text of which is set out in the annex* to the present resolution;

2. DETERMINES, in accordance with article VIII(b)(vi)(2)(bb) of the Convention, that the amendments shall be deemed to have been accepted on 1 January 2002, unless, prior to that date, more than one third of the Contracting Governments to the Convention or Contracting Governments the combined merchant fleets of which constitute not less than 50% of the gross tonnage of the world's merchant fleet, have notified their objections to the amendments;

3. INVITES Contracting Governments to note that, in accordance with article VIII(b)(vii)(2) of the Convention, the amendments shall enter into force on 1 July 2002 upon their acceptance in accordance with paragraph 2 above;

4. REQUESTS the Secretary-General, in conformity with article VIII(b)(v) of the Convention, to transmit certified copies of the present resolution and the text of the amendments contained in the annex to all Contracting Governments to the Convention;

5. FURTHER REQUESTS the Secretary-General to transmit copies of this resolution and its annex to Members of the Organization, which are not Contracting Governments to the Convention.

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* Only the amendments relevant to the GMDSS have been reproduced.

Annex to resolution MSC.69(69)
Amendments to the International Convention for the Safety of Life at Sea, 1974, as amended

[. . .]

CHAPTER IV
Radiocommunications

Regulation 1
Application

2 *In paragraph 1, the words "*Unless expressly provided otherwise,*" are inserted before the words "*this chapter*".*

Regulation 2
Terms and definitions

3 *The following new subparagraph .16 of paragraph 1 is added after existing subparagraph .15:*

".16 *Global maritime distress and safety system (GMDSS) identities* means maritime mobile services identity, the ship's call sign, Inmarsat identities and serial number identity which may be transmitted by the ship's equipment and used to identify the ship."

4 *The existing text of paragraph 2 is replaced by the following:*

"2 All other terms and abbreviations which are used in this chapter and which are defined in the Radio Regulations and in the International Convention on Maritime Search and Rescue (SAR), 1979, as may be amended, shall have the meanings as defined in those Regulations and the SAR Convention."

5 *The following new regulation 5-1 is added after existing regulation 5:*

"Regulation 5-1
Global maritime distress and safety system identities

1 This regulation applies to all ships on all voyages.

2 Each Contracting Government undertakes to ensure that suitable arrangements are made for registering global maritime distress and safety system (GMDSS) identities and for making information on these identities available to rescue co-ordination centres on a 24-hour basis. Where appropriate, international organizations maintaining a registry of these identities shall be notified by the Contracting Government of these assignments."

Regulation 13
Sources of energy

6 *In paragraph 8, the words "*, including the navigation receiver referred to in regulation 18,*" are inserted after the word "*chapter*".*

Regulation 15
Maintenance requirements

7 *The following new paragraph 9 is added after existing paragraph 8:*

"9 Satellite EPIRBs shall be tested at intervals not exceeding 12 months for all aspects of operational efficiency with particular emphasis on frequency stability, signal strength and coding. However, in cases where it appears proper and reasonable, the Administration may extend this period to 17 months. The test may be conducted on board the ship or at an approved testing or servicing station."

8 *The following new regulation 18 is added after existing regulation 17:*

"**Regulation 18**
Position-updating

All two-way communication equipment carried on board a ship to which this chapter applies which is capable of automatically including the ship's position in the distress alert shall be automatically provided with this information from an internal or external navigation receiver, if either is installed. If such a receiver is not installed, the ship's position and the time at which the position was determined shall be manually updated at intervals not exceeding 4 hours, while the ship is under way, so that it is always ready for transmission by the equipment."

Annex 2
*IMO Assembly and MSC resolutions relevant to the GMDSS**

		Resolution
Annex 2-1	– Use of the COSPAS–SARSAT low polar orbiting satellite EPIRB system	A.568(14)
Annex 2-2	– Type approval of ship earth stations	A.570(14)
Annex 2-3	– Review and evaluation of the global maritime distress and safety system (GMDSS)	A.606(15)
Annex 2-4	– Carriage of radar operating in the frequency band 9300–9500 MHz	A.614(15)
Annex 2-5	– Search and rescue homing capability	A.616(15)
Annex 2-6	– Implementation of the NAVTEX system as a component of the World-Wide Navigational Warning Service	A.617(15)
Annex 2-7	– Carriage of satellite emergency position-indicating radio beacons (EPIRBs)	A.660(16)
Annex 2-8	– Type approval of satellite EPIRBs operating in the COSPAS–SARSAT system	A.696(17)
Annex 2-9	– Carriage of Inmarsat Enhanced Group Call SafetyNET receivers under the GMDSS	A.701(17)
Annex 2-10	– Radio maintenance guidelines for the GMDSS related to sea areas A3 and A4	A.702(17)
Annex 2-11	– Training of radio personnel in the GMDSS	A.703(17)
Annex 2-12	– Promulgation of maritime safety information	A.705(17)
Annex 2-13	– World-Wide Navigational Warning Service	A.706(17)
Annex 2-14	– Charges for distress, urgency and safety messages through the Inmarsat system	A.707(17)
Annex 2-15	– Procedures and arrangements for issuing GMDSS certificates to holders of non-GMDSS certificates	A.769(18)
Annex 2-16	– Provision of radio services for the GMDSS	A.801(19)
Annex 2-17	– Guidelines for the avoidance of false distress alerts	A.814(19)
Annex 2-18	– Establishment, updating and retrieval of the information contained in the registration databases for the GMDSS	A.887(21)
Annex 2-19	– Criteria for the provision of mobile-satellite communication systems in the GMDSS	A.888(21)
Annex 2-20	– Maintenance of a continuous listening watch on VHF channel 16 by SOLAS ships whilst at sea after 1 February 1999 and installation of VHF DSC facilities on non-SOLAS ships	MSC.77(69)

* Excluding those related to the performance standards for the GMDSS radio equipment.

Annex 2-1
Resolution A.568(14)
(Adopted on 20 November 1985)

USE OF THE COSPAS–SARSAT LOW POLAR ORBITING SATELLITE EPIRB SYSTEM

THE ASSEMBLY,

RECALLING Article 15(j) of the Convention on the International Maritime Organization concerning the functions of the Assembly in relation to regulations and guidelines concerning maritime safety,

RECOGNIZING the need to improve maritime safety and to promote safety of life at sea,

NOTING that the Maritime Safety Committee has identified functional requirements and draft carriage requirements for the future global maritime distress and safety system which include the extensive use of satellite facilities,

NOTING ALSO that a number of countries are performing trials with the COSPAS–SARSAT system based on the use of low-orbital near-polar satellites,

NOTING FURTHER that the COSPAS–SARSAT Parties have invited Member Governments to participate in the COSPAS–SARSAT system,

BEARING IN MIND that the COSPAS–SARSAT system has demonstrated effective alerting and a high accuracy of determining the position of units in distress and has been successfully used in a number of real emergency situations,

BEING AWARE that the COSPAS–SARSAT system provides for use of existing emergency position-indicating radio beacons operating on 121.5 MHz with technical characteristics in accordance with ITU Radio Regulations and also for use of newly developed emergency position-indicating radio beacons operating in the frequency band 406 MHz to 406.1 MHz,

ALSO BEING AWARE that the World Administrative Radio Conference for the Mobile Services, 1983, adopted resolution No. 205 relating to the protection of the frequency band 406 MHz to 406.1 MHz allocated to the mobile-satellite service,

HAVING CONSIDERED the recommendation made by the Maritime Safety Committee at its fiftieth session,

1. RECOMMENDS Member Governments:

   (a) to encourage the use of the COSPAS–SARSAT system for alerting and position determination of units in distress using emergency position-indicating radio beacons;

   (b) to participate in evaluating the COSPAS–SARSAT system using emergency position-indicating radio beacons operating in the frequency band 406 MHz to 406.1 MHz;

   (c) to take appropriate measures to cease unauthorized transmissions in the frequency band 406 MHz to 406.1 MHz and also to participate in the monitoring programme of the International Frequency Registration Board of the International Telecommunication Union for identifying and eliminating interference caused by unauthorized equipment operating or causing interference in this band;

2. RECOMMENDS Member Governments that are COSPAS–SARSAT Parties to inform the Organization regularly of the result of their trials and to submit a final report to the Organization.

Annex 2-2
Resolution A.570(14)

(Adopted on 20 November 1985)

TYPE APPROVAL OF SHIP EARTH STATIONS

THE ASSEMBLY,

RECALLING Article 15(j) of the Convention on the International Maritime Organization concerning the functions of the Assembly in relation to regulations and guidelines concerning maritime safety,

RECOGNIZING that ship earth stations should be type approved to ensure their operational reliability and to avoid adverse interaction between this equipment and other communication and navigational equipment aboard ship,

FURTHER RECOGNIZING the value of the centralized type approval conducted by the International Maritime Satellite Organization (Inmarsat) in minimizing the duplication of effort in type approval,

HAVING CONSIDERED the recommendation made by the Maritime Safety Committee at its fiftieth session,

1. RECOMMENDS Member Governments to accept type approval of ship earth stations by Inmarsat as sufficient for their national type acceptance of such equipment, in respect of those aspects relating to the Inmarsat technical requirements;

2. REQUESTS Inmarsat, at the invitation of interested Administrations:

   (a) to encourage manufacturers to include tests covering additional national requirements of those Administrations in the Inmarsat type approval testing;

   (b) to certify that such additional tests have been successfully performed, in order to facilitate national type acceptance procedures.

Annex 2-3
Resolution A.606(15)

(Adopted on 19 November 1987)

REVIEW AND EVALUATION OF THE GLOBAL MARITIME DISTRESS AND SAFETY SYSTEM (GMDSS)

THE ASSEMBLY,

RECALLING Article 15(j) of the Convention on the International Maritime Organization concerning the functions of the Assembly in relation to regulations and guidelines concerning maritime safety,

NOTING the decisions of the WARC-MOB-87, related to the introduction of the GMDSS,

NOTING FURTHER the provisions of the preliminary draft of a revised chapter IV of the International Convention for the Safety of Life at Sea, 1974, developed for the purpose of establishing the requirements for the introduction of the global maritime distress and safety system (GMDSS),

RECOGNIZING the importance of the GMDSS for the safety of life at sea,

RECOGNIZING ALSO that the GMDSS is provisionally planned to be implemented between 1 August 1991 and 1 February 1997,

BEARING IN MIND the recommendations contained in resolution A.500(XII), concerning the costs and benefits to the maritime industry of the measures adopted by the Organization,

BEARING ALSO IN MIND that the investment required for ships to comply with the requirements of the GMDSS may, in many areas, be higher than the investment needed to meet present requirements, in particular for cargo ships of less than 1,600 gross tonnage,

CONSIDERING that a review of the requirements for MF DSC, VHF DSC and HF NBDP on cargo ships of less than 1,600 gross tonnage, as set out in this resolution, was a condition for the agreement on GMDSS carriage requirements for these ships and that DSC requirements for ships over 1,600 gross tonnage will be applicable when DSC equipment is available,

FURTHER CONSIDERING the importance of keeping the operation of the GMDSS and the technical developments related thereto under review,

REQUESTS the Maritime Safety Committee* to:

(a) keep under review the requirements for MF DSC, VHF DSC and HF NBDP on ships of 300 gross tonnage and over but less than 1,600 gross tonnage and for MF DSC and VHF DSC on ships of 1,600 gross tonnage and over, in the light of the cost and demonstrated effectiveness of such facilities compared with alternative systems which may become available prior to the entry into force of the relevant carriage requirements;

(b) review and evaluate the experience gained with the global maritime distress and safety system (GMDSS) and determine whether, in the future, there is a need to adjust the requirements of the system.

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* The 37th session of COM Sub-Committee concluded that there was no reason to modify ships' carriage requirements with respect to DSC and NBDP equipment (COM 37/17, paragraphs 3.14 and 3.15).

Annex 2-4
Resolution A.614(15)

(Adopted on 19 November 1987)

CARRIAGE OF RADAR OPERATING IN THE FREQUENCY BAND 9,300–9,500 MHz

THE ASSEMBLY,

RECALLING Article 15(j) of the Convention on the International Maritime Organization concerning the functions of the Assembly in relation to regulations and guidelines concerning maritime safety,

NOTING the decision of the Maritime Safety Committee that a 9 GHz radar transponder should provide the main means in the global maritime distress and safety system (GMDSS) for locating survival craft,

NOTING FURTHER the provisions of regulation V/12 of the International Convention for the Safety of Life at Sea, 1974, require that:

(a) ships of 500 tons gross tonnage and upwards constructed on or after 1 September 1984 and ships of 1,600 tons gross tonnage and upwards constructed before 1 September 1984 shall be fitted with a radar installation, and

(b) ships of 10,000 tons gross tonnage and upwards shall be fitted with two radar installations,

BEARING IN MIND that the performance standards for radar equipment, adopted by resolution A.477(XII), do not specify which frequency band should be used for ships' radar equipment,

HAVING CONSIDERED the recommendation made by the Maritime Safety Committee at its fifty-third session,

RECOMMENDS Member Governments to ensure that on ships equipped with a radar installation or installations at least one radar operates in the 9,300–9,500 MHz frequency band.

Annex 2-5
Resolution A.616(15)

(Adopted on 19 November 1987)

SEARCH AND RESCUE HOMING CAPABILITY

THE ASSEMBLY,

RECALLING Article 15(j) of the Convention on the International Maritime Organization concerning the functions of the Assembly in relation to regulations and guidelines concerning maritime safety,

RECALLING ALSO that the International Convention for the Safety of Life at Sea, 1974, as amended, requires by regulation V/12(q) that all new ships of 1,600 tons gross tonnage and upwards when engaged on international voyages be fitted with radio equipment for homing on the radiotelephone distress frequency,

RECALLING FURTHER that resolution A.221(VII) recommends Contracting Governments to the International Convention for the Safety of Life at Sea, 1960, to encourage the fitting of ships of less than 1,600 tons gross tonnage with radio equipment for homing on the radiotelephone distress frequency,

FURTHER RECALLING that resolution A.225(VII) strongly recommends that all search and rescue aircraft be equipped with direction-finders of sufficient sensitivity and frequency coverage to permit homing on radio transmissions on all distress frequencies and transmissions of emergency position-indicating radio beacons using internationally approved frequencies,

BEARING IN MIND that the radiotelephone distress frequency 2,182 kHz will not be used for homing in the global maritime distress and safety system (GMDSS),

NOTING that the Maritime Safety Committee has decided that a 9 GHz radar transponder should provide the main means for locating in the system,

NOTING FURTHER that:

(a) there will be a need for locating or determining the bearings of ships in distress by rescue units, as defined in the 1979 SAR Convention, participating in rescue operations and engaged in on-scene communications,

(b) some homing equipment can be modified relatively easily to permit homing on satellite emergency position-indicating radio beacons transmitting on the frequency 406 MHz,

(c) the VHF/FM 156 MHz system will be a primary radio system in the GMDSS for on-scene communications in all sea areas,

(d) the VHF/FM 156 MHz system is a recognized radio system in the GMDSS for communication with survival craft,

(e) there will be a need to locate ships to which chapter IV of the 1974 SOLAS Convention does not apply that are in distress and which are generally equipped with at least VHF radiotelephony,

(f) the VHF/AM 121.5/243 MHz aeronautical system is presently widely used for ships' emergency position-indicating radio beacons and aircraft emergency locating transmitters to enable aircraft to locate ships and aircraft so equipped when in distress,

(g) such use by ships and aircraft of the 121.5/243 MHz aeronautical system is likely to continue for a considerable time after the implementation of the GMDSS,

(h) there will be a consequent need for rescue units to be able to home on transmissions on appropriate VHF/FM frequencies specified in appendix 18 of the Radio Regulations, and channel 16 in particular, as well as on the VHF/AM frequency 121.5 MHz,

HAVING CONSIDERED the recommendation made by the Maritime Safety Committee at its fifty-fourth session,

RECOMMENDS Member Governments to:

(a) consider the need and, if appropriate, equip rescue units under their jurisdiction with devices suitable for homing or direction-finding on the appropriate VHF/FM frequencies specified in appendix 18 of the Radio Regulations and the VHF/AM 121.5 MHz frequency;

(b) consider the need and, if appropriate, equip the SAR aircraft under their jurisdiction with devices suitable for homing on satellite EPIRB transmissions in the 406 MHz band;

(c) equip rescue units under their jurisdiction with radar compatible with the 9 GHz search and rescue radar transponder;

(d) encourage voluntary carriage by ships and other craft entitled to fly their flag of direction-finding or homing devices suitable for transmission on the appropriate VHF/FM frequencies specified in appendix 18 of the Radio Regulations or the VHF/AM 121.5 MHz frequency or on all such frequencies; and

(e) consider the need and, where necessary, establish facilities for VHF direction-finding on their coasts.

Annex 2-6
Resolution A.617(15)

(Adopted on 19 November 1987)

IMPLEMENTATION OF THE NAVTEX SYSTEM AS A COMPONENT OF THE WORLD-WIDE NAVIGATIONAL WARNING SERVICE

THE ASSEMBLY,

RECALLING Article 15(j) of the Convention on the International Maritime Organization concerning the functions of the Assembly in relation to regulations and guidelines concerning maritime safety,

RECALLING ALSO resolution A.419(XI)* by which it established the World-Wide Navigational Warning Service,

RECALLING ADDITIONALLY resolution A.420(XI)† concerning development of the maritime distress and safety system,

RECALLING FURTHER resolution A.525(13)‡ by which it adopted performance standards for narrow-band direct-printing telegraph equipment for the reception of navigational and meteorological warnings and urgent information to ships,

BEARING IN MIND the decisions of the XIth and XIIth International Hydrographic Conference,

BEARING IN MIND ALSO Recommendation 540-1§ of the International Radio Consultative Committee (CCIR) of ITU,

BEARING IN MIND FURTHER that the World Administrative Radio Conference for the Mobile Services, 1987, allocated the frequency 518 kHz for the international NAVTEX system, as well as the frequencies 490 kHz and 4209.5 kHz for other NAVTEX-type systems;

NOTING that a number of countries are currently providing a NAVTEX service to ships operating in coastal waters,

NOTING ALSO that the Maritime Safety Committee has identified functional requirements and draft carriage requirements for the maritime distress and safety system which include the use of the NAVTEX system,

HAVING CONSIDERED the recommendations made by the Maritime Safety Committee at its fiftieth, fifty-first and fifty-second sessions,

1. ADOPTS the automated direct-printing telegraph system for promulgation of navigational and meteorological warnings and urgent information to ships (NAVTEX) as a component of the World-Wide Navigational Warning Service on the basis of the recommendation set out in the annex to the present resolution;

2. INVITES Member Governments to commence NAVTEX broadcasts as soon as practicable, in accordance with resolution A.420(XI)† and the present resolution, to serve those coastal areas where the safety of navigation warrants such a service;

3. ALSO INVITES Member Governments wishing to establish, augment or alter any NAVTEX service to forward all relevant information to the Organization;

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* Superseded by resolution A.706(17) (see annex 2-13)
† Overtaken by 1988 (GMDSS) amendments to SOLAS.
‡ See annex 3-5-1.
§ Amended as 540-2 (see annex 3-5-5).

4. FURTHER INVITES Member Governments to encourage their ships to be fitted as soon as practicable with NAVTEX equipment which conforms to performance standards not inferior to those specified in resolution A.525(13);*

5. AUTHORIZES the Maritime Safety Committee to agree to such departures from the principles and standards set out in the Recommendation annexed to the present resolution as it may deem necessary in individual cases to serve the interests of safety of navigation;

6. REQUESTS the Maritime Safety Committee to keep the Recommendation under review in the light of experience gained in its application and to report as necessary to the Assembly.

Annex

RECOMMENDATION ON THE ESTABLISHMENT AND OPERATION OF NAVTEX SERVICES

(contents superseded by NAVTEX Manual)†

* See annex 3-5-1.
† See annex 4-2.

Annex 2-7
Resolution A.660(16)
(Adopted on 19 October 1989)

CARRIAGE OF SATELLITE EMERGENCY POSITION-INDICATING RADIO BEACONS (EPIRBs)

THE ASSEMBLY,

RECALLING Article 15(j) of the Convention on the International Maritime Organization concerning the functions of the Assembly in relation to regulations and guidelines concerning maritime safety,

RECOGNIZING that emergency position-indicating radio beacons (EPIRBs) improve the safety of life at sea by greatly facilitating search and rescue,

RECALLING that resolution A.522(13) recommends Administrations to encourage the carriage of float-free EPIRBs operating on frequencies compatible with the existing satellite search and rescue services,

RECALLING FURTHER that the Maritime Safety Committee at its fifty-second session recommended carriage of survival craft radar transponders, as an equivalent arrangement to the survival craft EPIRBs required by regulation III/6.2.3 of the 1983 SOLAS amendments, and also recommended that the ship itself be fitted with a satellite EPIRB in order to provide the alerting function,*

NOTING that the Conference of Contracting Governments to the International Convention for the Safety of Life at Sea, 1974, on the Global Maritime Distress and Safety System (GMDSS Conference, 1988) adopted resolution 4 – Recommendation on the early introduction of GMDSS radio life-saving appliances, which recommends that, where a means of transmitting signals for locating is provided on board a ship, Administrations accept a satellite EPIRB as equivalent to the survival craft EPIRBs,

NOTING ALSO the favourable experience already gained with EPIRBs operating in conjunction with the COSPAS–SARSAT system,

NOTING FURTHER that the GMDSS Conference, by regulation IV/7.1.6 of the 1988 SOLAS amendments, has adopted provisions, applicable not later than 1 August 1993, for the carriage of a float-free satellite EPIRB on every ship as part of the global maritime distress and safety system,

HAVING CONSIDERED the recommendation made by the Maritime Safety Committee at its fifty-seventh session,

RECOMMENDS that Administrations encourage the early fitting of float-free satellite EPIRBs prior to the date of entry into force of the requirements of chapter IV of the 1988 SOLAS amendments for the carriage of satellite EPIRBs on ships.

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* MSC/Circ. 423 on Equivalent arrangements for survival craft emergency position-indicating radio beacons.

Annex 2-8
Resolution A.696(17)
(Adopted on 6 November 1991)

TYPE APPROVAL OF SATELLITE EMERGENCY POSITION-INDICATING RADIO BEACONS (EPIRBs) OPERATING IN THE COSPAS–SARSAT SYSTEM

THE ASSEMBLY,

RECALLING Article 15(j) of the Convention on the International Maritime Organization concerning the functions of the Assembly in relation to regulations and guidelines concerning maritime safety,

NOTING that the Conference of Contracting Governments to the International Convention for the Safety of Life at Sea, 1974 (SOLAS 1974), on the global maritime distress and safety system (GMDSS Conference, 1988) adopted regulation IV/7.1.6 of the 1988 SOLAS amendments, applicable not later than 1 August 1993, requiring the carriage of a float-free satellite EPIRB on every ship as part of the global maritime distress and safety system,

NOTING Assembly resolution A.695(17)*, "Performance Standards for Float-Free Satellite Emergency Position-Indicating Radio Beacons (EPIRBs) operating on 406 MHz",

NOTING FURTHER resolution 3†, "Recommendation on the early introduction of GMDSS elements", adopted by the 1988 GMDSS Conference, which recommends, *inter alia*, that satellite EPIRBs be introduced as early as possible,

RECOGNIZING that satellite EPIRBs forming part of the global maritime distress and safety system and operating through the COSPAS–SARSAT satellite system in the frequency band 406–406.1 MHz (406 MHz EPIRBs) should be type approved to ensure the integrity of the COSPAS–SARSAT satellite system, to avoid harmful interference to the spaceborne equipment, to exclude unauthorized transmissions and to provide reliable data to rescue co-ordination centres,

RECOGNIZING FURTHER the value of the type approval procedure proposed by the COSPAS–SARSAT partners in order to ensure that satellite EPIRBs will not degrade system performance and will be compatible with the spaceborne equipment,

HAVING CONSIDERED the recommendation made by the Maritime Safety Committee at its fifty-eighth session,

RECOMMENDS Governments:

(a) to ensure, as part of national type approval procedures, that any new type of 406 MHz satellite EPIRB to be deployed on board ships is tested to confirm that it is in accordance with the IMO performance standards for 406 MHz EPIRBs (resolution A.695(17)*); confirmation that the satellite EPIRB meets part B of that performance standard can be achieved by either:

  (i) performing, or having performed, under national procedures, all appropriate tests; or

  (ii) accepting type approval test results obtained through the COSPAS–SARSAT type approval procedure (C/S T.007) and confirmed by the delivery of a COSPAS–SARSAT Type Approval Certificate; and

(b) to encourage national type approval authorities to develop test procedures compatible, to the extent possible, with C/S T.007, if necessary in consultation with the COSPAS–SARSAT Secretariat.

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* This has been superseded by resolution A.810(19) (see annex 3-3-1).

† See annex 1-3.

Annex 2-9
Resolution A.701(17)

(Adopted on 6 November 1991)

CARRIAGE OF INMARSAT ENHANCED GROUP CALL SAFETYNET RECEIVERS UNDER THE GLOBAL MARITIME DISTRESS AND SAFETY SYSTEM (GMDSS)

THE ASSEMBLY,

RECALLING Article 15(j) of the Convention on the International Maritime Organization concerning the functions of the Assembly in relation to regulations and guidelines concerning maritime safety,

RECALLING ALSO that carriage of Inmarsat SafetyNET receive facilities is required under regulation IV/7.1.5 of the 1988 amendments to the 1974 SOLAS Convention concerning radiocommunications for the global maritime distress and safety system (GMDSS),

RECOGNIZING that performance standards for such equipment are prescribed in resolution A.664(16),*

NOTING that resolution A.702(17)† on radio maintenance guidelines for the GMDSS related to sea areas A3 and A4 does not require duplication of the enhanced group call receive facility in ships opting for equipment duplication,

NOTING ALSO that resolution A.664(16) allows such equipment to be combined with an Inmarsat-C or Inmarsat-A ship earth station (SES), or other equipment,

NOTING FURTHER that such equipment combined with another SES may miss important maritime safety information (MSI), if that SES is left tuned to an ocean region satellite other than the one broadcasting relevant maritime safety information,

RECOMMENDS that, in order to ensure reception of MSI broadcasts via the International SafetyNET service:

(a) MSI providers make:

  (i) unscheduled SafetyNET broadcasts of distress alerts and urgent warnings through all Inmarsat ocean region satellites covering their area of responsibility;

  (ii) routine SafetyNET broadcasts through at least one designated satellite in accordance with a pre-arranged schedule co-ordinated by the Organization;

(b) Governments ensure that up-to-date publications providing information on MSI broadcasts are included among the nautical publications required to be carried aboard ships in accordance with SOLAS regulation V/20;

(c) Governments encourage ships to carry an Inmarsat enhanced group call receive facility, with an omnidirectional antenna, dedicated to the reception of MSI via the International SafetyNET service.

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* See annex 3-5-2.

† See annex 2-10.

Annex 2-10
Resolution A.702(17)

(Adopted on 6 November 1991)

RADIO MAINTENANCE GUIDELINES FOR THE GLOBAL MARITIME DISTRESS AND SAFETY SYSTEM (GMDSS) RELATED TO SEA AREAS A3 AND A4

THE ASSEMBLY,

RECALLING Article 15(j) of the Convention on the International Maritime Organization concerning the functions of the Assembly in relation to regulations and guidelines concerning maritime safety,

NOTING regulation IV/15, Maintenance requirements, of the International Convention for the Safety of Life at Sea, 1974 (SOLAS), as amended by the 1988 GMDSS Conference, and in particular regulation IV/15.7 concerning the methods of ensuring the availability of the functional requirements specified in regulation IV/4, for distress and safety purposes on ships engaged on voyages in sea areas A3 and A4,

NOTING ALSO resolution 5 of the 1988 GMDSS Conference which requests the Maritime Safety Committee to periodically review the requirements of regulation IV/15.7 in the light of experience gained,

HAVING CONSIDERED the recommendation made by the Maritime Safety Committee at its fifty-ninth session,

1. ADOPTS the Guidelines for Ensuring the Availability of Radio Equipment for Ships Engaged on Voyages in Sea Areas A3 and A4 Required by Regulation IV/15.7 of the 1974 SOLAS Convention, as Amended in 1988, set out in the annex to the present resolution:

2. RECOMMENDS that Governments, in applying regulation IV/15.7 to ships, take account of the annexed Guidelines;

3. REQUESTS the Maritime Safety Committee, when periodically reviewing the requirements of regulation IV/15.7, also to review and update the Guidelines as appropriate and to report as necessary to the Assembly.

Annex

GUIDELINES FOR ENSURING THE AVAILABILITY OF RADIO EQUIPMENT FOR SHIPS ENGAGED ON VOYAGES IN SEA AREAS A3 AND A4 REQUIRED BY REGULATION IV/15.7 OF THE 1974 SOLAS CONVENTION, AS AMENDED IN 1988

1 BASIC REQUIREMENT FOR ENSURING AVAILABILITY

1.1 Irrespective of the methods used to ensure the availability of the functional requirements specified in regulation IV/4, and as specified in regulation IV/15.8, a ship should not depart from any port unless and until the ship is capable of performing all distress and safety functions, as set out in regulation IV/4.

1.2 Irrespective of the methods used by the ship, all manufacturers' instruction manuals and maintenance manuals for each piece of equipment required and installed should be available on board. Adequate tools, spare parts and test equipment appropriate to the methods used by the ship, as specified by the Administration, should be provided. The manuals, tools, spare parts and test equipment, as applicable, should be readily accessible.

2 DUPLICATION OF EQUIPMENT FOR ENSURING AVAILABILITY

2.1 If availability is ensured by using a combination of methods which includes duplication of equipment, in addition to the radio installations required by regulations IV/7, IV/10 and IV/11, as appropriate, the following radio installations complying with regulation IV/14 should be available on board ships engaged on voyages in:

.1 *sea area A3* – a VHF radio installation complying with the requirements of regulation IV/7.1.1 and either an MF/HF radio installation complying with the requirements of regulation IV/10.2.1 and being able to comply fully with the watch requirements of IV/12.1.3 or an Inmarsat ship earth station (SES) complying with the requirements of regulation IV/10.1.1. The MF/HF installation or Inmarsat SES installed for duplication should also comply with regulation IV/10.3;

.2 *sea areas A3 and A4* – a VHF radio installation complying with the requirements of regulation IV/7.1.1 and an MF/HF radio installation complying with the requirements of regulation IV/10.2.1 and being able to comply fully with the watch requirements of IV/12.1.3. Ships operating in sea area A4 only occasionally and having originally installed an MF/HF radio installation may, instead of the additional MF/HF radio installation, install an Inmarsat SES complying with the requirements of regulation IV/10.1.1. The MF/HF radio installation or Inmarsat SES installed for duplication should also comply with regulation V/10.3.

2.2 The additional radio installations specified in 2.1.1 and 2.1.2 of these Guidelines should each be connected to a separate antenna and be installed and ready for immediate operation.

2.3 It should be possible to connect the additional radio installations specified in 2.1.1 and 2.1.2 (hereinafter referred to as *duplicated equipment*) to the reserve source or sources of energy required by regulation IV/13.2, in addition to the appropriate radio equipment specified in that regulation (hereinafter referred to as *basic equipment*). The capacity of the reserve source or sources of energy should be sufficient to operate the particular installation (i.e. the basic equipment or the duplicated equipment) with the highest power consumption, for the appropriate period specified in regulation IV/13.2.1 to IV/13.2.3. However, the arrangement for the reserve source or sources of energy should be such that a single fault in this arrangement should not be able to affect both the basic and the duplicated equipment.

3 SHORE-BASED MAINTENANCE FOR ENSURING AVAILABILITY

3.1 If availability is ensured by using a combination of methods which includes shore-based maintenance, an arrangement acceptable to the Administration should be established to ensure adequate support of the ship for the maintenance and repair of its radio installations. For example, the following arrangements, among others, may be suitable:

.1 an agreement with a company known to cover the trading area of the ship to provide maintenance and repair facilities on a call-out basis;

.2 provision of facilities at the main base of ships engaged on a regular trading pattern. Records of Equipment (Form P, R or C) should include an indication of the types of arrangements for shore-based maintenance.

3.2 It should be recognized that, despite the use of other methods, some reliance on shore-based maintenance to ensure the availability of the functional requirements of the GMDSS will always be necessary.

4 AT-SEA ELECTRONIC MAINTENANCE CAPABILITY FOR ENSURING AVAILABILITY

4.1 If availability is ensured by using a combination of methods which includes at-sea electronic maintenance capability, adequate additional technical documentation, tools, test equipment and spare parts must be carried on board in order to enable the maintainer to perform tests and localize and repair faults in the radio equipment. The extent of this additional technical documentation, tools, measuring equipment and spare parts to be carried on board should be consistent with the equipment installed and should be approved by the Administration. An indication of such approval should be entered in the Records of Equipment (Form P, R or C).

4.2 The person designated to perform functions for at-sea electronic maintenance should either hold an appropriate certificate as specified by the Radio Regulations, as required, or have equivalent at-sea electronic maintenance qualifications, as may be approved by the Administration, taking into account the recommendations* of the Organization on the training of such personnel.

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* Refer to Assembly resolution A.703(17) concerning training of radio personnel in the global maritime distress and safety system (GMDSS) (see annex 2-11).

Annex 2-11
Resolution A.703(17)

(Adopted on 6 November 1991)

TRAINING OF RADIO PERSONNEL IN THE GLOBAL MARITIME DISTRESS AND SAFETY SYSTEM (GMDSS)

THE ASSEMBLY,

RECALLING Article 15(j) of the Convention on the International Maritime Organization concerning the functions of the Assembly in relation to regulations and guidelines concerning maritime safety,

CONSIDERING the 1987 amendments to the Radio Regulations, the 1988 amendments to the International Convention for the Safety of Life at Sea, 1974 (SOLAS), and the 1991 amendments to the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers, 1978 (STCW), for introduction of the global maritime distress and safety system (GMDSS),

NOTING that the 1991 amendments to regulation IV/2 of the STCW Convention require that, in determining the appropriate level of knowledge and training for certification of GMDSS radio personnel, the Administration shall also take into account the relevant recommendations of the Organization,

NOTING ALSO that resolutions 14 and 15 of the International Conference on Training and Certification of Seafarers, 1978, concerning the training and certification of radio officers and radiotelephone operators do not apply to radio personnel on ships operating in the GMDSS,

NOTING FURTHER that resolution A.702(17)* on radio maintenance guidelines for the GMDSS related to sea areas A3 and A4 includes provisions permitting Administrations to approve at-sea electronic maintenance qualifications which are equivalent to those recommended for holders of certificates specified by the Radio Regulations,

RECOGNIZING the need for developing recommendations on training for radio personnel in ships operating in the GMDSS,

HAVING CONSIDERED the recommendation made by the Maritime Safety Committee at its fifty-ninth session,

1. ADOPTS:

   (a) the Recommendation on Training of Radio Operators related to the First-Class Radioelectronic Certificate, set out in annex 1;

   (b) the Recommendation on Training of Radio Operators related to the Second-Class Radioelectronic Certificate, set out in annex 2;

   (c) the Recommendation on Training of Radio Operators related to the General Operator's Certificate, set out in annex 3;

   (d) the Recommendation on Training of Radio Operators related to the Restricted Operator's Certificate, set out in annex 4; and

   (e) the Recommendation on Training of Personnel Performing Maintenance of the GMDSS Installations Aboard Ships, set out in annex 5;

2. RECOMMENDS Governments to take account of the appropriate recommendation set out in the annexes to the present resolution on the training of radio personnel for ships operating in the GMDSS;

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* See annex 2-10.

3. INVITES the Maritime Safety Committee to keep the present resolution under review in consultation or association with other international organizations, as appropriate, particularly with the International Labour Organisation and the International Telecommunication Union, and to bring any future amendments to the attention of all Governments concerned;

4. AUTHORIZES the Maritime Safety Committee to keep the annexed recommendations under review and to adopt, when appropriate, amendments thereto.

Annex 1

RECOMMENDATION ON TRAINING OF RADIO OPERATORS RELATED TO THE FIRST-CLASS RADIOELECTRONIC CERTIFICATE

1 GENERAL

1.1 Before training is commenced, the requirements of medical fitness, especially as to hearing, eyesight and speech, should be met by the candidate.

2.1 The training should be relevant to the provisions of the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW), the provisions of the Radio Regulations annexed to the International Telecommunication Convention (Radio Regulations) and the provisions of the International Convention for the Safety of Life at Sea (SOLAS) then in force, with particular attention to provisions for the global maritime distress and safety system (GMDSS). In developing training requirements, account should be taken of knowledge of the following items, which is not an exhaustive list.

2 THEORY

2.1 Knowledge of the general principles and basic factors necessary for safe and efficient use of all the subsystems and equipment required in the GMDSS sufficient to support the training requirements listed in the practical section of this annex.

2.2 Knowledge of the use, operation and service areas of the GMDSS subsystems, including satellite system characteristics, navigational and meteorological warning systems and selection of appropriate communication circuits.

2.3 Knowledge of the principles of electricity and the theory of radio and electronics sufficient to meet the requirements specified in 2.4, 2.5, 2.6, 2.7 and 2.8 below.

2.4 Theoretical knowledge of GMDSS radiocommunication equipment, including narrow-band direct-printing telegraphy and radiotelephone transmitters and receivers, digital selective calling equipment, ship earth stations, emergency position-indicating radio beacons, marine antenna systems, radio equipment for survival craft together with all auxiliary items, including power supplies, as well as general knowledge of the principles of other equipment generally used for radionavigation, with particular reference to maintaining the equipment in service.

2.5 Knowledge of factors that affect system reliability, availability, maintenance procedures and proper use of test equipment.

2.6 Knowledge of microprocessors and fault diagnosis in systems using microprocessors.

2.7 Knowledge of control systems in the GMDSS radio equipment, including testing and analysis.

2.8 Knowledge of the use of computer software for the GMDSS radio equipment and methods for correcting faults caused by loss of software control of the equipment.

3 REGULATIONS AND DOCUMENTATION

The operator should have knowledge of:

.1 the SOLAS Convention and the Radio Regulations, with particular emphasis on:

.1.1 distress, urgency and safety radiocommunications;

.1.2 avoiding harmful interference, particularly with distress and safety traffic;

.1.3 prevention of unauthorized transmissions;

.2 other documents relating to operational and communication procedures for distress, safety and public correspondence services, including charges, navigational warnings, and weather broadcasts in the maritime mobile service and the maritime mobile satellite service;

.3 use of the International Code of Signals and the IMO Standard Marine Navigational Vocabulary.

4 WATCHKEEPING AND PROCEDURES

Training should be given in:

.1 communication procedures and discipline to prevent harmful interference in the GMDSS subsystems;

.2 procedures for using propagation-prediction information to establish optimum frequencies for communications;

.3 radiocommunications watchkeeping relevant to all GMDSS subsystems, exchange of radiocommunications traffic, particularly concerning distress, urgency and safety procedures, and radio records;

.4 use of the international phonetic alphabet;

.5 monitoring a distress frequency while simultaneously monitoring or working on at least one other frequency;

.6 ship position-reporting systems and procedures;

.7 communication procedures of the IMO Merchant Ship Search and Rescue Manual (MERSAR), using radiocommunications;

.8 radio medical systems and procedures.

5 PRACTICAL

Practical training, supported by appropriate laboratory work, should be given in:

.1 correct and efficient operation of all GMDSS subsystems and equipment under normal propagation conditions and under typical interference conditions;

.2 safe operation of all the GMDSS communication equipment and ancillary devices, including safety precautions;

.3 adequate and accurate keyboard skill for the satisfactory exchange of communications;

.4 operational techniques for:

.4.1 receiver and transmitter adjustment for the appropriate mode of operation, including digital selective calling and direct-printing telegraphy;

.4.2 antenna adjustment and re-alignment, as appropriate;

.4.3 use of radio life-saving appliances;

.4.4 use of emergency position-indicating radio beacons (EPIRBs);

.5 antenna rigging, repair and maintenance, as appropriate;

.6 reading and understanding of pictorial, logic and circuit diagrams;

.7 use and care of those tools and test instruments necessary to carry out at-sea electronic maintenance;

.8 manual soldering and desoldering techniques, including those involving semiconductor devices and modern circuits and the ability to distinguish whether the circuit is suitable to be manually soldered or desoldered;

.9 tracing and repair of faults to component level where practicable, and to board/module level in other cases;

.10 recognition and correction of conditions contributing to the fault occurring;

.11 maintenance procedures, both preventive and corrective, for all the GMDSS communication equipment and radionavigation equipment;

.12 methods of alleviating electrical and electromagnetic interference such as bonding, shielding and bypassing.

6 MISCELLANEOUS

The operator should have knowledge of, and/or receive training in:

.1 the English language, both written and spoken, for the satisfactory exchange of communications relevant to the safety of life at sea;

.2 world geography, especially the principal shipping routes, services of rescue co-ordination centres (RCCs) and related communication routes;

.3 survival at sea, the operation of lifeboats, rescue boats, liferafts, buoyant apparatus and their equipment, with special reference to radio life-saving appliances;

.4 fire prevention and fire fighting, with particular reference to the radio installation;

.5 preventive measures for the safety of ship and personnel in connection with hazards related to radio equipment, including electrical, radiation, chemical and mechanical hazards;

.6 first aid, including heart-respiration revival technique;

.7 co-ordinated universal time (UTC), global time zones and international date-line.

Annex 2

RECOMMENDATION ON TRAINING OF RADIO OPERATORS RELATED TO THE SECOND-CLASS RADIOELECTRONIC CERTIFICATE

1 GENERAL

1.1 Before training is commenced, the requirements of medical fitness, especially as to hearing, eyesight and speech, should be met by the candidate.

1.2 The training should be relevant to the provisions of the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW), the provisions of the Radio Regulations annexed to the International Telecommunication Convention (Radio Regulations) and the provisions of the International Convention for the Safety of Life at Sea (SOLAS) then in force, with particular attention to provisions for the global maritime distress and safety system (GMDSS). In developing training requirements, account should be taken of knowledge of the following items, which is not an exhaustive list.

2 THEORY

2.1 Knowledge of the general principles and basic factors necessary for safe and efficient use of all the subsystems and equipment required in the GMDSS sufficient to support the training requirements listed in the practical section of this annex.

2.2 Knowledge of the use, operation and service areas of the GMDSS subsystems, including satellite system characteristics, navigational and meteorological warning systems and selection of appropriate communication circuits.

2.3 Knowledge of the principles of electricity and the theory of radio and electronics sufficient to meet the requirements specified in 2.4, 2.5, 2.6, 2.7 and 2.8 below.

2.4 General theoretical knowledge of GMDSS radiocommunication equipment, including narrow-band direct-printing telegraph and radiotelephone transmitters and receivers, digital selective calling equipment, ship earth stations, emergency position-indicating radio beacons, marine antenna systems, radio equipment for survival craft together with all auxiliary items, including power supplies, as well as general knowledge of other equipment generally used for radionavigation, with particular reference to maintaining the equipment in service.

2.5 General knowledge of factors that affect system reliability, availability, maintenance procedures and proper use of test equipment.

2.6 General knowledge of microprocessors and fault diagnosis in systems using microprocessors.

2.7 General knowledge of control systems in the GMDSS radio equipment, including testing and analysis.

2.8 Knowledge of the use of computer software for the GMDSS radio equipment and methods for correcting faults caused by loss of software control of the equipment.

3 REGULATIONS AND DOCUMENTATION

The operator should have knowledge of:

.1 the SOLAS Convention and the Radio Regulations, with particular emphasis on:

.1.1 distress, urgency and safety radiocommunications;

.1.2 avoiding harmful interference, particularly with distress and safety traffic;

.1.3 prevention of unauthorized transmissions;

.2 other documents relating to operational and communication procedures for distress, safety and public correspondence services, including charges, navigational warnings, and weather broadcasts in the maritime mobile service and the maritime mobile satellite service;

.3 use of the International Code of Signals and the IMO Standard Marine Navigational Vocabulary.

4 WATCHKEEPING AND PROCEDURES

Training should be given in:

.1 communication procedures and discipline to prevent harmful interference in the GMDSS subsystems;

.2 procedures for using propagation-prediction information to establish optimum frequencies for communications;

.3 radiocommunications watchkeeping relevant to all GMDSS subsystems, exchange of radiocommunications traffic, particularly concerning distress, urgency and safety procedures, and radio records;

.4 use of the international phonetic alphabet;

.5 monitoring a distress frequency while simultaneously monitoring or working on at least one other frequency;

.6 ship position-reporting systems and procedures;

.7 communication procedures of the IMO Merchant Ship Search and Rescue Manual (MERSAR), using radiocommunications;

.8 radio medical systems and procedures.

5 PRACTICAL

Practical training, supported by appropriate laboratory work, should be given in:

.1 correct and efficient operation of all GMDSS subsystems and equipment under normal propagation conditions and under typical interference conditions;

.2 safe operation of all the GMDSS communication equipment and ancillary devices, including safety precautions;

.3 adequate and accurate keyboard skill for the satisfactory exchange of communications;

.4 operational techniques for:

.4.1 receiver and transmitter adjustment for the appropriate mode of operation, including digital selective calling and direct-printing telegraphy;

.4.2 antenna adjustment and re-alignment, as appropriate;

.4.3 use of radio life-saving appliances;

.4.4 use of emergency position-indicating radio beacons (EPIRBs);

.5 antenna rigging, repair and maintenance, as appropriate;

.6 reading and understanding of pictorial, logic and module interconnection diagrams;

.7 use and care of those tools and test instruments necessary to carry out at-sea electronic maintenance at the level of unit or module replacement;

.8 basic manual soldering and desoldering techniques and their limitations;

.9 tracing and repair of faults to board/module level;

.10 recognition and correction of conditions contributing to the fault occurring;

.11 basic maintenance procedures, both preventive and corrective, for all the GMDSS communication equipment and radionavigation equipment;

.12 methods of alleviating electrical and electromagnetic interference such as bonding, shielding and bypassing.

6 MISCELLANEOUS

The operator should have knowledge of, and/or receive training in:

.1 the English language, both written and spoken, for the satisfactory exchange of communications relevant to the safety of life at sea;

.2 world geography, especially the principal shipping routes, services of rescue co-ordination centres (RCCs) and related communication routes;

.3 survival at sea, the operation of lifeboats, rescue boats, liferafts, buoyant apparatus and their equipment, with special reference to radio life-saving appliances;

.4 fire prevention and fire fighting, with particular reference to the radio installation;

.5 preventive measures for the safety of ship and personnel in connection with hazards related to radio equipment, including electrical, radiation, chemical and mechanical hazards;

.6 first aid, including heart-respiration revival technique;

.7 co-ordinated universal time (UTC), global time zones and international date-line.

Annex 3

RECOMMENDATION ON TRAINING OF RADIO OPERATORS RELATED TO THE GENERAL OPERATOR'S CERTIFICATE

1 GENERAL

1.1 Before training is commenced, the requirements of medical fitness, especially as to hearing, eyesight and speech, should be met by the candidate.

1.2 The training should be relevant to the provisions of the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW), the provisions of the Radio Regulations annexed to the International Telecommunication Convention (Radio Regulations) and the provisions of the International Convention for the Safety of Life at Sea (SOLAS) then in force, with particular attention to provisions for the global maritime distress and safety system (GMDSS). In developing training requirements, account should be taken of knowledge of the following items, which is not an exhaustive list.

2 THEORY

2.1 Knowledge of the general principles and basic factors necessary for safe and efficient use of all the subsystems and equipment required in the GMDSS sufficient to support the training requirements listed in the practical section of this annex.

2.2 Knowledge of the use, operation and service areas of the GMDSS subsystems, including satellite system characteristics, navigational and meteorological warning systems and selection of appropriate communication circuits.

3 REGULATIONS AND DOCUMENTATION

The operator should have knowledge of:

.1 the SOLAS Convention and the Radio Regulations, with particular emphasis on:

.1.1 distress, urgency and safety radiocommunications;

.1.2 avoiding harmful interference, particularly with distress and safety traffic;

.1.3 prevention of unauthorized transmissions;

.2 other documents relating to operational and communication procedures for distress, safety and public correspondence services, including charges, navigational warnings, and weather broadcasts in the maritime mobile service and the maritime mobile-satellite service;

.3 use of the International Code of Signals and the IMO Standard Marine Navigational Vocabulary.

4 WATCHKEEPING AND PROCEDURES

Training should be given in:

.1 communication procedures and discipline to prevent harmful interference in the GMDSS subsystems;

.2 procedures for using propagation-prediction information to establish optimum frequencies for communications;

.3 radiocommunications watchkeeping relevant to all GMDSS subsystems, exchange of radiocommunications traffic, particularly concerning distress, urgency and safety procedures, and radio records;

.4 use of the international phonetic alphabet;

.5 monitoring a distress frequency while simultaneously monitoring or working on at least one other frequency;

.6 ship position-reporting systems and procedures;

.7 communication procedures of the IMO Merchant Ship Search and Rescue Manual (MERSAR), using radiocommunications;

.8 radio medical systems and procedures.

5 PRACTICAL

Practical training should be given in:

.1 correct and efficient operation of all GMDSS subsystems and equipment under normal propagation conditions and under typical interference conditions;

.2 safe operation of all the GMDSS communications equipment and ancillary devices, including safety precautions;

.3 accurate and adequate keyboard skills for the satisfactory exchange of communications;

.4 operational techniques for:

.4.1 receiver and transmitter adjustment for the appropriate mode of operation, including digital selective calling and direct-printing telegraphy;

.4.2 antenna adjustment and re-alignment as appropriate;

.4.3 use of radio life-saving appliances;

.4.4 use of emergency position-indicating radio beacons (EPIRBs).

6 MISCELLANEOUS

The operator should have knowledge of, and/or receive training in:

.1 the English language, both written and spoken, for the satisfactory exchange of communications relevant to the safety of life at sea;

.2 world geography, especially the principal shipping routes, services of rescue co-ordination centres (RCCs) and related communication routes;

.3 survival at sea, the operation of lifeboats, rescue boats, liferafts, buoyant apparatus and their equipment, with special reference to radio life-saving appliances;

.4 fire prevention and fire fighting, with particular reference to the radio installation;

.5 preventive measures for the safety of ship and personnel in connection with hazards related to radio equipment, including electrical, radiation, chemical and mechanical hazards;

.6 first aid, including heart-respiration revival technique;

.7 co-ordinated universal time (UTC), global time zones and international date-line.

Annex 4

RECOMMENDATION ON TRAINING OF RADIO OPERATORS RELATED TO THE RESTRICTED OPERATOR'S CERTIFICATE

1 GENERAL

1.1 Before training is commenced, the requirements of medical fitness, especially as to hearing, eyesight and speech, should be met by the candidate.

1.2 The training should be relevant to the provisions of the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW), the provisions of the Radio Regulations annexed to the International Telecommunication Convention (Radio Regulations) and the provisions of the International

Convention for the Safety of Life at Sea (SOLAS) then in force, with particular attention to provisions for the global maritime distress and safety system (GMDSS). In developing training requirements, account should be taken of knowledge of the following items, which is not an exhaustive list.

2 THEORY

2.1 Knowledge of the general principles and basic factors, including VHF range limitation and antenna height effect necessary for safe and efficient use of all the subsystems and equipment required in the GMDSS in sea area A1, sufficient to support the training requirements listed in the practical section of this annex.

2.2 Knowledge of the use, operation and service areas of the GMDSS sea area A1 subsystems, e.g. navigational and meteorological warning systems and the appropriate communication circuits.

3 REGULATIONS AND DOCUMENTATION

The operator should have knowledge of:

.1 those parts of the SOLAS Convention and the Radio Regulations relevant to sea area A1, with particular emphasis on:

.1.1 distress, urgency and safety radiocommunications;

.1.2 avoiding harmful interference, particularly with distress and safety traffic;

.1.3 prevention of unauthorized transmissions;

.2 other documents relating to operational and communication procedures for distress, safety and public correspondence services, including charges, navigational warnings and weather broadcasts in the maritime mobile service in sea area A1;

.3 use of the International Code of Signals and the IMO Standard Marine Navigational Vocabulary.

4 WATCHKEEPING AND PROCEDURES

Training should be given in:

.1 communication procedures and discipline to prevent harmful interference in the GMDSS subsystems used in sea area A1;

.2 VHF communication procedures for:

.2.1 radiocommunications watchkeeping, exchange of radiocommunications traffic, particularly concerning distress, urgency and safety procedures, and radio records;

.2.2 monitoring a distress frequency while simultaneously monitoring or working on at least one other frequency;

.2.3 digital selective calling system;

.3 use of the international phonetic alphabet;

.4 ship position-reporting systems and procedures;

.5 communication procedures of the IMO Merchant Ship Search and Rescue Manual (MERSAR) using VHF radiocommunications;

.6 radio medical systems and procedures.

5 PRACTICAL

Practical training should be given in:

.1 correct and efficient operation of the GMDSS subsystems and equipment prescribed for ships operating in sea area A1 under normal propagation conditions and under typical interference conditions;

.2 safe operation of the relevant GMDSS communication equipment and ancillary devices, including safety precautions;

.3 operational techniques for:

.3.1 use of VHF, including channel, squelch, and mode adjustment, as appropriate;

.3.2 use of radio life-saving appliances;

.3.3 use of emergency position-indicating radio beacons (EPIRBs);

.3.4 use of NAVTEX receiver.

6 MISCELLANEOUS

The operator should have knowledge of, and/or receive training in:

.1 the English language, both written and spoken, for the satisfactory exchange of communications relevant to the safety of life at sea;

.2 services of rescue co-ordination centres (RCCs) and related communication routes;

.3 survival at sea, the operation of lifeboats, rescue boats, liferafts, buoyant apparatus and their equipment, with special reference to radio life-saving appliances;

.4 fire prevention and fire fighting, with particular reference to the radio installation;

.5 preventive measures for the safety of ship and personnel in connection with hazards related to radio equipment, including electrical, radiation, chemical and mechanical hazards;

.6 first aid, including heart-respiration revival technique.

Annex 5

RECOMMENDATION ON TRAINING OF PERSONNEL PERFORMING MAINTENANCE OF THE GMDSS INSTALLATIONS ABOARD SHIPS

1 GENERAL

1.1 Reference is made to regulation IV/15, Maintenance requirements, as contained in the 1988 amendments to the 1974 SOLAS Convention concerning radiocommunications for the GMDSS, and to resolution A.702(17) on radio maintenance guidelines for the GMDSS related to sea areas A3 and A4, which includes in its annex the following provision:

> "4.2 The person designated to perform functions for at-sea electronic maintenance should either hold an appropriate certificate as specified by the Radio Regulations, as required, or have equivalent at-sea electronic maintenance qualifications, as may be approved by the Administration, taking into account the recommendations of the Organization on the training of such personnel."

1.2 The following guidance on equivalent electronic maintenance qualifications is provided for use by Administrations as appropriate.

1.3 Training as recommended below does not qualify the person to be an operator of GMDSS radio equipment, unless he holds an appropriate radio operator's certificate.

2 MAINTENANCE TRAINING EQUIVALENT TO THE FIRST-CLASS RADIOELECTRONIC CERTIFICATE

2.1 In determining training equivalent to the maintenance elements of the first-class radioelectronic certificate, knowledge of the items referred to in the following paragraphs, contained in annex 1 to the present resolution, should be taken into account, but the list should not be considered exhaustive.

2.2 Theory

2.1, 2.3, 2.4, 2.5, 2.6, 2.7 and 2.8.

2.3 Practical

5.2, 5.4.1, 5.4.2, 5.4.3, 5.4.4, 5.5, 5.6, 5.7, 5.8, 5.9, 5.10, 5.11 and 5.12.

2.4 Miscellaneous

6.4, 6.5 and 6.6.

3 MAINTENANCE TRAINING EQUIVALENT TO THE SECOND-CLASS RADIOELECTRONIC CERTIFICATE

3.1 In determining training equivalent to the maintenance elements of the second-class radioelectronic certificate, knowledge of the items referred to in the following paragraphs, contained in annex 2 to the present resolution, should be taken into account, but the list should not be considered exhaustive.

3.2 Theory

2.1, 2.3, 2.4, 2.5, 2.6, 2.7 and 2.8.

3.3 Practical

5.2, 5.4.1, 5.4.2, 5.4.3, 5.4.4, 5.5, 5.6, 5.7, 5.8, 5.9, 5.10, 5.11 and 5.12.

3.4 Miscellaneous

6.4, 6.5 and 6.6.

Annex 2-12
Resolution A.705(17)
(Adopted on 6 November 1991)

PROMULGATION OF MARITIME SAFETY INFORMATION

The ASSEMBLY,

RECALLING Article 15(j) of the Convention on the International Maritime Organization concerning the functions of the Assembly in relation to regulations and guidelines concerning maritime safety,

RECALLING ALSO regulation V/2 of the International Convention for the Safety of Life at Sea, 1974 (SOLAS), which establishes the requirement for promulgating information on direct dangers to navigation,

NOTING resolution A.706(17)* on the World-Wide Navigational Warning Service,

RECALLING FURTHER regulation V/4 of the 1974 SOLAS Convention which establishes the requirement for promulgating maritime meteorological information,

BEARING IN MIND the 1988 amendments to the 1974 SOLAS Convention concerning radiocommunications for the global maritime distress and safety system (GMDSS),

BEARING IN MIND ALSO the work of the Organization in developing co-ordinated world-wide search and rescue facilities,

NOTING ADDITIONALLY that the Organization has adopted carriage requirements and performance standards for specialized systems for receiving maritime safety information on ships subject to the 1974 SOLAS Convention, as amended,

NOTING ALSO that some of the present means of transmitting maritime safety information will no longer be effective under the GMDSS,

NOTING FURTHER that Governments may, at their discretion, implement and operate other additional means of promulgation of maritime safety information to meet national requirements,

RECOGNIZING that international co-operation and co-ordination are essential for the satisfactory maintenance of maritime safety information services and that such services make a vital contribution to the safety of life at sea,

HAVING CONSIDERED the recommendation made by the Maritime Safety Committee at its fifty-ninth session,

1. RESOLVES that the procedures for the provision and promulgation of maritime safety information should be in accordance with the Recommendation on Promulgation of Maritime Safety Information set out in the annex to the present resolution;

2. URGES Governments to co-operate in providing maritime safety information in accordance with the structure established by the said Recommendation.

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* See annex 2-15.

Annex

RECOMMENDATION ON PROMULGATION OF MARITIME SAFETY INFORMATION

1 INTRODUCTION

1.1 The maritime safety information service is an internationally co-ordinated network of radio broadcasts containing information which is necessary for safe navigation, received in all ships by equipment which automatically* monitors the appropriate frequencies and prints out in simple English only that information which is relevant to the ship. This concept is illustrated in figure 1.

1.2 Maritime safety information (MSI) is of vital concern to all vessels. It is therefore essential that common standards are applied to the collection, editing and dissemination of this information. Only by doing so will the mariner be assured of receiving the information he needs, in a form which he understands, at the earliest possible time.

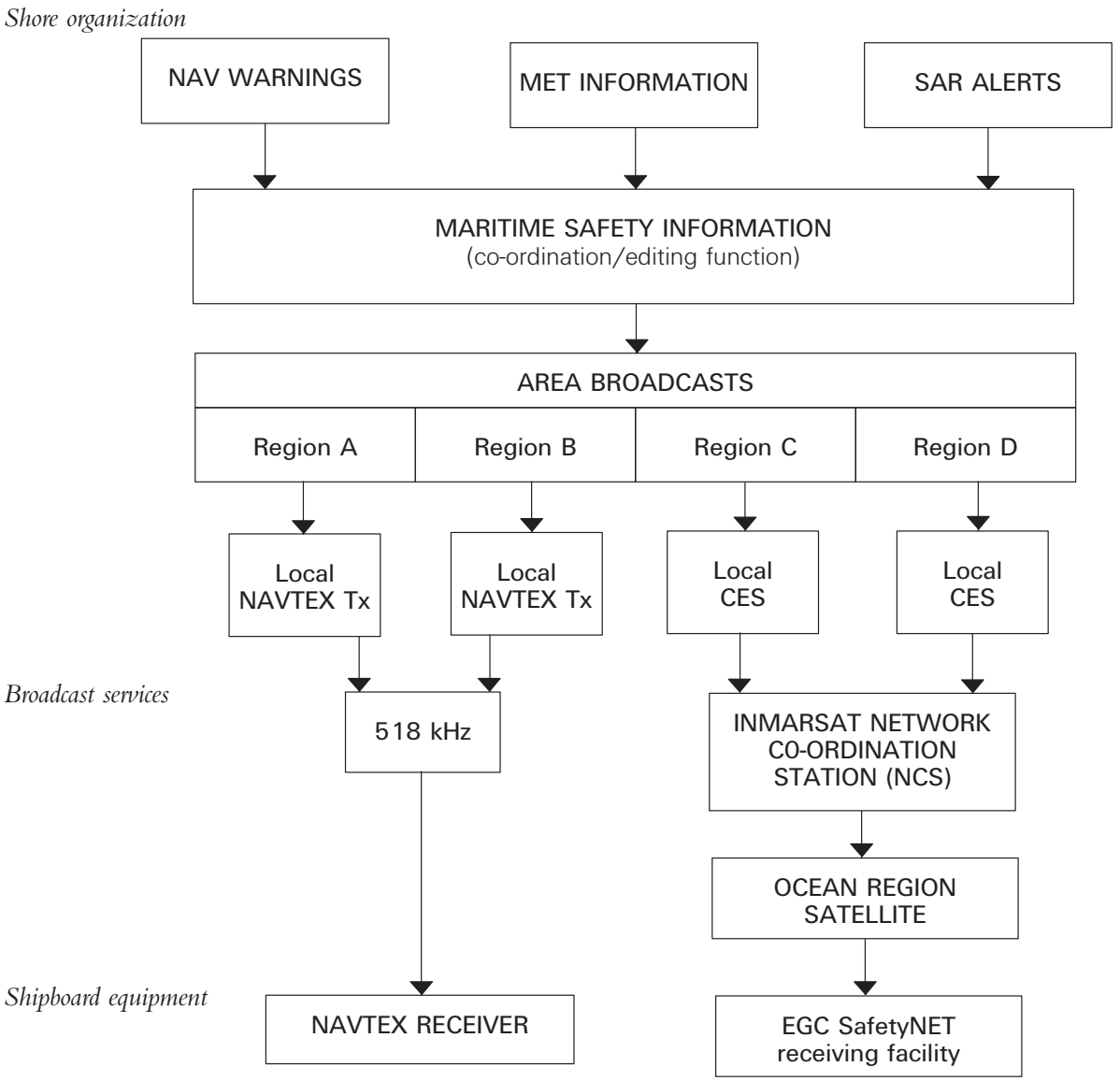


Figure 1 – *The international maritime safety information service*

Note: HF NBDP systems may be used to provide an additional supplementary equivalent service to EGC SafetyNET.

* The Organization has decided that manual operation will be acceptable for receiving broadcasts of MSI via the operational HF NBDP system (where available) until the full implementation of the GMDSS on 1 February 1999.

1.3 The purpose of this Recommendation is to set out the organization, standards and methods which should be used for the promulgation and reception of maritime safety information.

2 DEFINITIONS

2.1 For the purposes of this Recommendation, the following definitions apply:

.1 *Maritime safety information (MSI)* means navigational and meteorological warnings, meteorological forecasts and other urgent safety-related messages.

.2 *Maritime safety information service* means the co-ordinated service of navigational and meteorological warnings, meteorological forecasts and distress alerts.

.3 *World-wide navigational warning service (WWNWS)* means the internationally co-ordinated service for the promulgation of navigational warnings as set out in resolution A.706(17).

.4 *Meteorological information* means the marine meteorological warning and forecast information described in regulation V/4(b)(i) and (ii) of the 1974 SOLAS Convention.

.5 *Distress alert* means the initial shore-to-ship distress message broadcast in accordance with the Radio Regulations.

.6 *NAVTEX* means the system for the broadcast and automatic reception of maritime safety information by means of narrow-band direct-printing telegraphy.

.7 *International NAVTEX service* means the co-ordinated broadcast and automatic reception on 518 kHz of maritime safety information by means of narrow-band direct-printing telegraphy using the English language, as set out in the NAVTEX Manual, published by IMO.

.8 *National NAVTEX service* means the broadcast and automatic reception of maritime safety information by means of narrow-band direct-printing telegraphy using frequencies and languages as decided by the Administrations concerned.

.9 *International SafetyNET service* means the area-addressable global broadcast system, provided by Inmarsat, through the geostationary maritime communications satellite network for promulgation of maritime safety information.

3 BROADCAST SERVICES

3.1 Two systems are used for broadcasting maritime safety information. They are provided specifically to serve the requirements of chapter V of the 1974 SOLAS Convention in the areas covered by these systems, as follows:

.1 the International NAVTEX service transmissions in coastal regions; and

.2 the international SafetyNET service transmissions which cover all the waters of the globe, except for polar regions.

3.2 Information should be provided for unique and precisely defined sea areas, each being served only by the most appropriate of the above systems. Although there will be some duplication to allow a vessel to change from one system to another, the majority of messages will only be broadcast on one system.

3.3 NAVTEX transmissions should be made in accordance with the standards and procedures set out in the NAVTEX Manual. These transmissions are subject to approval by the Maritime Safety Committee. The means of obtaining this approval is described in the NAVTEX Manual.

3.4 International SafetyNET service transmissions should be made in accordance with the standards and procedures set out in the International SafetyNET Manual.*

3.5 Member Governments may also choose to provide supplementary equivalent broadcasts of maritime safety information in other modes using other frequencies. These may include national NAVTEX services on 4,209.5 kHz and 490 kHz and HF NBDP broadcasts.

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* Refer to annex 4-3.

4 RECEPTION FACILITIES

4.1 Ships are required to be capable of receiving maritime safety information broadcasts for the area in which they operate. This requirement is set out in chapter IV of the 1974 SOLAS Convention, as amended.

4.2 The international SafetyNET service receiving facility should conform to part A of the Inmarsat design and installation guidelines for the EGC SafetyNET equipment and should meet the performance standards adopted by the Organization by resolution A.664(16).*

4.3 The NAVTEX receiver should operate in accordance with the technical specifications set out in CCIR Recommendation 540†, as amended, and should meet the performance standards adopted by the Organization by resolution A.525(13).‡

5 PROVISION OF INFORMATION

5.1 Navigational warnings should be provided in accordance with the standards, organization and procedures of the WWNWS under the functional guidance of the International Hydrographic Organization (IHO) through its Commission on Promulgation of Radio Navigational Warnings.

5.2 Meteorological information should be provided in accordance with the technical regulations and recommendations of the World Meteorological Organization (WMO).

5.3 Distress alerts should be provided by the various authorities responsible for co-ordinating maritime search and rescue operations in accordance with the standards and procedures established by the Organization.

6 CO-ORDINATION PROCEDURES

6.1 In order to make the best use of automated reception facilities and to ensure that the mariner receives the minimum information necessary for safe navigation, careful co-ordination is required.

6.2 In general, this requirement for co-operation and co-ordination will be met by the standard operational procedures of IHO, WMO, International Telecommunication Union (ITU) and Inmarsat.

6.3 Cases of difficulty should be referred, in the first instance, to the most appropriate parent body.

6.4 Member States wishing to provide maritime safety information services should nominate a national co-ordinator for each type of information concerned, informing the Organization of such nominations as they are made. The Organization will maintain and, through the Maritime Safety Committee, publish a list of the nominated co-ordinators.

6.5 The establishment of transmissions in the international NAVTEX service is co-ordinated by the Maritime Safety Committee. Detailed guidance on the provision of NAVTEX services is contained in the NAVTEX Manual.

6.6 The use of satellite maritime safety information services is co-ordinated by the Maritime Safety Committee.

6.7 The designation of service areas is an important part of the co-ordination process since it is intended that a vessel should be able to obtain all the information relevant to a given area from a single source. Information co-ordinators should, therefore, design their broadcasts to suit a particular service area. The Maritime Safety Committee will designate service areas for the international SafetyNET service and the International NAVTEX service. In doing so, the Committee will take full account of the character and volume of information and the pattern of maritime traffic in the region and the advice of IHO and WMO.

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* See annex 3-5-2.
† See annex 3-5-5.
‡ See annex 3-5-1.

7 SYSTEM MANAGEMENT

7.1 Proposals for amendment or enhancement of maritime safety information services should be submitted to the Maritime Safety Committee for evaluation.

7.2 The agreement of IHO, WMO and ITU, as appropriate, and the active participation of other bodies should be sought, according to the nature of the proposed amendments.

7.3 The active participation of IHO, WMO, ITU and Inmarsat is considered necessary for the co-ordination of broadcasts of all maritime safety information.

7.4 Amendments adopted by the Maritime Safety Committee will be notified to all concerned, will provide at least 12 months' notification and will come into force on 1 January of the following year.

Annex 2-13
Resolution A.706(17)
(Adopted on 6 November 1991)

WORLD-WIDE NAVIGATIONAL WARNING SERVICE

THE ASSEMBLY,

RECALLING Article 15(j) of the Convention on the International Maritime Organization concerning the functions of the Assembly in relation to regulations and guidelines concerning maritime safety,

BEARING IN MIND the decisions of the XIth International Hydrographic Conference,

NOTING that the world-wide navigational warning service, adopted by resolution A.419(XI), has successfully been in existence since 1979,

NOTING FURTHER the provisions made for the promulgation of maritime safety information by the 1988 amendments to the International Convention for the Safety of Life at Sea, 1974, concerning radio-communications for the global maritime distress and safety system,

HAVING CONSIDERED the recommendations made by the Maritime Safety Committee at its fifty-ninth session,

1. ADOPTS the IMO/IHO World-Wide Navigational Warning Service – Guidance Document, as set out in annex 1 to the present resolution;

2. RECOMMENDS Governments to implement the world-wide navigational warning service;

3. AUTHORIZES the Maritime Safety Committee to amend the world-wide navigational warning service, as may be necessary, in accordance with the procedure set out in annex 2 to the present resolution;

4. REVOKES resolution A.419(XI).

Annex 1

IMO/IHO WORLD-WIDE NAVIGATIONAL WARNING SERVICE GUIDANCE DOCUMENT

[Text is contained in annex 4-1 of this publication*].

Annex 2

IMO PROCEDURE FOR AMENDING THE WORLD-WIDE NAVIGATIONAL WARNING SERVICE

1 Proposed amendments to the world-wide navigational warning service should be submitted to the Maritime Safety Committee for evaluation.

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* Contains the amendments adopted by the Maritime Safety Committee at its sixty-fifth session (9 to 17 May 1995), which entered into force on 1 January 1997 (see MSC/Circ.685), and the amendments adopted at its sixty-sixth session (28 May to 6 June 1996), which entered into force on 1 January 1998 (see MSC/Circ.750).

2 Amendments to the service should normally come into force at intervals of approximately two years or at such longer periods as determined by the Maritime Safety Committee at the time of adoption. Amendments adopted by the Maritime Safety Committee will be notified to all concerned, will provide at least 12 months' notification and will come into force on 1 January of the following year.

3 The agreement of the International Hydrographic Organization and the active participation of other bodies should be sought according to the nature of the proposed amendments.

4 When the proposals for amendment have been examined in substance, the Maritime Safety Committee will entrust the Sub-Committee on Radiocommunications with the ensuing editorial tasks.

5 The NAVAREA schedule of broadcast times and frequencies, not being an integral part of the service and being subject to frequent changes, will not be subject to the amendment procedures.

Annex 2-14
Resolution A.707(17)

(Adopted on 6 November 1991)

CHARGES FOR DISTRESS, URGENCY AND SAFETY MESSAGES THROUGH THE INMARSAT SYSTEM

THE ASSEMBLY

RECALLING Article 15(j) of the Convention on the International Maritime Organization concerning the functions of the Assembly in relation to regulations and guidelines concerning maritime safety,

RECALLING ALSO resolution 2 adopted by the International Conference on Maritime Search and Rescue, 1979, which recommends that States should arrange that participation in ship reporting systems shall be free of message cost to the ships concerned,

RECALLING FURTHER resolution 6 adopted by the 1988 Conference of Contracting Governments to SOLAS 1974 on the global maritime distress and safety system (GMDSS) which requests the Maritime Safety Committee to review funding arrangements prior to the implementation date of the GMDSS,

BEARING IN MIND that the existing terrestrial maritime radiocommunication services for distress, urgency and safety messages are free of charge to shipping,

NOTING that Inmarsat accounts with its coast earth station operators for all communications other than the initial distress call and message,

NOTING ALSO that the Joint IMO/Inmarsat Meeting on Funding for Maritime Distress and Safety Communications (4–7 December 1990) made further recommendations regarding the treatment of Inmarsat space segment charges as shown in the service/charging matrix for distress and safety communications through the Inmarsat system, set out in the annex to the present resolution, as well as, review arrangements,

NOTING FURTHER that the thirty-eighth session of the Inmarsat Council had agreed to the recommendations of the Director-General of Inmarsat regarding the treatment of maritime distress and safety communications which were based on the service/charging matrix set out in the annex to the present resolution,

FURTHER NOTING that the charges to ships and land subscribers for communication services provided via the Inmarsat system are established by national telecommunication entities in conformity with national policies and practices,

RECOGNIZING the advantages of the Inmarsat service for distress, urgency and safety purposes,

RECOGNIZING FURTHER that funding arrangements remain to be agreed at national level for coast earth stations and land-line charges related to the traffic covered by the recommendations of the Joint IMO/Inmarsat Meeting,

HAVING CONSIDERED the recommendation made by the Maritime Safety Committee at its fifty-ninth session,

1. RECOMMENDS that States having coast earth stations under their jurisdiction arrange that the following transmissions through the Inmarsat system shall be free of charge:

- ship-to-shore and shore-to-ship distress traffic;
- urgent ship-to-shore navigational and meteorological danger reports using record communications; and
- medical assistance for persons in grave and imminent danger;

2. RECOMMENDS ALSO that States make every effort, consistent with domestic laws and policies, to arrange that meteorological reports, ship position reports and medical advice and assistance messages other than those referred to in paragraph 1, transmitted through the Inmarsat system, shall be free of charge to shipping;

3. RECOMMENDS FURTHER that States should put suitable arrangements in place for the treatment of coast earth station and land-line charges prior to the entry into force of the 1988 SOLAS amendments to introduce the GMDSS on 1 February 1992;

4. REVOKES resolution A.523(13).

Annex

SERVICE/CHARGING MATRIX FOR DISTRESS AND SAFETY COMMUNICATIONS THROUGH THE INMARSAT SYSTEM

Service	Recommendations of joint IMO/Inmarsat Meeting			Inmarsat Council decision[1]	Current coast earth station (CES) practice[7]
	Charge to originator?[1]	Charge to addressee?[1]	Space segment[2]		
Ship-to-shore					
(a) Distress alerts	No	No	No charge	No space segment charge	No CES charges
(b) SAR co-ordination (including communications subsequent to initial distress alerts)	No	No	No charge for voice or record[10] calls to associated RCCs via Code 39[4]	Reduced Inmarsat-A space segment charge for calls to associated RCCs.[3] Calls to other RCCs are charged at the standard space segment rate.	One CES makes no charge to ships via Code 39 as these costs are funded by governments. All other CESs charge at the standard rate.
(c) Meteorological reports	No[3]	Yes	Standard Inmarsat-A, Inmarsat-C, or Inmarsat-C short data report charge	Currently charged at the standard space segment rate.	Several CESs make no charge to ships via Code 41 as these costs are funded by governments. Other CESs charge at the standard rate. Some CESs have announced end-user charges of around US$0.10 for Inmarsat-C short data reports.[9]
(d) Urgent navigational/ meteorological danger reports	No[3]	No	No charge via record[10] communications using Code 42	Reduced Inmarsat-A space segment charge via telex/teletype record comms using Code 42.[8] Other reports charged at the applicable standard space segment rate.	Two CESs make no charge to ships as these costs are funded by governments. Other CESs charge at the standard rate.
(e) Ship reports	No[3]	Yes	Standard Inmarsat-A, Inmarsat-C or Inmarsat-C short data report charge	Currently charged at the standard space segment rate.	Several CESs accept position reports at no charge to ships via Code 43 as these costs are funded by governments. Other CESs charge at the standard rate. Some CESs have announced end-user charges of around US$0.10 for Inmarsat-C short data reports.[9]
(f) Medical advice	No[5]	Yes	Special Inmarsat-A and Inmarsat-C charges via Code 32. Other requests for medical advice at standard charges levied on the originator or the addressee, as may be decided by the Administration.	Currently charged at the standard space segment rate.	Several CESs make no charge to ships via Code 32 as these costs are funded by governments. Other CESs charge at the standard rate.

Service	Recommendations of joint IMO/Inmarsat Meeting			Inmarsat Council decision[1]	Current coast earth station (CES) practice[7]
	Charge to originator?[1]	Charge to addressee?[1]	Space segment[2]		
Ship-to-shore (continued)					
(g) Medical assistance for grave and imminent danger	No	No	No charge via Code 38 to an agency recognized by Administrations. Other requests for medical assistance at standard charges levied on the originator or the addressee, as may be decided by the Administration	Currently charged at the standard space segment rate	Several CESs make no charge to ships via Code 38 as these costs are funded by governments. Other CESs charge at the standard rate.
Shore-to-ship					
(a) Distress alerts	No	No	No charge	No space segment charge[8]	Not known
(b) SAR co-ordination (including communications subsequent to initial distress alerts)	No	No	No charge for voice or record communications from associated RCCs to ships and when relating to the immediate assistance required by a ship in distress and in grave and imminent danger	Reduced space segment charge for calls from associated RCCs[8]	Not known
(c) Meteorological forecast	Yes	—	Standard[6] SafetyNET™ charge	SafetyNET™ space segment charge	Several CESs have indicated end-user charges in the vicinity of US$0.50 per kbit
(d) Meteorological warnings	Yes	—	Standard[6] SafetyNET™ charge	SafetyNET™ space segment charge	Several CESs have indicated end-user charges in the vicinity of US$0.50 per kbit
(e) Navigational warnings	Yes	—	Standard[6] SafetyNET™ charge	SafetyNET™ space segment charge	Several CESs have indicated end-user charges in the vicinity of US$0.50 per kbit
(f) Other urgent messages	Yes	—	Standard[6] SafetyNET™ charge	SafetyNET™ space segment charge	Several CESs have indicated end-user charges in the vicinity of US$0.50 per kbit
(g) Medical advice	Yes	No	Standard		
(h) Medical assistance	No	No	No charge for calls from agencies recognized by Administrations		

Notes

1 Space segment and coast earth station elements only; excludes land-line charges.

2 See definitions of charges.

3 No charge to originator if sent via record communications.

4 In the unlikely event of difficulty in securing a connection, ships may use priority 3 at no charge.

5 Only to recognized medical authorities.

6 Via SafetyNET™.

7 Subject to confirmation by individual CES owners.

8 Not yet implemented.

9 Inmarsat-C short data reports consist of up to 32 bytes of binary encoded user information. Data formats have been developed for meteorological and ship position reports.

10 *Record* is defined as all types of Inmarsat communications other than those via voice channels.

Inmarsat two-digit codes for safety services

Abbreviated dialling codes have been established in the Inmarsat system, for use by CESs which desire to use them, to enable automatic routeing of specific types of calls from ships to the appropriate addresses. The following two-digit codes pertain to safety services:

32 – Request for medical advice

38 – Request for medical assistance

39 – Request for maritime assistance

41 – Shipment of meteorological data

42 – Shipment of meteorological data and navigational dangers

43 – Ship report

Definitions (space segment only)

No charge	No charges are levied by Inmarsat. Inmarsat will absorb the costs.
Standard charge	Standard space segment utilization charges for the particular Inmarsat service which are levied by Inmarsat on coast earth station operators.
Special charge	Special space segment utilization charges levied by Inmarsat on coast earth station operators and at a lower tariff than standard charges.

Annex 2-15
Resolution A.769(18)

(Adopted on 4 November 1993)

PROCEDURES AND ARRANGEMENTS FOR ISSUING GMDSS CERTIFICATES TO HOLDERS OF NON-GMDSS CERTIFICATES

THE ASSEMBLY,

RECALLING Article 15(j) of the Convention on the International Maritime Organization concerning the functions of the Assembly in relation to regulations and guidelines concerning maritime safety,

CONSIDERING the relevant provisions of the Radio Regulations, the 1988 amendments to the International Convention for the Safety of Life at Sea, 1974 (SOLAS), and the 1991 amendments to the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers, 1978 (STCW), for the introduction of the global maritime distress and safety system (GMDSS),

NOTING that the 1991 amendments to STCW regulation IV/2 require that, in determining the appropriate level of knowledge and training for certification of GMDSS radio personnel, the Administration shall also take into account the relevant recommendations of the Organization,

NOTING ALSO that resolution A.703(17) on training of radio personnel differs substantially from resolutions 14 and 15 of the International Conference on Training and Certification of Seafarers, 1978, concerning the training and certification of radio officers and radiotelephone operators,

BEING OF THE OPINION that issuing of GMDSS certificates to holders of old (non-GMDSS) certificates without any requirement for passing an examination is not acceptable,

HAVING CONSIDERED the recommendation made by the Maritime Safety Committee at its sixty-second session,

1. ADOPTS the Procedures and Arrangements for Issuing GMDSS Certificates to Holders of non-GMDSS Certificates, set out in the annex to the present resolution;

2. RECOMMENDS Governments, before issuing a GMDSS certificate to a holder of a non-GMDSS certificate, to require the candidate for the certificate to pass a limited examination in accordance with the relevant provisions of the Radio Regulations and the Procedures and Arrangements set out in the annex to the present resolution;

3. RECOMMENDS ALSO that this procedure only lasts for a limited period of time, as recommended in the annex to the present resolution.

Annex

PROCEDURES AND ARRANGEMENTS FOR ISSUING GMDSS CERTIFICATES TO HOLDERS OF NON-GMDSS CERTIFICATES

1 INTRODUCTION

1.1 GMDSS operator certificates should only be issued to candidates who have passed an appropriate examination verifying that the candidate has reached the required level of competence, taking into account the recommendations of the Organization. This requirement also applies to candidates who hold a non-GMDSS operator certificate.

1.2 However, Administrations may make arrangements, as described in the following paragraphs, to permit certain holders of non-GMDSS certificates to obtain a GMDSS certificate after passing a "limited GMDSS examination".

1.3 Arrangements for "limited GMDSS examinations" should cease on 1 February 1997. After this date all candidates should be required to pass the full GMDSS examination.

2 REQUIREMENTS FOR CANDIDATES HOLDING NON-GMDSS CERTIFICATES

2.1 Candidates wishing to obtain a General Operator's Certificate (GOC) after a "limited GMDSS examination" should hold a valid non-GMDSS certificate of one of the following types, issued before 1 February 1997:

.1 Radiocommunication Operator's General Certificate for the Maritime Mobile Service (MRGC);

.2 First or Second Class Radiotelegraph Operator's Certificate;

.3 Radiotelephone Operator's General Certificate; or

.4 Radiotelephone Operator's Restricted Certificate for the combination of VHF, MF and HF.

2.2 Candidates wishing to obtain a Restricted Operator's Certificate (ROC) after a "limited GMDSS examination" should hold a valid certificate of one of the types listed above, or any Radiotelephone Operator's Restricted Certificate issued before 1 February 1997.

3 REQUIREMENTS FOR CANDIDATES REGARDING PRACTICAL EXPERIENCE AND TRAINING IN USE OF GMDSS EQUIPMENT

3.1 A "limited GMDSS examination" for GOC should only be offered to candidates who have practical experience or familiarity with relevant GMDSS equipment and procedures appropriate for a ship engaged on voyages in all sea areas.

3.2 Candidates for a ROC should have experience or familiarity with equipment and procedures appropriate for a ship engaged on voyages exclusively in sea area A1.

3.3 Each candidate should have had at least six months operational experience, preferably on board ships, since 1 February 1992, and should be able to provide proof of such experience.

3.4 The candidate should receive supplementary training in the use of, and operational procedures for, all GMDSS equipment with which he has no experience or familiarity. The candidate should provide proof of such training.

4 ARRANGEMENTS FOR "LIMITED GMDSS EXAMINATION"

4.1 Each Administration may decide the practical arrangements to use for "limited GMDSS examination" (i.e. whether to use a "traditional classroom-type examination" or to accept different arrangements), provided that the following requirements are fulfilled in all cases:

.1 The examination should verify – with a high degree of certainty – whether or not the candidate posesses the knowledge and skills needed for correct operation of all relevant types of GMDSS equipment.

.2 As a minimum, the content of each "limited GMDSS examination" should be such as to check that the candidate has knowledge and skills as follows:

.2.1 Candidates for a GOC: appendix 1

.2.2 Candidates for a ROC: appendix 2

.3 Precautions should be taken to prevent candidates being given the opportunity of receiving or using any kind of unauthorized written or verbal assistance during examination.

.4 The evaluation of whether or not the candidate has proved that he possesses the necessary knowledge and skills during the limited examination should always be done by a person authorized by the Administration.

Appendix 1

Examination syllabus applicable to limited GMDSS examinations for the General Operator's Certificate

1 Global maritime distress and safety system (GMDSS)

1.1 Sea area concept and the GMDSS Master Plan

1.2 Functions of the GMDSS

.1 Alerting

.2 Search and Rescue (SAR) co-ordinating communications

.3 On-scene communications

.4 Locating and homing signals

.5 Dissemination of maritime safety information (MSI)

.6 General radiocommunications

.7 Bridge-to-bridge communications

1.3 Means of ensuring availability of the GMDSS functional requirements

.1 Equipment maintenance strategies

1.4 Sources of energy of ship stations

1.5 GMDSS frequencies

1.6 Protection of distress frequencies

.1 Guard bands

.2 Test on distress frequencies

.3 Transmissions during distress traffic

.4 Avoiding harmful interference

.5 Prevention of unauthorized transmissions

1.7 Watchkeeping on GMDSS frequencies

1.8 Carriage requirements of ship stations

1.9 Licences, radio safety certificates, inspections and surveys

1.10 Radio record keeping

2 SAR Operations in the GMDSS

2.1 The role of rescue co-ordination centres (RCCs)

2.2 Merchant Ship Search and Rescue Manual (MERSAR)

2.3 Maritime rescue organizations

2.4 Ship reporting systems

3 Communication procedures in the GMDSS

3.1 Distress communications via a ship station

.1 Digital selective calling (DSC) distress alert

.1.1 The definition of a distress alert

.1.2 Transmission of a distress alert

.1.3 Transmission of a shore-to-ship distress alert relay

.1.4 Transmission of a distress alert by a station not itself in distress

.2 Receipt and acknowledgement of a DSC distress alert

.2.1 Acknowledgement procedure by radiotelephony

.2.2 Acknowledgement procedure by narrow-band direct printing (NBDP)

.2.3 Receipt and acknowledgement by a coast station

.2.4 Receipt and acknowledgement by a ship station

.3 Handling of distress alerts

.3.1 Preparations for handling of distress traffic

.3.2 Distress traffic terminology

.4 On-scene communications

.5 SAR operation

3.2 Urgency and safety communications via a ship station

.1 The meaning of urgency and safety communications

.2 Procedures for DSC urgency and safety calls

.3 Urgency communications

.4 Medical transport

.5 Safety communications

3.3 Testing DSC equipment

3.4 Distress communications via a ship earth station

.1 Inmarsat-A

.1.1 Use of the distress facility

.1.2 Satellite acquisition

.1.3 Telex and telephony distress calls

.1.4 Procedures for distress calls

.1.5 RCCs associated with the coast earth stations

.2 Inmarsat-C

.2.1 Store-and-forward operation

.2.2 Entering/updating position

.2.3 Sending a distress alert

.2.4 Sending a distress priority message

.2.5 2-digit code services

4 GMDSS Subsystems

4.1 Alerting and locating signals

.1 Purpose and definition

.2 Emergency position-indicating radio beacons (EPIRBs)

.2.1 Satellite EPIRBs

.2.1.1 The COSPAS/SARSAT 406 MHz EPIRB

.2.1.2 The Inmarsat-E 1.6 GHz EPIRB

.2.2 The VHF DSC EPIRB

.3 The search and rescue radar transponder (SART)

4.2 Maritime safety information (MSI)

.1 Reception by NAVTEX

.2 Reception by Inmarsat enhanced group calling (EGC) system

.3 Reception by HF NBDP

.4 Dissemination of meteorological and navigational warnings

Appendix 2

Examination syllabus applicable to limited GMDSS examinations for the Restricted Operator's Certificate

1 Global maritime distress and safety system (GMDSS)

1.1 Sea area concept and the GMDSS Master Plan

1.2 Functions of the GMDSS

.1 Alerting

.2 Search and Rescue (SAR) co-ordinating communications

.3 On-scene communications

.4 Locating and homing signals

.5 Dissemination of maritime safety information (MSI)

.6 General radiocommunications

.7 Bridge-to-bridge communications

1.3 Means of ensuring availability of the GMDSS functional requirements

.1 Equipment maintenance strategies

1.4 Sources of energy of ship stations

1.5 GMDSS frequencies

1.6 Protection of distress frequencies

.1 Guard bands

.2 Test on distress frequencies

.3 Transmissions during distress traffic

.4 Avoiding harmful interference

.5 Prevention of unauthorized transmissions.

1.7 Watchkeeping on GMDSS frequencies

1.8 Carriage requirements of ship stations

1.9 Licences, radio safety certificates, inspections and surveys

1.10 Radio record keeping

2 SAR Operations in the GMDSS

2.1 The role of rescue co-ordination centres (RCCs)

2.2 Merchant Ship Search and Rescue Manual (MERSAR)

2.3 Maritime rescue organizations

2.4 Ship reporting systems

3 Communication procedures in the GMDSS

3.1 Distress communications via a ship station

.1 Digital selective calling (DSC) distress alert

.1.1 The definition of a distress alert

.1.2 Transmission of a distress alert

.1.3 Transmission of a shore-to-ship distress alert relay

.1.4 Transmission of a distress alert by a station not itself in distress

.2 Receipt and acknowledgement of DSC distress alert

.2.1 Acknowledgement procedure by radiotelephony

.2.2 Receipt and acknowledgement by a coast station

.2.3 Receipt and acknowledgement by a ship station

.3 Handling of distress alerts

.3.1 Preparations for handling of distress traffic

.3.2 Distress traffic terminology

.4 On-scene communications

.5 SAR operation

3.2 Urgency and safety communications via a ship station

.1 The meaning of urgency and safety communications

.2 Procedures for DSC urgency and safety calls

.3 Urgency communications

.4 Medical transport

.5 Safety communications

3.3 Testing of DSC equipment.

4 GMDSS Subsystems

4.1 Alerting and locating signals

.1 Purpose and definition

.2 Emergency position-indicating radio beacons (EPIRBs)

.2.1 Satellite EPIRBs

.2.1.1 The COSPAS/SARSAT 406 MHz EPIRB

.2.1.2 The Inmarsat-E 1.6 GHz EPIRB

.2.2 The VHF DSC EPIRB

.3 The search and rescue radar transponder (SART)

4.2 Maritime safety information (MSI)

.1 Reception by NAVTEX

.2 Reception by Inmarsat enhanced group calling (EGC) system

.3 Dissemination of meteorological and navigational warnings

Annex 2-16
Resolution A.801(19)

(Adopted on 23 November 1995)

PROVISION OF RADIO SERVICES FOR THE GLOBAL MARITIME DISTRESS AND SAFETY SYSTEM (GMDSS)

THE ASSEMBLY,

RECALLING Article 15(j) of the Convention on the International Maritime Organization concerning the functions of the Assembly in relation to regulations and guidelines concerning maritime safety,

RECALLING ALSO that regulation IV/5 of the International Convention for the Safety of Life at Sea (SOLAS), 1974 as amended in 1988, requires each Contracting Government to undertake to make available, either individually or in co-operation with other Contracting Governments, as they may deem practical and necessary, appropriate shore-based facilities for terrestrial and space radio services having due regard to the recommendations of the Organization,

RECALLING FURTHER that the Inmarsat system provides for radiocommunication services, including those for distress and safety, utilizing geostationary satellites in the 1.5 and 1.6 GHz band,

NOTING that the COSPAS–SARSAT system provides for the reception of distress alerts on the frequency 406 MHz utilizing polar-orbiting satellites,

NOTING ALSO that regulation IV/5 of the 1974 SOLAS Convention requires the following radio services to be provided:

- a radiocommunication service utilizing geostationary satellites in the maritime mobile satellite service,
- a radiocommunication service utilizing polar-orbiting satellites in the mobile satellite service,
- the maritime mobile service in the bands between 156 MHz and 174 MHz,
- the maritime mobile service in the bands between 4,000 kHz and 27,500 kHz, and
- the maritime mobile service in the bands 415 kHz to 535 kHz and 1,605 kHz to 4,000 kHz,

NOTING FURTHER that the provision contained in paragraph 5.1.1 of the annex to the International Convention on Maritime Search and Rescue, 1979, requires that Parties shall ensure that such continuous radio watches as are deemed practicable and necessary are maintained on international distress frequencies,

TAKING INTO ACCOUNT the resolutions of the World Administrative Radio Conference for Mobile Services, 1987, in particular resolution 331 (Mob-87) relating to the introduction of provisions for the global maritime distress and safety system (GMDSS) and the continuation of the existing distress and safety provisions, and resolution 322 (Rev. Mob-87) relating to coast stations and coast earth stations assuming watchkeeping responsibilities on certain frequencies in connection with the implementation of distress and safety communications for the GMDSS,

TAKING INTO ACCOUNT ALSO resolution 3, Recommendation on the Early Introduction of the Global Maritime Distress and Safety System (GMDSS) Elements, adopted by the 1988 GMDSS Conference,

CONSIDERING that the GMDSS will use digital selective calling equipment operating in the MF, HF and VHF bands,

CONSIDERING ALSO that ships should not be required to install equipment intended primarily for ship/shore communication functions when operating in areas where no corresponding shore-based facilities are available,

CONSIDERING FURTHER that it is necessary to provide radio services for transmission and reception of distress and safety communications and that not all coast stations will be obliged to provide for such distress and safety communications,

HAVING CONSIDERED the recommendation made by the Maritime Safety Committee at its sixty-third session,

1. ADOPTS the Recommendation on Provision of Radio Services for the GMDSS, the Criteria for Use When Providing Shore-Based Digital Selective Calling (DSC) Facilities for Use in the GMDSS, the Criteria for Establishing GMDSS Sea Areas, the Criteria for Use When Providing a NAVTEX Service and the Criteria for Use When Providing Inmarsat Shore-Based Facilities for Use in the GMDSS set out respectively in annexes 1, 2, 3, 4 and 5 to the present resolution;

2. RECOMMENDS that Governments undertake, as a matter of urgency, a review of the need to provide shore-based facilities to support the GMDSS and to make available, either individually or in co-operation with other Governments, adequate shore-based facilities for terrestrial and space radio services deemed practicable and necessary;

3. URGES Governments to provide, either individually or in co-operation with other Governments, the radio services deemed practicable and necessary for the proper operation of the GMDSS;

4. INVITES Governments and organizations concerned to inform the Secretary-General of radio facilities to be provided in support of the GMDSS in response to this resolution;

5. REQUESTS the Maritime Safety Committee to keep this resolution under review and to adopt amendments thereto, as necessary;

6. REVOKES resolution A.704(17).

Annex 1

RECOMMENDATION ON PROVISION OF RADIO SERVICES FOR THE GMDSS

1 Governments should establish such coast stations, individually or in co-operation with other Governments, as are needed to designate a sea area or areas A1 or A2, or both, off their coasts. Each sea area should be established in accordance with the criteria for establishing GMDSS areas recommended in annex 3.

2 Areas not defined by Governments as sea areas A1 or A2 will, as appropriate, be designated as sea areas A3 or A4 in accordance with regulations IV/2.14 and IV/2.15 of the 1974 SOLAS Convention, as amended in 1988.

3 Each Government should submit to the Organization information on the sea area or sea areas A1, A2 and A3, NAVTEX and/or International SafetyNET service areas it has established for the GMDSS and on any changes which may affect the sea area or areas it has so defined.

4 Governments, taking into account annex 2, should, as appropriate, make provision for radio-communications in each sea area A1 or A2 they have defined and, in addition, Governments are invited to provide for radiocommunications in sea areas A3 or A4, as appropriate, for the purposes of:

.1 reception of ship-to-shore distress alerting; in particular, facilities for receiving distress alerts on the frequency 406 MHz are urgently needed in the southern hemisphere;

.2 transmission of shore-to-ship distress alerting;

.3 transmission and reception of search and rescue co-ordinating communications;

.4 transmission and reception of navigational and meteorological warnings and urgent information; and

.5 transmission and reception of general radiocommunications.

Annex 2

CRITERIA FOR USE WHEN PROVIDING SHORE-BASED DIGITAL SELECTIVE CALLING (DSC) FACILITIES FOR USE IN THE GMDSS

1 Governments desiring to provide an HF coast station facility for use in the GMDSS should notify the Organization of their intention so that the Organization can maintain and circulate a complete list of stations providing HF DSC distress watch. Governments should ensure that such shore-based HF DSC facilities are provided in accordance with the criteria contained in appendix 1.

2 Governments, individually or in co-operation with other Governments within a specific SAR region, desiring to provide MF coast station DSC facilities serving, either wholly or in part, a particular sea area A2 should notify the Organization as to the extent of continuous coverage and the extent of coverage from shore. This information should be determined by Governments in accordance with the criteria for establishing GMDSS sea areas contained in annex 3. Governments should ensure that shore-based MF coast station DSC facilities providing part of this sea area A2 coverage, are provided in accordance with appendix 2.

3 Governments, individually or in co-operation with other Governments within a specific SAR region, desiring to provide VHF coast station DSC facilities serving, either wholly or in part, a particular sea area A1 should notify the Organization as to the extent of continuous coverage and the extent of coverage from shore. This information should be determined by Governments in accordance with the criteria contained in annex 3. Governments should ensure that shore-based VHF coast station DSC facilities providing part of this sea area A1 coverage are provided in accordance with appendix 3.

4 The Organization should maintain a master plan of all sea areas covered by MF and VHF coast station DSC facilities and should periodically circulate an updated copy of the description of such sea areas to Governments.

Appendix 1

1 Basic principles for establishing HF DSC coast stations for sea areas A3 and A4

The selection of HF DSC coast stations for sea areas A3 and A4 should be based on the following principles:

.1 each ocean area requiring HF guard should have a minimum of two stations to provide the required HF cover;

.2 where practicable, stations should be selected on opposite sides of an ocean area; and

.3 in ocean areas of high traffic density, e.g. the North Atlantic, more than two stations should be provided.

2 Criteria for the selection of HF DSC stations

Stations participating in HF DSC watchkeeping in the GMDSS should:

.1 be affiliated to an RCC and have reliable communications by telephone and telex;

.2 have long-range HF communication capability in all HF bands;

.3 monitor all HF DSC distress frequencies in order to avoid the multiplication of communications links between RCCs which would be required if several stations divided the watchkeeping on different frequencies;

.4 provide as complete a coverage of their ocean area as possible;

.5 be in continuous operation; and

.6 be able to relay communications under a common procedure.

3 Availability of participating HF stations

The minimum number of coast stations indicated in 1.1 for any given ocean area may need to be adjusted in future in order to:

.1 provide full back-up in the event of operational failure; and

.2 confirm full HF coverage as a result of future tests.

Appendix 2

1 Basic principles for establishing sea area A2

The selection of MF DSC coast stations for sea area A2 should be based on the following principles:

.1 each sea area designated as A2 requires a continuous MF guard on the distress frequencies and a sufficient number of coast stations to provide MF coverage in the coastal area of the Government concerned; and

.2 in certain areas, several Governments may collectively provide complete coverage (e.g. the North Sea).

2 Criteria for provision of MF DSC stations

Stations participating in MF DSC watchkeeping in the GMDSS should:

.1 be affiliated to an RCC and have reliable communications by telephone and telex;

.2 have medium-range MF capability;

.3 provide as complete a coverage of their immediate sea area as possible; and

.4 be in continuous operation.

Appendix 3

1 Basic principles for establishing sea area A1

The selection of VHF DSC coast stations for sea area A1 should be based on the following principles:

.1 each sea area designated as A1 requires a continuous VHF guard and should have the minimum number of stations necessary to provide VHF coverage in the coastal area of the Government concerned; and

.2 in certain areas, several Governments may collectively provide complete coverage along their coasts (e.g. the North Sea).

2 Criteria for the provision of VHF DSC stations

Stations participating in VHF DSC watchkeeping in the GMDSS should:

.1 be affiliated to an RCC and have reliable communications by telephone and telex;

.2 have short-range VHF capability;

.3 provide as complete a coverage of their immediate sea area as possible; and

.4 be in continuous operation.

Annex 3

CRITERIA FOR ESTABLISHING GMDSS SEA AREAS

1 INTRODUCTION

It is intended that Governments should use the following criteria as guidance when determining the four mutually exclusive sea areas off their coasts, which are defined in regulations IV/2.12, IV/2.13, IV/2.14 and IV/2.15 of the 1974 SOLAS Convention, as amended in 1988.

2 SEA AREA A1

2.1 General

The communication range of stations operating in the maritime mobile VHF band is likely to be limited by propagation factors rather than lack of radiated power.

2.2 Guidance criteria

Sea area A1 is that sea area which is within a circle of radius *A* nautical miles over which the radio propagation path lies substantially over water. The radius *A* is equal to the transmission distance between a ship's VHF antenna at a height of 4 m above sea level and the antenna of the VHF coast station which lies at the centre of the circle.

2.3 Determination of radius *A*

2.3.1 The following formula should be used to calculate the range *A* in nautical miles:

$$A = 2.5(\sqrt{H \text{ (in metres)}} + \sqrt{h \text{ (in metres)}})$$

H is the height of the coast station VHF receiving antenna and *h* is the height of the ship's transmitting antenna, which is assumed to be 4 m.

2.3.2 The following table gives the range in nautical miles (n m) for typical values of *H:*

h \ *H*	50 m	100 m
4 m	23 NM	30 NM

2.3.3 The formula given above applies to line-of-sight cases but is not considered adequate for cases where both antennae are at a low level. The VHF range in sea area A1 should be verified by field strength measurements.

3 SEA AREA A2

3.1 General

3.1.1 Consideration of the reception of radio signals in the 2 MHz band indicates that the range is likely to be limited by propagation conditions and atmospheric noise, which are affected by variations in geographical position and time of day, as well as radiated power.

3.1.2 The theoretical distance to be expected from ground-wave propagation can be determined by reference to the "Ground-wave propagation curves: Sea Water" in Recommendation ITU-R PN.368-7, adjusted as necessary to take account of the actual radiated field strength from the transmitting antenna and the minimum field strength necessary for the proper operation of a receiver conforming with resolution A.804(19).

3.1.3 The determination of the minimum signal level required for satisfactory radio reception in the absence of other unwanted signals necessitates taking account of the noise with which the wanted signal must compete. ITU-R Report 322 gives the world distribution of values of noise level and of other noise parameters and shows the method of using these in the evaluation of the probable performance of a radio circuit.

3.2 Guidance criteria

Sea area A2 is that sea area which is within a circle of radius *B* nautical miles over which the propagation path lies substantially over water and which is not part of any sea area A1, the centre of the circle being the position of the coast station receiving antenna.

3.3 Determination of radius *B*

The radius *B* may be determined for each coast station by reference to Recommendation ITU-R PN.368-7 and ITU-R Report 322 for the performance of a single-sideband (J3E) system under the following conditions:

Frequency	–	2182 kHz
Bandwidth	–	3 kHz
Propagation	–	ground wave
Time of day	–	*
Season	–	*
Ship's transmitter power (PEP)	–	60 W[†]

* Administrations should determine time periods and seasons appropriate to their geographic area, based on prevailing noise level.

[†] See footnote to regulation IV/16(c)(i) of the 1981 amendments to the 1974 SOLAS Convention.

Ship's antenna efficiency	–	25%
S/N (RF)	–	9 dB (voice)
Mean transmitter power	–	8 dB below peak power
Fading margin	–	3 dB

The range of sea area A2 should be verified by field strength measurements.

4 AREA A3 – Guidance criteria

Sea area A3 is that sea area of the world not being part of any sea area A1 or A2 within which the elevation angle of an Inmarsat satellite is 5° or more.

5 AREA A4 – Guidance criteria

Sea area A4 is that sea area of the world not being part of any seas area A1, A2 or A3.

Annex 4

CRITERIA FOR USE WHEN PROVIDING A NAVTEX SERVICE

1 There are two basic areas which must be defined when establishing a NAVTEX service. They are:

Coverage area: an area defined by an arc of a circle having a radius from the transmitter calculated according to the method and criteria given in this annex.

Service area: a unique and precisely defined sea area, wholly contained within the coverage area, for which MSI is provided from a particular NAVTEX transmitter. It is normally defined by a line which takes full account of local propagation conditions and the character and volume of information and maritime traffic patterns in the region.

2 Governments desiring to provide a NAVTEX service should use the following criteria for calculating the coverage area of the NAVTEX transmitter they intend to install, in order to:

- determine the most appropriate location for NAVTEX stations having regard to existing or planned stations;
- avoid interference with existing or planned NAVTEX stations; and
- establish a service area for promulgation to seafarers.

3 The ground-wave coverage may be determined for each coast station by reference to Recommendation ITU-R PN.368-7 and ITU-R Report 322 for the performance of a system under the following conditions::

Frequency	–	518 kHz
Bandwidth	–	500 Hz
Propagation	–	ground wave
Time of day	–	*
Season	–	*
Transmitter power	–	†
Antenna efficiency	–	†
RF S/N in 500 Hz band width	–	8 dB‡
Percentage of time	–	90

4 Full coverage of the NAVTEX service area should be verified by field strength measurements.

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* Administrations should determine time periods in accordance with the NAVTEX time transmission table (NAVTEX Manual, figure 3) and seasons appropriate to their geographic area based on prevailing noise level.

† The range of a NAVTEX transmitter depends on the transmitter power and local propagation conditions. The actual range achieved should be adjusted to the minimum required for adequate reception in the NAVTEX area served, taking into account the needs of ships approaching from other areas. Experience has indicated that the required range of 250 to 400 nautical miles can generally be attained by transmitter power in the range between 100 and 1,000 W during daylight with a 60% reduction at night.

‡ Bit error rate 1×10^{-2}.

Annex 5

CRITERIA FOR USE WHEN PROVIDING INMARSAT SHORE-BASED FACILITIES FOR USE IN THE GMDSS

1 Governments desiring to provide an Inmarsat coast earth station facility for use in the GMDSS should notify the Organization of their intention so that the Organization can maintain and circulate a complete list of stations providing distress watch. Governments should ensure that such shore-based facilities are provided in accordance with the criteria contained in the appendix.

2 Governments, individually or in co-operation with other Governments within a specific SAR region, desiring to provide Inmarsat coast earth station facilities serving, either wholly or in part, particular sea areas should notify the Organization as to the extent of continuous coverage and the extent of coverage from shore. This information should be determined by Governments in accordance with the criteria for establishing GMDSS sea areas contained in annex 3 to the present resolution.

3 The Organization should maintain in the GMDSS Master Plan details of all sea areas covered by Inmarsat coast earth station facilities and should periodically circulate an updated copy of the description of these sea areas to Governments.

4 Governments having coast earth stations participating in the GMDSS should ensure that those stations conform with these criteria specified in 2 of the appendix to this annex and ensure that only those stations are listed in the GMDSS Master Plan.

Appendix

1 Basic principles for establishing Inmarsat coast earth stations for GMDSS services

1.1 The selection of Inmarsat coast earth stations for GMDSS services should be based on the following principle:

each ocean area requiring guard should have a minimum of two coast earth stations to provide the required cover for each system.

1.2 The minimum number of coast earth stations indicated in 1.1 for any given ocean area may need to be adjusted in future in order to provide full back-up in the event of operational failure.

2 Criteria for Inmarsat coast earth stations

2.1 Inmarsat coast earth stations participating in the GMDSS should:

.1 meet the Inmarsat technical requirements confirmed by Inmarsat type acceptance and commissioning tests;

.2 operate in compliance with the Inmarsat system operating procedures (SOP) for distress alerting and distress communications;

.3 have a registered associated RCC and have reliable communications by telephone, telex, or other means;

.4 be in continuous operation; and

.5 support the following GMDSS communications functions:

.5.1 ship-to-RCC distress alerting preferably by a dedicated link;

.5.2 RCC-to-ship(s) distress alert relay preferably by a dedicated link;

.5.3 RCC-to-RCC co-ordinating communications by using SES terminals;

.5.4 transmit maritime safety information (Inmarsat-C only); and

.5.5 receiving maritime safety information.

2.2 Stations with store-and-forward systems should:

.1 make an initial attempt to deliver a ship-to-shore or shore-to-ship message within 60 s for any distress alert or traffic, and 10 min for all other safety messages, from the time the receiving station receives the message;

.2 generate the notification of non-delivery immediately once the message is considered non-deliverable; and

.3 activate an aural/visual alarm to alert a designated responsible person if the distress traffic cannot be forwarded within the criteria of paragraph 2.2.1.

2.3 Stations with circuit switching systems should immediately attempt to deliver a ship-to-shore or shore-to-ship distress alert or traffic.

2.4 Stations should:

.1 be capable of recognizing distress alerts in the ship-to-shore direction;

.2 be capable of recognizing the following categories of priorities in both the ship-to-shore and shore-to-ship direction:

– maritime distress,

– all other maritime (urgency, safety and routine);

and

.3 ensure the avoidance of degradation of, or obstructions to, urgency and safety maritime communications by employing four levels of priority in the shore-to-ship and ship-to-shore directions, by differentiating non-maritime from maritime communications or by other means established by Inmarsat.

Annex 2-17
Resolution A.814(19)

(Adopted on 23 November 1995)

GUIDELINES FOR THE AVOIDANCE OF FALSE DISTRESS ALERTS

THE ASSEMBLY,

RECALLING Article 15(j) of the Convention on the International Maritime Organization concerning the functions of the Assembly in relation to regulations and guidelines concerning maritime safety and the prevention and control of marine pollution from ships,

CONSIDERING problems reported by Member Governments in regard to the proper operation of the GMDSS, in particular that false distress alerts are becoming a major obstacle to the efficient operation of search and rescue (SAR) services,

RECALLING that the GMDSS was developed on the basis of resolution 6 of the International Conference on Maritime Search and Rescue, 1979, and that according to that resolution the GMDSS should provide, among other things, the essential radio elements of the international SAR plan,

NOTING that the excessive amount of false distress alerts imposes a considerable and unnecessary burden on Rescue Co-ordination Centres (RCCs), may have adverse effects on seafarers' confidence in the GMDSS, and could also have a potentially serious impact on real distress situations and on safety of life at sea,

BEING AWARE that, if a substantive reduction in the number of false distress alerts now occurring is not achieved in the near future, the quality and efficiency of SAR organizations may be jeopardized,

CONSIDERING that an urgent dissemination of some of the problems which have become evident to providers of rescue services would help to educate people and organizations involved and eventually contribute to a reduction in the number of false distress alerts,

CONSIDERING ALSO that Administrations, manufacturers, educators, users, providers of communications and rescue services, and all others concerned need guidance on ways and means of reducing false distress alerts,

HAVING CONSIDERED the recommendation made by the Maritime Safety Committee at its sixty-fifth session,

1. ADOPTS the Guidelines for Avoiding False Distress Alerts set out in the annex to the present resolution;

2. URGES Governments to bring these Guidelines to the attention of all concerned.

Annex

GUIDELINES FOR AVOIDING FALSE DISTRESS ALERTS

1 Administrations should:

.1 inform shipowners and seafarers about the implications of the rising number of false distress alerts;

.2 take steps to enable ships properly to register all GMDSS equipment, and ensure that this registration data is readily available to RCCs;

.3 consider establishing and using national enforcement measures to prosecute those who:

.3.1 inadvertently transmit a false distress alert without proper cancellation, or who fail to respond to a distress alert due to misuse or negligence;

.3.2 repeatedly transmit false distress alerts; and

.3.3 deliberately transmit false distress alerts;

.4 use the International Telecommunication Union violation reporting process for false distress alerts, or for failure to respond to a distress alert relayed from shore to ship;

.5 ensure that all relevant ship personnel know how GMDSS equipment operates, the importance of avoiding false distress alerts, the steps to be taken to prevent the transmission of such false distress alerts, and the procedures to be followed when a false distress alert has been transmitted;

.6 inform type-approval authorities of false distress alert problems, in order to draw their attention to the testing and alerting functions of radio equipment during the type approval process;

.7 urge companies installing radio equipment to ensure that relevant ship personnel are made familiar with the operation of the installed equipment;

.8 investigate the cause when a specific model of GMDSS equipment repeatedly transmits unwanted distress alerts, and inform the appropriate organizations accordingly;

.9 ensure that surveyors and inspectors are informed about GMDSS equipment, and particularly about how to operate and test it without transmitting a false distress alert; and

.10 require that GMDSS radio operators be appropriately certificated.

2 Manufacturers, suppliers and installers should:

.1 design equipment for distress alerting so that:

.1.1 it will not be possible to transmit a distress alert unintentionally;

.1.2 the panel for emergency operation is separated from the one for normal operation and is partially fitted with a cover, and the switches on the panel are clearly classified by colouring; and

.1.3 there are standardized arrangements of operation panels and operational procedures;

.2 design test features so that the testing of GMDSS equipment will not result in the transmission of false distress alerts;

.3 ensure that any distress alert activation is indicated visually or acoustically, or both, and shows that the equipment is transmitting a distress alert until manually deactivated;

.4 ensure that the satellite EPIRB position on board, installations (including the release and activation mechanisms) and handling procedures preclude unwanted activation (designing the EPIRB so that when it is out of its bracket it must also be immersed in water to activate automatically, and so that, when operated manually, a two-step activation action is required);

.5 provide clear and precise operational instructions that are easy to understand (maintenance and operational instructions should be separated, and should be written both in English and in any other language deemed necessary);

.6 ensure that when any GMDSS equipment has been installed, the necessary instructions are given to ship personnel, drawing specific attention to operational procedures (a record should be kept that such instructions have been given); and

.7 ensure that supply and installation personnel understand how the GMDSS works, and the consequences of transmitting a false distress alert.

3 Trainers and educators should:

.1 ensure that maritime education centres are informed about false distress alert problems and their implications for SAR, the GMDSS, etc., and procedures to be followed if a false distress alert is transmitted, and include them in their teaching programmes;

.2 obtain and use actual case histories as examples;

.3 emphasize the need to avoid false distress alerts; and

.4 ensure that no inadvertent transmission of a false distress alert occurs when training on GMDSS equipment.

4 Companies, masters and seafarers should, as appropriate:

.1 ensure that all GMDSS certificated personnel responsible for sending a distress alert have been instructed about, and are competent to operate, the particular radio equipment on the ship;

.2 ensure that the person or persons responsible for communications during distress incidents give the necessary instructions and information to all crew members on how to use GMDSS equipment to send a distress alert;

.3 ensure that as part of each ''abandon ship'' drill, instruction is given on how emergency equipment should be used to provide GMDSS functions;

.4 ensure that GMDSS equipment testing is only undertaken under the supervision of the person responsible for communications during distress incidents;

.5 ensure that GMDSS equipment testing or drills are never allowed to cause false distress alerts;

.6 ensure that encoded identities of satellite EPIRBs, which are used by SAR personnel responding to emergencies, are properly registered in a database accessible 24 h a day or automatically provided to SAR authorities (masters should confirm that their EPIRBs have been registered with such a database, to help SAR services identify the ship in the event of distress and rapidly obtain other information which will enable them to respond appropriately);

.7 ensure that EPIRB, Inmarsat and DSC registration data is immediately updated if there is any change in information relating to the ship such as owner, name or flag, and that the necessary action is taken to reprogramme the ship's new data in the GMDSS equipment concerned;

.8 ensure that, for new ships, positions for installing EPIRBs are considered at the earliest stage of ship design and construction;

.9 ensure that satellite EPIRBs are carefully installed in accordance with manufacturers' instructions and using qualified personnel (sometimes satellite EPIRBs are damaged or broken due to improper handling or installation. They must be installed in a location that will enable them to float free and automatically activate if the ship sinks. Care must be taken to ensure that they are not tampered with or accidentally activated. If the coding has to be changed or the batteries serviced, manufacturers' requirements must be strictly followed. There have been cases where EPIRB lanyards were attached to the ship so that the EPIRB could not float free; lanyards are only to be used by survivors for securing the EPIRB to a survival craft or person in water);

.10 ensure that EPIRBs are not activated if assistance is already immediately available (EPIRBs are intended to call for assistance if the ship is unable to obtain help by other means, and to provide position information and homing signals for SAR units);

.11 ensure that, if a distress alert has been accidentally transmitted, the ship makes every reasonable attempt to communicate with the RCC by any means to cancel the false distress alert using the procedures given in the appendix;

.12 ensure that, if possible, after emergency use, the EPIRB is retrieved and deactivated; and

.13 ensure that when an EPIRB is damaged and needs to be disposed of, if a ship is sold for scrap, or if for any other reason a satellite EPIRB will no longer be used, the satellite EPIRB is made inoperable, either by removing its battery and, if possible, returning it to the manufacturer, or by demolishing it.

Note: If the EPIRB is returned to the manufacturer, it should be wrapped in tin foil to prevent transmission of signals during shipment.

Appendix

Instructions for mariners and others* on how to cancel a false distress alert

DSC

1 VHF

.1 switch off transmitter immediately;†

.2 switch equipment on and set to channel 16; and

* Appropriate signals should precede these messages in accordance with the ITU Radio Regulations chapter NIX.
† This applies when the false alert is detected during transmission.

.3 make broadcast to "All Stations" giving the ship's name, call sign and DSC number, and cancel the false distress alert.

Example

All Stations, All Stations, All Stations

This is NAME, CALL SIGN, DSC NUMBER, POSITION.

Cancel my distress alert of DATE, TIME UTC,

= Master NAME, CALL SIGN, DSC NUMBER, DATE, TIME UTC.

2 MF

.1 switch off equipment immediately;*

.2 switch equipment on and tune for radiotelephony transmission on 2,182 kHz; and

.3 make broadcast to "All Stations" giving the ship's name, call sign and DSC number, and cancel the false distress alert.

Example

All Stations, All Stations, All Stations

This is NAME, CALL SIGN, DSC NUMBER, POSITION.

Cancel my distress alert of DATE, TIME UTC,

= Master NAME, CALL SIGN, DSC NUMBER, DATE, TIME UTC.

3 HF

As for MF, but the alert must be cancelled on all the frequency bands on which it was transmitted. Hence, in stage 2.2 the transmitter should be tuned consecutively to the radiotelephony distress frequencies in the 4, 6, 8, 12 and 16 MHz bands, as necessary.

4 Inmarsat-C

Notify the appropriate RCC to cancel the alert by sending a distress priority message via the same CES through which the false distress alert was sent.

Example of message

NAME, CALL SIGN, IDENTITY NUMBER, POSITION,

Cancel my Inmarsat-C distress alert of DATE, TIME UTC

= Master +

5 EPIRBs

If for any reason an EPIRB is activated accidentally, the ship should contact the nearest coast station or an appropriate coast earth station or RCC and cancel the distress alert.

6 General

6.1 Notwithstanding the above, ships may use any means available to them to inform the appropriate authorities that a false distress alert has been transmitted and should be cancelled.

6.2 No action will normally be taken against any ship or mariner for reporting and cancelling a false distress alert. However, in view of the serious consequences of false alerts, and the strict ban on their transmission, Governments may prosecute in cases of repeated violations.

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* This applies when the false alert is detected during transmission.

Annex 2-18
Resolution A.887(21)

(Adopted on 25 November 1999)

ESTABLISHMENT, UPDATING AND RETRIEVAL OF THE INFORMATION CONTAINED IN THE REGISTRATION DATABASES FOR THE GLOBAL MARITIME DISTRESS AND SAFETY SYSTEM (GMDSS)

THE ASSEMBLY,

RECALLING Article 15(j) of the Convention on the International Maritime Organization concerning the functions of the Assembly in relation to regulations and guidelines concerning maritime safety,

RECALLING ALSO regulation IV/5-1 of the International Convention for the Safety of Life at Sea (SOLAS), 1974, as amended, which requires that each Contracting Government undertakes to ensure that suitable arrangements are made for registering Global Maritime Distress and Safety System (GMDSS) identities and for making information on these identities available to rescue co-ordination centres on a 24-hour basis,

RECOGNIZING the need to continuously update the information contained in the registration databases for the GMDSS,

RECOGNIZING ALSO that the information in such registration databases is essential for search and rescue purposes,

HAVING CONSIDERED the recommendation made by the Maritime Safety Committee at its seventieth session,

1. ADOPTS the Recommendation on the Establishment, Updating and Retrieval of the Information Contained in the Registration Databases for the GMDSS set out in the annex to the present resolution;

2. RECOMMENDS Governments to ensure that the information contained in the registration databases for the GMDSS and their continuous updating and availability to rescue co-ordination centres is in accordance with the annexed Recommendation;

3. REVOKES resolution A.764(18).

Annex

RECOMMENDATION ON ESTABLISHMENT, UPDATING AND RETRIEVAL OF THE INFORMATION CONTAINED IN THE REGISTRATION DATABASES FOR THE GLOBAL MARITIME DISTRESS AND SAFETY SYSTEM (GMDSS)

1 All identities that may be used for identifying ships in distress should be registered in accordance with this resolution and the data should be updated whenever it changes.

2 Every State requiring or allowing the use of these GMDSS systems should make suitable arrangements for ensuring registrations of these identities are made, maintained and enforced.

3 Those responsible for maintaining registration databases for GMDSS equipment should ensure that any MRCC can immediately access the registration data at any time.

4 Means should be provided for the GMDSS equipment licensee, owner or the ship's master to easily and expediently update emergency information in the registration database.

5 All databases for GMDSS equipment should have an identical data format to permit immediate access among each other.

6 All equipment using Maritime Mobile Service Identities (MMSIs) should be registered, if appropriate, with the International Telecommunication Union in accordance with established procedures.

7 All Inmarsat equipment should be registered with Inmarsat.

8 Registration databases should include the following information, noting that the data elements listed are not necessarily those maintained by the radio licensing authority and that not all of the following entries need to be notified to the ITU as long as the national database is identified and is accessible 24 hours per day:

.1 ship name;

.2 Maritime Mobile Service Identity (MMSI);

.3 radio call sign;

.4 EPIRB identification code (if applicable) and its homing frequency;

.5 country (ship flag State; may be derived from MMSI and call sign);

.6 ship identification number (IMO number or national registration number);

.7 brief ship description (type, gross tonnage, ship superstructure, deck colours, identifying marks, etc.);

.8 name, address, telephone and (if applicable) telefax number of emergency contact person ashore;

.9 alternative 24-hour emergency telephone number (alternate contact ashore);

.10 capacity for persons on board (passengers and crew);

.11 radio installations (Inmarsat-A, -B, -C, -M, VHF DSC, etc.) for ship and survival craft;

.12 identification numbers for all radio systems available;

.13 type and number of survival craft; and

.14 date of last modification of database record.

9 For 406 MHz satellite emergency position indicating radiobeacons (EPIRBs), the country of registration should be coded in accordance with one of the following principles:

.1 if the registration database is maintained by the ship's flag State, use the Maritime Identification Digits (MID) of the flag State;

.2 if the registration database is not maintained by the ship's flag State, use:

.2.1 the MID of the flag State, and inform all concerned where the unique database containing its registry of 406 MHz satellite EPIRBs is located; or

.2.2 serialized protocol with the MID of the country which is maintaining the database.

10 The data record of ships to which SOLAS chapter IV applies should be reviewed, and the database information should be updated annually. Other ships should be encouraged to update their data records annually or at least every other year.

11 Authorities maintaining or using databases should ensure that information described in paragraphs 8.4, 8.8, 8.9 and 8.12 above supplied for GMDSS equipment registration is used only by appropriate recognized SAR authorities.

12 Every State should:

.1 maintain a suitable national database, or co-ordinate with other States of their geographical area to maintain a joint database; and additionally,

.2 for ships which are using GMDSS frequencies and techniques or which are sailing internationally, ensure that the data records of these ships are notified to an international database (e.g. updated ITU database).

13 States should also:

.1 promulgate clear and timely guidance to manufacturers, agents and users on the appropriate coding, registration and updating procedures;

.2 co-operate closely with other States, manufacturers, owners and organizations to help resolve any registration or information-retrieval problems that may arise;

.3 formalize co-operative arrangements between the parties concerned for the maintenance of the joint database;

.4 encourage manufacturers and distributors to advise customers, upon purchase of GMDSS equipment, about registration requirements, and refer unresolved coding and registration issues to proper national authorities for resolution; and

.5 encourage manufacturers and distributors to educate users about the maintenance of GMDSS equipment.

Annex 2-19
Resolution A.888(21)

(Adopted on 25 November 1999)

CRITERIA FOR THE PROVISION OF MOBILE-SATELLITE COMMUNICATION SYSTEMS IN THE GLOBAL MARITIME DISTRESS AND SAFETY SYSTEM (GMDSS)

THE ASSEMBLY,

RECALLING Article 15(j) of the Convention of the International Maritime Organization concerning the functions of the Assembly in relation to regulations and guidelines concerning maritime safety,

RECALLING ALSO that regulation IV/5 of the International Convention for the Safety of Life at Sea (SOLAS), 1974, as amended in 1988, requires each Contracting Government to undertake to make available, either individually or in co-operation with other Contracting Governments, as they may deem practical and necessary, appropriate shore-based facilities for space and terrestrial radiocommunication services having due regard to the recommendations of the Organization,

TAKING INTO ACCOUNT resolution 322 (Rev. Mob-87) of the World Administrative Radio Conference, 1987, relating to coast stations and coast earth stations assuming watchkeeping responsibilities on certain frequencies in connection with the implementation of distress and safety communications for the GMDSS,

TAKING INTO ACCOUNT ALSO resolution 3, Recommendation on the Early Introduction of the Global Maritime Distress and Safety System (GMDSS) Elements, adopted by the 1988 SOLAS Conference introducing the GMDSS,

NOTING resolution A.801(19) on the Provision of radio services for the GMDSS,

NOTING ALSO developments within the field of mobile-satellite communications,

NOTING FURTHER that future mobile-satellite communication systems might have the potential to offer maritime distress and safety communications,

CONSIDERING that mobile-satellite communication systems for use in the GMDSS should fulfil performance criteria adopted by the Organization,

RECOGNIZING that the Inmarsat system at present is the only mobile-satellite communication system recognized by SOLAS Contracting Governments for use in the GMDSS,

RECOGNIZING ALSO the need for the Organization to have in place criteria against which to evaluate the capabilities and performance of mobile-satellite communication systems, as may be notified to the Organization by Governments for possible recognition for use in the GMDSS,

1. ADOPTS the Criteria for the Provision of Mobile-Satellite Communication Systems in the GMDSS set out in the annex to the present resolution;

2. INVITES Governments, when permitting ships flying their countries' flag to carry equipment which can utilize recognized regional satellite systems on a national or regional basis, to apply the criteria set out in sections 2 to 5 of the annex;

3. REQUESTS the Maritime Safety Committee to:

(a) apply the criteria set out in the annex to the present resolution, in particular the procedure set out in section 1 of the annex, when evaluating mobile-satellite communication systems notified by Governments for possible recognition for use in the GMDSS, and to consider, in connection with decisions thereon, the provisions of relevant regulations of SOLAS chapter IV;

(b) ensure that, for mobile-satellite communication systems to be recognized by the Organization for use in the GMDSS, they should be compatible with appropriate SOLAS requirements, and also that any such recognition should not result in substantial changes having to be made to existing procedures and equipment performance standards; and

(c) keep this resolution under review and take appropriate action as necessary to secure the long-term integrity of the GMDSS.

Annex

CRITERIA FOR THE PROVISION OF MOBILE-SATELLITE COMMUNICATION SYSTEMS IN THE GLOBAL MARITIME DISTRESS AND SAFETY SYSTEM (GMDSS)

1 GENERAL

1.1 Mobile-satellite communication systems presented to the Organization for evaluation and possible recognition as a radio system providing the maritime distress and safety satellite communication capabilities necessary for use in the GMDSS should be notified to the Organization by Governments, either individually or in co-operation with other Governments. The Governments concerned should make available to the Organization all necessary information relevant to the criteria indicated below, including proof of availability obtained in the mobile-satellite system concerned.

1.2 Governments desiring, individually or in co-operation with other Governments within a specific SAR area, to provide coast earth station facilities for serving the GMDSS in particular areas as part of a recognized system should notify the Organization as to the extent of continuous coverage and the extent of coverage from shore. This information should be determined by Governments in accordance with the criteria indicated below.

1.3 Governments proposing such mobile-satellite communication systems for possible recognition and use in the GMDSS should ensure that:

.1 these mobile-satellite communication systems conform with the criteria specified in this annex;

.2 only those systems are notified to the Organization for evaluation and possible recognition for use in the GMDSS; and

.3 the provisions of resolution A.707(17) on Charges for distress, urgency and safety messages through the Inmarsat system are complied with.

1.4 Notifications of mobile-satellite communication systems proposed for evaluation and possible recognition for use in the GMDSS should be evaluated by the Maritime Safety Committee relative to the criteria specified in this annex. Based on the results of the detailed evaluation, the Maritime Safety Committee will decide as appropriate, taking into account the provisions of the relevant regulations of chapter IV of the 1974 SOLAS Convention, as amended.

1.5 Governments providing mobile-satellite communication systems recognized by the Organization for use in the GMDSS should, either individually or in co-operation with other Governments, ensure that these systems continue to conform to the criteria specified in this annex and should, at least once a year, make available to the Organization for evaluation a report on the availability and performance obtained during the period since the preceding report in accordance with section 3.5.2 of the criteria indicated below. The Maritime Safety Committee should evaluate such reports relative to the criteria specified in this annex and take action as appropriate.

1.6 The Organization should include and maintain in the GMDSS Master Plan details of all areas covered by mobile-satellite communication systems recognized for use in the GMDSS and of all areas covered by individual coast earth stations operating in those systems recognized as serving the GMDSS. The Organization should periodically circulate an updated copy of the description of these systems and areas to Governments.

2 DEFINITIONS

2.1 Satellite system

The satellite system means the space segment, the arrangements for controlling the space segment and the network control facilities controlling the access to the space segment.

2.2 Coverage area

The coverage area of the satellite system is the geographical area within which the satellite system provides an availability in accordance with the criteria stated in section 3.5 in the ship-to-shore and shore-to-ship directions, and within which continuous alerting is available. This should be described in relation to any of the sea areas as defined in the SOLAS Convention, i.e. sea area A4 is an area outside sea areas A1, A2 and A3; sea area A3 is within the coverage of an Inmarsat geostationary satellite in which continuous alerting is available, excluding sea areas A1 and A2; sea area A2 is within the radiotelephone coverage of at least one MF coast station in which continuous DSC alerting is available; and sea area A1 is within the radiotelephone coverage of at least one VHF coast station in which continuous DSC alerting is available.

2.3 Availability

2.3.1 The availability of a communication system is defined as the percentage of time in which the system is available for access to and communications through the system, i.e.:

$$A = \frac{(\text{scheduled operating time}) - (\text{downtime})}{(\text{scheduled operating time})} \times 100\%$$

2.3.2 Definitions and calculations of availabilities of communications circuits in the Maritime Mobile-Satellite Service are given in ITU-R M.828-1.

3 CRITERIA AND REQUIREMENTS FOR THE MOBILE-SATELLITE COMMUNICATION SYSTEM

3.1 Functional requirements*

3.1.1 Mobile-satellite communication systems for maritime distress and safety communication services and forming part of the GMDSS radio systems specified in chapter IV, regulation 5 of the 1974 SOLAS Convention, as amended, should be capable of processing at least the following maritime distress and safety communications:

.1 ship-to-shore distress alerts/calls;

.2 shore-to-ship distress relay alerts/calls;

.3 ship-to-shore, shore-to-ship and ship-to-ship search and rescue co-ordinating communications;

.4 ship-to-shore transmissions of maritime safety information; and shore-to-ship broadcast of maritime safety information; and

.5 ship-to-shore, shore-to-ship, and ship-to-ship general communications.

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* – Resolution A.801(19) "Provision of radio services for the global maritime distress and safety system (GMDSS)", annex 5 "Criteria for use when providing Inmarsat shore-based facilities for use in the GMDSS";
– Resolution A.887(21) "Establishment, updating and retrieval of the information contained in the registration databases for the global maritime distress and safety system (GMDSS)";
– Resolution A.694(17) "General requirements for shipborne radio equipment forming part of the global maritime distress and safety system (GMDSS) and for electronic navigational aids";
– IMO International SafetyNET Manual;
– Resolution A.664(16) "Performance standards for enhanced group call equipment" and
– appropriate IEC Standards and ITU Recommendations.

3.2 Capacity

The satellite system should be designed for and should provide adequate channel and power capacity for processing effectively, and with an availability as stated in section 3.5, the maritime distress, urgency, safety and general communication traffic estimated to be required by the ships using the system.

3.3 Priority access

3.3.1 Although current systems can recognize more levels, the capability is not implemented in all coast earth stations. In any case, distress alerts and distress calls should be given priority treatment by providing immediate access to satellite channels and, for store-and-forward systems, should be placed ahead of all routine traffic. Any system currently being designed for use in the GMDSS after 1 February 1999 should be able to recognize the four levels of priority as described below:

.1 Mobile-satellite communication systems and coast earth stations used for providing other mobile-satellite communications in addition to maritime communications should be capable of automatically recognizing requests for maritime communications from:

- ship earth stations; and
- recognized entities of importance for safety at sea, such as MRCCs, hydrographic and meteorological offices, medical centres, etc., registered with the coast earth station.

The system should process such maritime communications in the ship-to-shore and shore-to-ship directions for levels 1 to 3 with priority over other communications.

.2 The satellite system and the coast earth stations should be capable of processing maritime distress, urgency, safety and routine communications in accordance with the message priority as defined by the ITU Radio Regulations. The order of processing these communications should be:

.1 distress;

.2 urgency;

.3 safety; and

.4 other communications.

.3 In processing maritime distress, urgency, safety and routine communications, the satellite system and the coast earth stations should be capable of:

.1 automatically recognizing the message or access priority for ship-to-shore communications;

.2 automatically recognizing the message or access priority for shore-to-ship communications from, as a minimum, recognized entities of importance for safety at sea, registered by the coast earth station;

.3 preserving and transferring the priority;

.4 giving distress alerts and distress messages immediate access, if necessary by pre-emption of ongoing communications of level 4;

.5 automatically recognizing maritime distress communications, and of routeing automatically maritime distress alerts/messages directly to the associated MRCC or responsible RCC, if this capability exists; and

.6 processing maritime urgency and safety communications in the ship-to-shore and shore-to-ship directions with adequate priority, for example by allocating the first vacant channel, if no channel is immediately available.

.4 Selection and use of message or access priority for urgency and safety transmissions by ship earth stations should preferably be automatic and should be restricted to calls to special, recognized entities such as medical centres, maritime assistance, hydrographic and meteorological offices, etc., as defined for the coast earth station. The coast earth station should automatically route such calls directly to the relevant entity.

3.4 Coverage area

3.4.1 Documentation on the coverage area of the satellite system, as defined in section 2.2, should be forwarded to the Organization.

3.4.2 Information on coverage areas for satellite systems accepted by the Organization, as forming part of the GMDSS, should be published by the Organization in the GMDSS Master Plan.

3.5 Availability

3.5.1 The satellite system should provide continuous availability for maritime distress and safety communications in the ship-to-shore and shore-to-ship directions.

3.5.2 The availability of the space segment, provision of spare satellite capacity and the network control function (i.e. the network availability), as defined in section 2.3 above, should be continuously monitored, and reports on the recorded availability of the system should be given to the Organization at least once every year. Service providers should be obligated to advise the Organization and RCCs of planned outages and advise ships of scheduled downtime and known interruptions in service and any other relevant network information.

3.6 Network availability

The following minimum values of availability are recommended for the complete mobile-satellite communication network, including coast earth stations:

.1 for ship-to-shore distress priority alerts calls: 99.9%; and

.2 for other maritime communications in ship-to-shore and shore-to-ship directions: 99%.

3.7 Restoration and spare satellites

3.7.1 Spare satellite capacity and arrangements prepared in advance should be provided for ensuring, in the event of a partial or total satellite failure, restoration of the maritime distress and safety communication services in the area concerned to their normal availability, within no more than one hour after the event of a satellite failure.

3.7.2 Adequate information on the means and arrangements prepared for restoration of the maritime distress and safety communication services in the event of a satellite failure should be notified to the Organization.

3.8 Identification

The satellite system should be capable of automatically recognizing and preserving the identification of maritime mobile earth stations.

3.9 Information to be made available to SAR authorities

For all distress, urgency and safety communications, the Mobile Earth Station Identification Number or Maritime Mobile Service Identity should be an integral part of the distress alert and provided to the RCC with the alert. When available, all additional registration, commissioning or other data relevant to the search and rescue or prosecution of false alert should be referenced to this number and made available to the proper SAR authority or RCC upon request.

3.10 Reception of distress alerts

The satellite system should allow for addressing a maritime distress alert to a specific coast earth station chosen by the ship's operator and covering the area concerned, but should also provide for automatic routeing of manually initiated response to maritime distress alerts even if no specific CES is selected.

3.11 Control of ship earth stations

Access-control arrangements for controlling and giving, or temporarily rejecting, access for ship earth stations to the system should at any time allow ship earth stations access for transmission of maritime distress alerts/calls and distress messages.

3.12 Test facilities

The system should provide facilities making it possible for ship earth stations to test the distress capability of their stations without initiating a distress alert/call.

4 CRITERIA AND REQUIREMENTS FOR COAST EARTH STATIONS

4.1 Functional requirements

4.1.1 Coast earth stations serving the GMDSS should:

.1 be in continuous operation;

.2 be connected to an associated RCC;

.3 keep continuous watch on appropriate satellite communication channels; and

.4 be capable of transmission and reception of at least the following maritime distress and safety communications:

.4.1 ship-to-shore distress alerts/calls;

.4.2 shore-to-ship distress relay alerts/calls;

.4.3 ship-to-shore, ship-to-ship and shore-to-ship search and rescue co-ordinating communications;

.4.4 ship-to-shore and shore-to-ship transmissions of Maritime Safety Information; and

.4.5 ship-to-shore, ship-to-ship and shore-to-ship general communications.

Note: Coast earth stations operating in the Inmarsat-C system should be capable of transmission of Maritime Safety Information in the shore-to-ship direction via the Inmarsat SafetyNET service.

4.2 Priority

4.2.1 The coast earth station should be capable of automatically recognizing the priority of ship-to-shore and shore-to-ship communications, and should preserve the priority and process maritime mobile communications for the following four levels of priority:

.1 distress;

.2 urgency;

.3 safety; and

.4 other communications.

4.2.2 Priority access should be given for distress alerts and calls in real time. Although the current system can recognize more than two levels of priority, the capability is not implemented in all coast earth stations. In any case, distress alerts and calls should be given priority treatment by providing immediate access to satellite channels, and distress alerts and calls for store-and-forward systems should be placed ahead of all routine traffic. Any system currently being designed for use in the GMDSS after 1 February 1999 should be able to recognize the four levels of priority and give appropriate access for communications in the ship-to-shore direction and in the shore-to-ship direction for distress, urgency and safety traffic originated by RCCs or other Search and Rescue Authorities.

4.2.3 Limitations in existing public switched networks on facilities for indication and use of priority access codes might necessitate special arrangements such as use of leased lines between, for example, MSI providers and the coast earth station, until such facilities become available in the public switched network.

4.3 Routeing of maritime distress alerts

4.3.1 The coast earth station should have reliable communication links to an associated MRCC.

4.3.2 The coast earth station should be capable of automatically recognizing maritime distress and safety communications and of routeing, as far as possible automatically, the maritime distress alerts/calls directly to the associated MRCC, via a highly reliable communication link. In cases where capability exists, CESs may route alerts directly to the responsible RCC as defined in the IAMSAR Manual.

4.3.3 The coast earth station should be provided with an aural/visual alarm to alert a designated responsible person in the event that appropriate connection to the MRCC cannot be achieved within 60 s. In this case, all necessary action should be taken to inform the MRCC of the details of the distress alert or call.

4.3.4 The coast earth station should be provided with reliable communication links to the MRCC for shore-to-ship distress relay alerts and distress traffic, preferably via dedicated communication links.

4.4 Identification

The coast earth station should be capable of automatically identifying ship earth stations. If another identification than the Maritime Mobile Service Identity (MMSI) is used in the system, a means should be provided 24 h a day to easily identify the ship by cross-referencing to the ship's MMSI number, and to provide all the appropriate additional information to the MRCC necessary for effecting the rescue.

4.5 Voice communication systems

4.5.1 The communication links for mobile-satellite voice communication systems should be connectable to the public switched network in accordance with relevant ITU-T Recommendations.

4.5.2 Coast earth stations using the public switched network for routeing maritime distress alerts/calls and distress traffic to and from its associated MRCC should, upon receipt of ship-to-shore or shore-to-ship distress alerts/calls or distress traffic, immediately attempt to establish the connection necessary for transfer of the distress alert or distress message.

4.6 Data communication systems

4.6.1 The communication links for mobile-satellite data communication systems should be connectable to the public data communication network in accordance with relevant ITU-T Recommendations. The system should provide capability for transfer of the identity of the called subscriber to the calling subscriber. Maritime distress alerts/calls and distress messages should include the ship identity and the coast earth station identity.

4.6.2 Coast earth stations using the public switched network for routeing distress alerts/calls and distress traffic to and from its associated MRCC should, on receipt of ship-to-shore or shore-to-ship distress alerts/calls or distress traffic, immediately attempt to establish the connection necessary for transfer of the distress alert or distress message.

4.7 Store-and-forward systems

Coast earth stations for store-and-forward communication systems should:

.1 make an initial attempt to deliver a ship-to-shore or shore-to-ship message within 60 s for any maritime distress alert or distress traffic, and 10 min for all other maritime messages, from the time the receiving station receives the message. The message should include the ship identity and the coast earth station identity; and

.2 generate notification of non-delivery immediately once the message is considered non-deliverable, for maritime distress alerts and distress messages not later than 4 min after the reception of the alert or message.

4.8 Facilities for broadcast of maritime safety information

4.8.1 Maritime mobile-satellite communication systems forming part of the GMDSS should technically be capable of offering facilities for broadcast of maritime safety information (MSI) by direct printing from MRCC's and authorized providers of MSI, such as Hydrographic Offices and Meteorological Offices, to ships at sea.

4.8.2 Such facilities for broadcast of MSI should provide for automatic, continuous and reliable reception on board ships and should, as a minimum, fulfil the requirements specified in sections 4.8.3 to 4.8.7 below.

4.8.3 The facilities should provide for recognition of and processing the following four levels of priority:

.1 distress;

.2 urgency;

.3 safety; and

.4 other communications.

4.8.4 It should be possible to address the broadcast of MSI to all properly equipped ships within a specified area for at least the following types of areas:

.1 the entire region covered by the satellite over which the transmission is made;

.2 the NAVAREAs/METAREAs as established by the International Maritime Organization (IMO), the International Hydrographic Organization (IHO) and the World Meteorological Organization (WMO) respectively; and

.3 a temporary area chosen and specified by the originator of the MSI message, including area specifications appropriate for broadcast of distress relay alerts and search and rescue co-ordinating communications.

4.8.5 The facilities should provide for transmission of at least the following types of maritime safety information:

.1 search and rescue co-ordination information, including distress relay alerts;

.2 navigational warnings; and

.3 meteorological warnings and forecasts.

4.8.6 The facilities for broadcast of navigational and meteorological warnings should include possibilities for:

.1 scheduling the broadcast at fixed times or as unscheduled broadcast transmissions; and

.2 automatic repetition of the broadcast with time intervals and number of broadcast transmissions as specified by the MSI provider, or until cancelled by the MSI provider.

4.8.7 The facilities should provide for marking MSI messages with a unique identity, making it possible for the shipborne equipment for reception of these broadcasts to automatically ignore messages already received.

4.8.8 The broadcast facilities may in addition provide facilities for broadcasts similar to NAVTEX to coastal areas not covered by the International NAVTEX Service, in accordance with the identification system (i.e. the identification characters B1, B2, B3, B4) used in the International NAVTEX Service.

5 ADDITIONAL RECOMMENDED CAPABILITIES

Mobile-satellite service providers should be encouraged to:

.1 route Automatic Location Identification (ALI) and Automatic Number Identification (ANI) in accordance with appropriate ITU-T Recommendations with distress calls originating from MSS terminals directly to responsible RCCs for voice and data calls;

.2 automatically route information contained in registration databases in accordance with resolution A.887(21) in a recognizable format with the distress call to the responsible RCC, once means are established for doing so;

.3 be capable of retrieving maritime safety information in a timely manner from NAVAREA, METAREA, other relevant co-ordinators, and the International Ice Patrol Service, in a standard format and process established by those co-ordinators; and

.4 broadcast maritime safety information (MSI) in accordance with the relevant provisions of the IMO International SafetyNET Manual.

Annex 2-20
Resolution MSC.77(69)
(Adopted on 13 May 1998)

MAINTENANCE OF A CONTINUOUS LISTENING WATCH ON VHF CHANNEL 16 BY SOLAS SHIPS WHILST AT SEA AFTER 1 FEBRUARY 1999 AND INSTALLATION OF VHF DSC FACILITIES ON NON-SOLAS SHIPS

THE MARITIME SAFETY COMMITTEE,

RECALLING Article 28(b) of the Convention on the International Maritime Organization concerning the functions of the Committee,

RECALLING ALSO that regulation 12.3, chapter IV of the International Convention for the Safety of Life at Sea (SOLAS), 1974, as amended in 1988, requires that until 1 February 1999 or until such other date as may be determined by the Maritime Safety Committee, every ship while at sea shall maintain, when practicable, a continuous listening watch on VHF channel 16,

RECALLING FURTHER MSC/Circ.803 on participation of non-SOLAS ships in the global maritime distress and safety system (GMDSS),

NOTING that a large number of vessels to which the SOLAS Convention does not apply may not have fitted GMDSS equipment by 1 February 1999 and, if watchkeeping was discontinued on VHF channel 16 by SOLAS Convention ships, such non-Convention vessels would, if in distress, be unable to alert global maritime distress and safety system (GMDSS)-fitted ships,

NOTING ALSO the time needed for the large number of non-Convention ships being required to carry a radio installation under national legislation, to be fitted with a VHF installation which includes DSC facilities, and to provide adequate GMDSS training for the large number of personnel required to operate the radio equipment of non-Convention ships,

NOTING FURTHER the many parts of the world, not covered by VHF coast stations, where distress alerts can only be received by ships in the vicinity of those in distress,

RECOGNIZING the capability of GMDSS-fitted ships to simultaneously maintain continuous listening watch on VHF channel 16 and for digital selective calling (DSC) on VHF channel 70,

BEING OF THE OPINION that, for the time being, safety of life at sea would best be served by retaining watchkeeping for GMDSS-fitted ships on VHF channel 16 so that all ships can establish and conduct communications with each other for distress and safety purposes,

HAVING CONSIDERED, at its sixty-ninth session, the recommendation made by the Sub-Committee on Radiocommunications and Search and Rescue (COMSAR), at its third session, with respect to the continuation of listening watch by GMDSS-fitted ships,

1. DETERMINES, in accordance with regulation IV/12.3 of the SOLAS Convention, that all GMDSS ships, while at sea, shall continue to maintain, when practicable, continuous listening watch on VHF channel 16 until 1 February 2005;

2. URGES Governments:

.1 to require all new VHF radio equipment manufactured for, or installed on or after 1 February 1999 on, seagoing vessels to which the 1974 SOLAS Convention does not apply to be fitted with facilities capable of transmitting and receiving distress alerts by DSC on VHF channel 70;

.2 to require all seagoing vessels to which the 1974 SOLAS Convention does not apply, but which are required to carry a radio installation under national legislation, to be fitted with a radio installation which includes facilities for transmitting and receiving distress alerts by DSC on VHF channel 70 no later than 1 February 2005;

.3 to encourage seagoing vessels being voluntarily fitted with VHF radio equipment to be fitted also with facilities for transmitting and receiving distress alerts by DSC on VHF channel 70 no later than 1 February 2005; and

.4 to require all vessels being fitted with facilities in accordance with sub-paragraph .1 to .3 above, to maintain, when practicable, a continuous listening watch on VHF channel 16 until 1 February 2005, and to require personnel operating such equipment to be adequately trained, taking into account ITU Resolution 343 (WRC-97);

3. INVITES Governments to bring this decision to the attention of all seafarers, fishing vessel personnel, shipowners, ship operators, the off-shore industries, radio equipment manufacturers, coast stations and all others involved or who may be involved in search and rescue operations at sea;

4. INVITES FURTHER the Secretary-General to bring this resolution to the attention of the Secretary-General of the International Telecommunication Union.

Annex 3
Radio equipment
(IMO Performance Standards and related ITU-R Recommendations)

3-1	**General requirements**	*IMO resolutions*
-1	General requirements for shipborne radio equipment forming part of the global maritime distress and safety system (GMDSS) and for electronic navigational aids	A.694(17)
-2	General requirements for electromagnetic compatibility (emc) for all electrical and electronic ship's equipment	A.813(19)
3-2	**DSC and NBDP equipment**	
-1	Performance standards for shipborne VHF radio installations capable of voice communication and digital selective calling – *valid for equipment installed on or after 23 November 1996*	A.803(19)
-2	Amendments to resolution A.803(19) – *valid for equipment installed on or after 1 January 2000*	MSC.68(68), annex 1
-3	Performance standards for shipborne MF radio installations capable of voice communication and digital selective calling – *valid for equipment installed on or after 23 November 1996*	A.804(19)
-4	Amendments to resolution A.804(19) – *valid for equipment installed on or after 1 January 2000*	MSC.68(68), annex 2
-5	Performance standards for shipborne MF/HF radio installations capable of voice communication, narrow-band direct printing and digital selective calling – *valid for equipment installed on or after 23 November 1996*	A.806(19)
-6	Amendments to resolution A.806(19) – *valid for equipment installed on or after 1 January 2000*	MSC.68(68), annex 3
		ITU-R Recommendations
-7	DSC system for use in the maritime mobile service	Rec. ITU-R M.493-10
-8	Operational procedures for the use of DSC equipment in the maritime mobile service	Rec. ITU-R M.541-8
-9	Direct-printing telegraph equipment in the maritime mobile service	Rec. ITU-R M.476-5
-10	The introduction of direct-printing telegraph equipment in the maritime mobile service (Equivalence of terms)	Rec. ITU-R M.490
-11	Translation between an identity number and identities for direct-printing telegraphy in the maritime mobile service	Rec. ITU-R M.491-1
-12	Operational procedures for the use of direct-printing telegraph equipment in the maritime mobile service	Rec. ITU-R M.492-6
-13	Direct-printing telegraph equipment employing automatic identification in the maritime mobile service	Rec. ITU-R M.625-3
-14	Use of 9-digit identities for narrow-band direct-printing telegraphy in the maritime mobile service	Rec. ITU-R M.820

Note: ITU-R Recommendations contained herein were produced from the *ITU-R Recommendations,* Volume 2000 – M Series – Parts 3, 4 and 5

3-3	**EPIRBs**	*IMO resolutions*
-1	Performance standards for float-free satellite emergency position-indicating radio beacons operating on 406 MHz – *valid for equipment installed on or after 23 November 1996*	A.810(19)
-2	Amendments to resolution A.810(19) – *valid for equipment installed on or after 23 November 1996*	MSC.56(66)
-3	Performance standards for float-free VHF emergency position-indicating radio beacons – *valid for equipment installed on or after 23 November 1996*	A.805(19)
-4	Performance standards for float-free satellite EPIRBs operating through the geostationary Inmarsat satellite system on 1.6 GHz – *valid for equipment installed on or after 23 November 1996*	A.812(19)
		ITU-R Recommendations
-5	Transmission characteristics of a satellite EPIRB system operating through geostationary satellites in the 1.6 GHz band	Rec. ITU-R M.632-3
-6	Transmission characteristics of a satellite EPIRB system operating through a low polar-orbiting satellite system in the 406 MHz band	Rec. ITU-R M.633-2
-7	Technical characteristics of VHF EPIRBs using DSC	Rec. ITU-R M.693
3-4	**Ship earth station equipment**	*IMO resolutions*
-1	Performance standards for ship earth stations capable of two-way communications – *valid for equipment installed on or after 23 November 1996*	A.808(19)
-2	Performance standards for Inmarsat-C ship earth stations capable of transmitting and receiving direct-printing communications – *valid for equipment installed on or after 23 November 1996*	A.807(19)
-3	Amendments to resolution A.807(19) – *valid for equipment installed on or after 1 January 2000*	MSC.68(68), annex 4
3-5	**MSI reception equipment**	
-1	Performance standards for narrow-band direct-printing telegraph equipment for the reception of navigational and meteorological warnings and urgent information to ships	A.525(13)
-2	Performance standards for enhanced group call equipment	A.664(16)
-3	System performance standard for the promulgation and co-ordination of maritime safety information using HF NBDP	A.699(17)
-4	Performance standards for narrow-band direct-printing telegraph equipment for the reception of navigational and meteorological warnings and urgent information to ships (MSI) by HF	A.700(17)
		ITU-R Recommendations
-5	Operational and technical characteristics for an automated direct-printing telegraph system for promulgation of navigational and meteorological warnings and urgent information to ships	Rec. ITU-R M.540-2
-6	Technical characteristics for a HF direct-printing telegraph system for promulgation of high seas and NAVTEX-type maritime safety information	Rec. ITU-R M.688

3-6	**Other equipment**	*IMO resolutions*
-1	Performance standards for survival craft radar transponders for use in search and rescue operations – *valid for equipment installed on or after 23 November 1995*	A.802(19)
-2	Performance standards for survival craft two-way VHF radiotelephone apparatu – *valid for equipment installed on or after 23 November 1996*	A.809(19)
-3	Performance standards for on-scene (aeronautical) two-way VHF radiotelephone apparatus – *valid for equipment installed on or after 1 July 2001*	MSC.80(70)
-4	Performance standards for a shipborne integrated radiocommunication system (IRCS) when used in the GMDSS	A.811(19)
-5	Performance standards for float-free release and activation arrangements for emergency radio equipment	A.662(16)
-6	Performance standards for radio direction-finding systems	A.665(16)
-7	Use of radar transponders for search and rescue purposes	A.530(13)
		ITU-R Recommendations
-8	Technical characteristics for search and rescue radar transponders	Rec. ITU-R M.628-3
-9	Assignment and use of maritime mobile service identities	Rec. ITU-R M.585-2
-10	Operational procedures for mobile-satellite networks or systems in the bands 1530–1544 MHz and 1626.5–1645.5 MHz which are used for distress and safety purposes as specified for GMDSS	Rec. ITU-R M.830

Annex 3-1-1
Resolution A.694(17)

(Adopted on 6 November 1991)

GENERAL REQUIREMENTS FOR SHIPBORNE RADIO EQUIPMENT FORMING PART OF THE GLOBAL MARITIME DISTRESS AND SAFETY SYSTEM (GMDSS) AND FOR ELECTRONIC NAVIGATIONAL AIDS

THE ASSEMBLY,

RECALLING Article 15(j) of the Convention on the International Maritime Organization concerning the functions of the Assembly in relation to regulations and guidelines concerning maritime safety,

RECOGNIZING the need to prepare performance standards for shipborne radio equipment to ensure operational reliability and suitability of equipment used for safety purposes,

NOTING that regulation IV/14.1 of the International Convention for the Safety of Life at Sea, 1974 (SOLAS), as amended, requires all equipment to which chapter IV of the Convention applies to conform to appropriate performance standards not inferior to those adopted by the Organization,

NOTING ALSO that SOLAS regulation V/12(r) requires all shipborne navigational equipment installed on ships on or after 1 September 1984 to conform to appropriate performance standards not inferior to those adopted by the Organization,

HAVING CONSIDERED the recommendation made by the Maritime Safety Committee at its fifty-ninth session,

1. ADOPTS the Recommendation on General Requirements for Shipborne Radio Equipment Forming Part of the Global Maritime Distress and Safety System (GMDSS) and for Electronic Navigational Aids set out in the annex to the present resolution;

2. RECOMMENDS Governments to ensure that shipborne radio equipment forming part of the GMDSS and shipborne electronic navigational aids conform to performance standards not inferior to those specified in the annex to the present resolution;

3. REVOKES resolutions A.569(14) and A.574(14);

4. DECIDES that any reference to resolutions A.569(14) or A.574(14) in existing IMO instruments be read as a reference to the present resolution.

Annex

RECOMMENDATION ON GENERAL REQUIREMENTS FOR SHIPBORNE RADIO EQUIPMENT FORMING PART OF THE GLOBAL MARITIME DISTRESS AND SAFETY SYSTEM (GMDSS) AND FOR ELECTRONIC NAVIGATIONAL AIDS

1 INTRODUCTION

1.1 Equipment, which:

.1 forms part of the global maritime distress and safety system; or

.2 is required by regulation V/12 of the 1974 SOLAS Convention as amended and other electronic navigational aids, where appropriate;

should comply with the following general requirements and with all applicable performance standards adopted by the Organization.

1.2 Where a unit of equipment provides a facility which is additional to the minimum requirements of this Recommendation, the operation and, as far as is reasonably practicable, the malfunction of such additional facility should not degrade the performance of the equipment specified in 1.1.

2 INSTALLATION

Equipment should be installed in such a manner that it is capable of meeting the requirements of 1.1.

3 OPERATION

3.1 The number of operational controls, their design and manner of function, location, arrangement and size should provide for simple, quick and effective operation. The controls should be arranged in a manner which minimizes the chance of inadvertent operation.

3.2 All operational controls should permit normal adjustments to be easily performed and should be easy to identify from the position at which the equipment is normally operated. Controls not required for normal operation should not be readily accessible.

3.3 Adequate illumination should be provided in the equipment or in the ship to enable identification of controls and facilitate reading of indicators at all times. Means should be provided for dimming the output of any equipment light source which is capable of interfering with navigation.

3.4 The design of the equipment should be such that misuse of the controls should not cause damage to the equipment or injury to personnel.

3.5 If a unit of equipment is connected to one or more other units of equipment the performance of each should be maintained.

3.6 Where a digital input panel with the digits 0 to 9 is provided, the digits should be arranged to conform with relevant CCITT recommendations.* However, where an alphanumeric keyboard layout, as used on office machinery and data processing equipment, is provided, the digits 0 to 9 may, alternatively, be arranged to conform with the relevant ISO standard.†

4 POWER SUPPLY

4.1 Equipment should continue to operate in accordance with the requirements of this Recommendation in the presence of variations of power supply normally to be expected in a ship.

4.2 Means should be incorporated for the protection of equipment from the effects of excessive current and voltage, transients and accidental reversal of the power supply polarity.

4.3 If provision is made for operating equipment from more than one source of electrical energy, arrangements for rapidly changing from one source to the other should be provided but not necessarily incorporated in the equipment.

5 DURABILITY AND RESISTANCE TO ENVIRONMENTAL CONDITIONS

Equipment should be capable of continuous operation under the conditions of various sea states, ship's motion, vibration, humidity and temperature likely to be experienced in ships.‡

6 INTERFERENCE

6.1 All reasonable and practicable steps should be taken to ensure electromagnetic compatibility between the equipment concerned and other radiocommunication and navigational equipment carried on board in compliance with the relevant requirements of chapter IV and chapter V of the 1974 SOLAS Convention.§

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* CCITT Recommendation E161/Q.11.
† ISO Standard 3791.
‡ IEC Publications 92-101 and 945.
§ IEC Publications 533 and 945.

6.2 Mechanical noise from all units should be limited so as not to prejudice the hearing of sounds on which the safety of the ship might depend.

6.3 Each unit of equipment normally to be installed in the vicinity of a standard compass or a magnetic steering compass should be clearly marked with the minimum safe distance at which it may be mounted from such compasses.

7 SAFETY PRECAUTIONS

7.1 As far as is practicable, accidental access to dangerous voltages should be prevented. All parts and wiring in which the direct or alternating voltages or both (other than radio-frequency voltages) combine to give a peak voltage greater than 55 V should be protected against accidental access and should be isolated automatically from all sources of electrical energy when the protective covers are removed. Alternatively, the equipment should be so constructed that access to such voltages may only be gained after having used a tool for this purpose, such as a spanner or screwdriver, and warning labels should be prominently displayed both within the equipment and on protective covers.

7.2 Means should be provided for earthing exposed metallic parts of the equipment but this should not cause any terminal of the source of electrical energy to be earthed.

7.3 All steps should be taken to ensure that electromagnetic radio-frequency energy radiated from the equipment shall not be a hazard to personnel.

7.4 Equipment containing elements such as vacuum tubes which are likely to cause X-radiation should comply with the following requirement:

.1 External X-radiation from the equipment in its normal working condition should not exceed the limits laid down by the Administration concerned.

.2 When X-radiation can be generated inside the equipment above the levels laid down by the Administration, a prominent warning should be fixed inside the equipment and the precautions to be taken when working on the equipment should be included in the equipment manual.

.3 If malfunction of any part of the equipment can cause an increase in X-radiation, adequate advice should be included in the information about the equipment, warning of the circumstances which could cause the increase and stating the precautions which should be taken.

8 MAINTENANCE

8.1 The equipment should be so designed that the main units can be replaced readily, without elaborate recalibration or readjustment.

8.2 Equipment should be so constructed and installed that it is readily accessible for inspection and maintenance purposes.

8.3 Adequate information should be provided to enable the equipment to be properly operated and maintained. The information should:

.1 in the case of equipment so designed that fault diagnosis and repair down to component level are practicable, provide full circuit diagrams, component layouts and a component parts list; and

.2 in the case of equipment containing complex modules in which fault diagnosis and repair down to component level are not practicable, contain sufficient information to enable a defective complex module to be located, identified and replaced. Other modules and those discrete components which do not form part of modules should also meet the requirements of .1 above.

9 MARKING AND IDENTIFICATION

Each unit of the equipment should be marked externally with the following information, which should be clearly visible in the normal installation position:

.1 identification of the manufacturer;

.2 equipment type number or model identification under which it was type tested; and

.3 serial number of the unit.

Annex 3-1-2
Resolution A.813(19)

(Adopted on 23 November 1995)

GENERAL REQUIREMENTS FOR ELECTROMAGNETIC COMPATIBILITY (EMC) FOR ALL ELECTRICAL AND ELECTRONIC SHIP'S EQUIPMENT

THE ASSEMBLY,

RECALLING Article 15(j) of the Convention on the International Maritime Organization concerning the functions of the Assembly in relation to regulations and guidelines concerning maritime safety,

RECALLING ALSO resolution A.694(17), which requires that all reasonable and practical steps should be taken to ensure electromagnetic compatibility between the equipment concerned and other radiocommunication and navigational equipment carried on board in accordance with the relevant requirements of chapters IV and V of the International Convention for the Safety of Life at Sea (SOLAS), 1974,*

NOTING the growing number of problems experienced with equipment that is susceptible to electromagnetic interference, which can result in dangerous situations,

NOTING ALSO that some standards on electromagnetic compatibility have been developed,

RECOGNIZING the need to prepare standards on electromagnetic compatibility for all electrical and electronic ship's equipment to ensure the operational reliability and suitability of such equipment,

HAVING CONSIDERED the recommendation made by the Maritime Safety Committee at its sixty-fifth session,

INVITES Governments to ensure that all ship's electrical and electronic equipment is tested to the relevant electromagnetic compatibility standards.

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* IEC Publications 533 and 945.

Annex 3-2-1
Resolution A.803(19)
(Adopted on 23 November 1995)

PERFORMANCE STANDARDS FOR SHIPBORNE VHF RADIO INSTALLATIONS CAPABLE OF VOICE COMMUNICATION AND DIGITAL SELECTIVE CALLING

THE ASSEMBLY,

RECALLING Article 15(j) of the Convention on the International Maritime Organization concerning the functions of the Assembly in relation to regulations and guidelines concerning maritime safety,

RECALLING ALSO regulations IV/7.1.1, 7.1.2 and 14.1 of the 1988 amendments to the International Convention for the Safety of Life at Sea (SOLAS), 1974, concerning radiocommunications for the global maritime distress and safety system (GMDSS), which require respectively that ships be provided with a VHF radio installation capable of voice communication and digital selective calling and that such VHF radio installations shall conform to appropriate performance standards not inferior to those adopted by the Organization,

RECOGNIZING the need to prepare performance standards for VHF radio installations capable of voice communication and digital selective calling to be used in the GMDSS in order to ensure the operational reliability of such equipment and to avoid, as far as practicable, adverse interaction between such equipment and other communication and navigation equipment on board ship,

HAVING CONSIDERED the recommendation made by the Maritime Safety Committee at its sixty-fifth session,

1. ADOPTS the Recommendation on Performance Standards for Shipborne VHF Radio Installations Capable of Voice Communication and Digital Selective Calling set out in the annex to the present resolution;

2. RECOMMENDS Governments to ensure that shipborne VHF radio installations capable of voice communication and digital selective calling which will form part of the GMDSS:

   (a) if installed on or after 23 November 1996, conform to performance standards not inferior to those specified in the annex to the present resolution;

   (b) if installed before 23 November 1996, conform to performance standards not inferior to those specified in the annex to resolution A.609(15);

3. REQUESTS the Maritime Safety Committee to keep these performance standards under review and to adopt amendments thereto, as necessary.

Annex

RECOMMENDATION ON PERFORMANCE STANDARDS FOR SHIPBORNE VHF RADIO INSTALLATIONS CAPABLE OF VOICE COMMUNICATION AND DIGITAL SELECTIVE CALLING

1 INTRODUCTION

The VHF radio installation, in addition to meeting the requirements of the Radio Regulations, the relevant ITU-R Recommendations and the general requirements set out in resolution A.694(17), should comply with the following performance standards.

2 GENERAL

2.1 The installation, which may consist of more than one piece of equipment, should be capable of operating on single-frequency channels or on single- and two-frequency channels.

2.2 The equipment should provide for the following categories of calls using both voice and digital selective calling (DSC):

.1 distress, urgency and safety;

.2 ship operational requirements; and

.3 public correspondence.

2.3 The equipment should provide for the following categories of communications using voice:

.1 distress, urgency and safety;

.2 ship operational requirements; and

.3 public correspondence.

2.4 The equipment should comprise at least:

.1 a transmitter/receiver including antenna;

.2 an integral control unit or one or more separate control units;

.3 a microphone with a press-to-transmit switch, which may be combined with a telephone in a handset;

.4 an internal or external loudspeaker;

.5 an integral or separate digital selective calling facility; and

.6 a dedicated DSC watchkeeping facility to maintain a continuous watch on channel 70.

2.5 The installation may also include additional receivers.

2.6 A distress alert should be activated only by means of a dedicated distress button. This button should not be any key of an ITU-T digital input panel or an ISO keyboard provided on the equipment.

2.7 The dedicated distress button should:

.1 be clearly identified; and

.2 be protected against inadvertent operation.

2.8 The distress alert initiation should require at least two independent actions.

2.9 The equipment should indicate the status of the distress alert transmission.

2.10 It should be possible to interrupt and initiate distress alerts at any time.

3 CLASS OF EMISSION, FREQUENCY BANDS AND CHANNELS

3.1 The equipment may be designated for operation on one or more channels selected from and in accordance with appendix 18 of the Radio Regulations.

3.2 The radiotelephone facility should be capable of operating as follows:

.1 in the band 156.3 MHz to 156.875 MHz on single-frequency channels as specified in appendix 18 of the Radio Regulations; and

.2 in the band 156.025 MHz to 157.425 MHz for transmitting and the band 160.625 MHz to 162.025 MHz for receiving on two-frequency channels as specified in appendix 18 of the Radio Regulations.

3.3 The digital selective calling facility should be capable of operating on channel 70.

3.4 Class of emission should comply with appendix 19 of the Radio Regulations.

4 CONTROLS AND INDICATORS

4.1 General

4.1.1 Change of channel should be capable of being made as rapidly as possible, but in any event within 5 s.

4.1.2 The time taken to switch from the transmit to the receive condition, and vice versa, should not exceed 0.3 s.

4.1.3 An on/off switch should be provided for the entire installation with a visual indication that the installation is switched on.

4.1.4 A visual indication that the carrier is being transmitted should be provided.

4.1.5 The equipment should indicate the channel number, as given in the Radio Regulations, to which it is tuned. It should allow the determination of the channel number under all conditions of external lighting. Where practicable, channels 16 and 70 should be distinctively marked.

4.1.6 Control of the equipment should be possible at the position from which the ship is normally navigated. Control from that position should have priority if additional control units are provided. When there is more than one control unit, indication should be given to the other units that the equipment is in operation.

4.1.7 The equipment should not be able to transmit during a channel switching operation.

4.1.8 Operation of the transmit/receive control should not cause unwanted emissions.

4.2 Radiotelephone facility

4.2.1 Provision should be made for changing from transmission to reception by use of a press-to-transmit switch. Additionally, facilities for operation on two-frequency channels without manual control may be provided.

4.2.2 The receiver should be provided with a manual volume control by which the audio output may be varied.

4.2.3 A squelch (mute) control should be provided on the exterior of the equipment.

5 PERMISSIBLE WARMING-UP PERIOD

The equipment should be operational within 1 min of switching on.

6 SAFETY PRECAUTIONS

The equipment, when operating, should not be damaged by the effects of open-circuited or short-circuited antenna terminals.

7 TRANSMITTER OUTPUT POWER

7.1 The transmitter output power should be between 6 and 25 W.

7.2 Provision should be made for reducing the transmitter output power to a value of between 0.1 W and 1 W. However, this reduction of the power is optional on channel 70.

8 RECEIVER PARAMETERS

8.1 Radiotelephone facility

The sensitivity of the receiver should be equal to or better than 2 μV e.m.f. for a signal-to-noise ratio of 20 dB.

8.2 **Digital selective calling facility**

With a DSC modulated input signal having a level of 1 μV e.m.f. to its associated VHF receiver, the DSC equipment should be capable of decoding the received message with a maximum permissible output character error rate of 10^{-2}.

8.3 **Immunity to interference**

The immunity to interference of the receiver should be such that the wanted signal is not seriously affected by unwanted signals.

9 ANTENNA SYSTEM

The VHF antenna or antennae should be vertically polarized and, as far as practicable, be omnidirectional in the horizontal plane. The installation should be suitable for efficient radiation and reception of signals at the operating frequencies.

10 LOUDSPEAKER AND TELEPHONE HANDSET (radiotelephone facility)

10.1 The receiver output should be suitable for use with a loudspeaker or a telephone handset. The audio output should be sufficient to be heard in the ambient noise level likely to be encountered on board ships.

10.2 It should be possible to switch off the loudspeaker without affecting the audio output of the telephone handset, if provided.

10.3 In the transmit condition during simplex operation, the output of the receiver should be muted.

10.4 In the transmit condition during duplex operation, only the telephone handset should be in circuit. Care should be taken to prevent any electrical or acoustic feedback, which could cause singing.

11 DIGITAL SELECTIVE CALLING FACILITY

11.1 The facility should conform to the provisions of the relevant ITU-R Recommendations pertaining to the DSC system.*

11.2 The DSC facility should comprise:

.1 means to decode and encode DSC messages;

.2 means necessary for composing the DSC message;

.3 means to verify the prepared message before it is transmitted;

.4 means to display the information contained in a received call in plain language;

.5 means for the manual entry of the position information; additionally, automatic entry may be provided; and

.6 means for the manual entry of the time at which the position was determined; additionally, automatic entry may be provided.

11.3 **Distress message storage**

11.3.1 If the received messages are not printed immediately, sufficient capacity should be provided to enable at least 20 received distress messages to be stored in the DSC facility.

11.3.2 These messages should be stored until readout.

11.4 It should be possible to initiate and make distress and safety calls from the position from which the ship is normally navigated. The means for initiating a distress call should be as prescribed in 2.6.

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* Class A or B DSC equipment conforming to Recommendation ITU-R M.493 should be used to meet this requirement.

11.5 Initiation of DSC distress calls should supersede any other operation of the facility.

11.6 Self-identification data should be stored in the DSC unit. It should not be possible for the user easily to change these data.

11.7 Means should be provided to enable routine testing of the DSC facilities without radiation of signals.

11.8 Provision should be made for:

.1 a specific aural alarm and visual indication to indicate receipt of a distress or urgency call or a call having distress category. It should not be possible to disable this alarm and indication. Provision should be made to ensure that they can be reset only manually; and

.2 aural alarms and visual indication for calls other than distress and urgency.

12 POWER SUPPLY

The VHF radio installation should be powered from the ship's main source of electrical energy. In addition, it should be possible to operate the VHF installation from an alternative source of electrical energy.

Annex 3-2-2
Resolution MSC.68(68), annex 1

(Adopted on 6 June 1997)

AMENDMENTS TO RESOLUTION A.803(19) – PERFORMANCE STANDARDS FOR VHF RADIO INSTALLATIONS CAPABLE OF VOICE COMMUNICATION AND DIGITAL SELECTIVE CALLING

Modify paragraphs 11.2.5 and 11.2.6 of the annex, as follows:

"".5 facilities to automatically update the ship's position and the time at which the position was determined from a suitable electronic position-fixing aid which may be an integral part of the equipment. For equipment which does not have an integral position-fixing aid, such facilities should include a suitable interface conforming to the appropriate international standard;*

.6 means for manual entry of position information and the time at which the position was determined; and"

Add new paragraph 11.2.7:

"".7 means to activate an alarm when no position data is received from the electronic position-fixing aid or, in the case of manual input, the position information is over 4 hours old. Any position information not updated for more than $23\frac{1}{2}$ hours should be erased."

Modify paragraph 11.3.2, as follows:

"11.3.2 These messages should be stored until readout and should be erased 48 hours after their reception."

Modify the second sentence of paragraph 11.4, as follows:

"11.4 . . . The means for initiating a distress alert should be as prescribed in 2.6 to 2.8."

* IEC 1162.

Annex 3-2-3
Resolution A.804(19)

(Adopted on 23 November 1995)

PERFORMANCE STANDARDS FOR SHIPBORNE MF RADIO INSTALLATIONS CAPABLE OF VOICE COMMUNICATION AND DIGITAL SELECTIVE CALLING

THE ASSEMBLY,

RECALLING Article 15(j) of the Convention on the International Maritime Organization concerning the functions of the Assembly in relation to regulations and guidelines concerning maritime safety,

RECALLING ALSO regulations IV/8.1.3, 9.1.1, 9.1.2, 10.1.2 and 14.1 of the 1988 amendments to the International Convention for the Safety of Life at Sea (SOLAS) 1974, concerning radiocommunications for the global maritime distress and safety system (GMDSS), which require, respectively, that ships be provided with a MF radio installation capable of voice communication and digital selective calling and that such MF radio installations shall conform to appropriate performance standards not inferior to those adopted by the Organization,

RECOGNIZING the need to prepare performance standards for shipborne MF radio installations capable of voice communication and digital selective calling to be used in the GMDSS in order to ensure the operational reliability of such equipment and to avoid, as far as practicable, adverse interaction between such equipment and other communication and navigation equipment on board ship,

HAVING CONSIDERED the recommendation made by the Maritime Safety Committee at its sixty-fifth session,

1. ADOPTS the Recommendation on Performance Standards for Shipborne MF Radio Installations Capable of Voice Communication and Digital Selective Calling set out in the annex to the present resolution;

2. RECOMMENDS Governments to ensure that shipborne MF radio installations capable of voice communication and digital selective calling, which will form part of the GMDSS:

(a) if installed on or after 23 November 1996, conform to performance standards not inferior to those specified in the annex to this resolution,

(b) if installed before 23 November 1996, conform to performance standards not inferior to those specified in the annex to resolution A.610(15);

3. REQUESTS the Maritime Safety Committee to keep these Performance Standards under review and to adopt amendments thereto, as necessary.

Annex

RECOMMENDATION ON PERFORMANCE STANDARDS FOR SHIPBORNE MF RADIO INSTALLATIONS CAPABLE OF VOICE COMMUNICATION AND DIGITAL SELECTIVE CALLING

Part A
General

1 INTRODUCTION

The MF radiotelephone and digital selective calling installation, in addition to meeting the requirements of the Radio Regulations, the relevant ITU-R Recommendations and the general requirements set out in Assembly resolution A.694(17), should comply with the following performance standards.

2 GENERAL

2.1 The installation, which may consist of more than one piece of equipment, should be capable of operating on single-frequency channels or on single- and two-frequency channels.

2.2 The equipment should provide for the following categories of calling, using both voice and digital selective calling (DSC):

.1 distress, urgency and safety;

.2 ship operational requirements; and

.3 public correspondence.

2.3 The equipment should provide for the following categories of communications, using voice and, optionally, narrow-band direct printing (NBDP):

.1 distress, urgency and safety;

.2 ship operational requirements; and

.3 public correspondence.

2.4 The equipment should comprise at least:

.1 a transmitter/receiver, including antenna;

.2 an integral control unit or one or more separate control units;

.3 a microphone with a press-to-transmit switch, which may be combined with a telephone in a handset;

.4 an internal or external loudspeaker;

.5 an integral or separate digital selective calling facility; and

.6 a dedicated DSC watchkeeping facility to maintain a continuous watch on the distress channel.

2.5 A distress alert should be activated only by means of a dedicated distress button. This button should not be any key of an ITU-T digital input panel or an ISO keyboard provided on the equipment.

2.6 The dedicated distress button should:

.1 be clearly identified; and

.2 be protected against inadvertent operation.

2.7 The distress alert initiation should require at least two independent actions.

2.8 The equipment should indicate the status of the distress alert transmission.

2.9 It should be possible to interrupt and initiate distress alerts at any time.

3 POWER SUPPLY

The MF radio installation should be powered from the ship's main source of electrical energy. In addition, it should be possible to operate the MF installation from an alternative source of electrical energy.

4 CONTROL

It should be possible to conduct distress and safety communications from the position, or in the vicinity of the position, from which the ship is normally navigated.

Part B

Transmitters

1 FREQUENCIES AND CLASSES OF EMISSION

1.1 The radiotelephone and DSC transmitter should be capable of transmitting on a number of frequencies in the bands between 1,605 kHz and 4,000 kHz considered by the Administration as adequate for the operation of the ship, but at least on the frequencies 2,182 kHz and 2,187.5 kHz.

1.2 Radiotelephone frequencies are designated in terms of the carrier frequency; DSC frequencies are designated in terms of the assigned (centre) frequency. When DSC signals are transmitted using a transmitter in J2B mode, the (suppressed) carrier frequency should be adjusted so as to have the DSC signal transmitted on the assigned DSC frequency. The selected transmitter frequency should be clearly identifiable on the control panel of the equipment.

1.3 The transmitter should be capable of transmitting (upper side-band signals, where appropriate) using classes of emission J3E, H3E and either J2B or F1B.

1.3.1 When switching to the preset distress frequency 2,182 kHz, the appropriate class of emission in accordance with the Radio Regulations should be selected automatically.*

1.3.2 When switching to the preset distress frequency 2,187.5 kHz, the class of emission J2B or F1B should be selected automatically.†

3.1 During normal modulation, the peak envelope power in the case of J3E or H3E emissions, or the mean power in the case of J2B or F1B emissions, should be at least 60 W at any frequency within the specified frequency range.

3.2 If the rated output power exceeds 400 W, provision should be made for reducing the output to 400 W or less.

4 PERMISSIBLE WARMING-UP PERIOD

The equipment should be capable of operating on 2,182 kHz and 2,187.5 kHz within 1 min after switching on.

5 CONTINUOUS OPERATION

Continuous operation should be possible when the transmitter is adjusted to its rated power.

6 CONTROLS AND INDICATORS

6.1 Provision should be made for indicating the antenna current or power delivered to the antenna. Failure of the indicating system should not interrupt the antenna circuit.

6.2 Manually tuned equipment should be fitted with a sufficient number of indicators to permit accurate and rapid tuning.

6.3 Operation of the transmit/receive control should not cause unwanted emissions.

6.4 All adjustments and controls necessary for switching the transmitter to operate on 2,182 kHz and 2,187.5 kHz should be clearly marked, in order that these operations may be performed readily.

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* Existing transmitters, during the transition and amortization period, may be exempted from these requirements.

† In determining the A2 area, an antenna efficiency of 25% and an output power of 60 W are assumed.

7 SAFETY PRECAUTIONS

The equipment should be so designed and constructed that, when the transmitter is providing power to the antenna, the transmitter is protected against damage resulting from disconnection of the antenna or short-circuiting of antenna terminals. If this protection is provided by means of a safety device, that device should automatically be reset following removal of the antenna open-circuit or short-circuit conditions.

8 POWER SUPPLY

8.1 If it is necessary to delay the application of voltage, for example anode voltage, to any part of the transmitter after switching on, this delay should be provided automatically.

8.2 If the transmitter includes parts which are required to be heated in order to operate correctly, for example crystal ovens, the power supplies to the heating circuits should be so arranged that they can remain operative when other supplies to or within the equipment are switched off. If a special switch for the heating circuits is provided, its function should be clearly indicated; it shall normally be in the "on" position and be protected against inadvertent operation. The correct operating temperature should be reached within a period of 30 min after the application of power.

Part C

Receivers

1 FREQUENCIES AND CLASSES OF EMISSION

1.1 The receiver should be capable of being tuned throughout the bands between 1,605 kHz and 4,000 kHz. Tuning should be either continuous, or by incremental steps, or by the selection of a number of spot frequencies considered by the Administration as adequate for the operation of the ship, or by any combination of these methods. The frequencies 2,182 kHz and 2,187.5 kHz should always be included.

1.2 Radiotelephone frequencies should be designated in terms of the carrier frequency; DSC frequencies should be designated in terms of assigned (centre) frequency. The selected receiver frequency should be clearly identifiable on the control panel of the equipment.

1.3 The receiver should be capable of receiving upper side-band signals, as appropriate, for classes of emission J3E, H3E, J2B and F1B.

1.4 The class of emission should be selectable by not more than one control.

1.5 It should be possible for the user to select reception frequencies independent of any transmitter setting. This does not preclude the use of transceivers.

1.6 The receiver should be capable of being tuned to different frequencies quickly, and in any event, within a period not exceeding 15 s.

2 FREQUENCY STABILITY AND ACCURACY

The receiver frequency should at all times remain within 10 Hz of the required frequency following the warming-up period.

3 USABLE SENSITIVITY

For classes of emission J3E and F1B, the sensitivity of the receiver should be equal to or better than 6 μV e.m.f. at the receiver input for a signal-to-noise ratio of 20 dB. For DSC, an output character error rate of 10^{-2} or less should be obtained for a signal-to-noise ratio of 12 dB.

4 RECEIVER OUTPUT

4.1 For the reception of voice signals, the receiver should be suitable for use with a loudspeaker and a telephone handset and should be capable of providing power of at least 2 W to the loudspeaker and at least 1 mW to the handset.

4.2 An output should be provided for DSC signals if the corresponding facility is not integrated.

5 PERMISSIBLE WARMING-UP PERIOD

The equipment should be capable of operating on 2,182 kHz and 2,187.5 kHz within 1 min after switching on.

6 IMMUNITY TO INTERFERENCE

The immunity to interference of the receiver should be such that the wanted signal is not seriously affected by unwanted signals.

7 CONTROLS

7.1 All adjustment and controls necessary for switching the receiver to operate on 2,187.5 kHz should be clearly marked in order that these operations may be performed readily. The arrangements for switching the receiver to operate on 2,182 kHz should also be clearly marked.

7.2 The receiver should be provided with automatic gain control.

8 POWER SUPPLY

If the receiver includes parts which are required to be heated in order to operate correctly, for example crystal ovens, the power supplies to the heating circuits should be so arranged that they can remain operative when other supplies to or within the equipment are switched off. If a special switch for the heating circuits is provided, its function should be clearly indicated; it should normally be in the "on" position and be protected against inadvertent operation. The correct operating temperature should be reached within a period of 30 min after the application of power.

Part D

Digital selective calling facility

1 The facility should conform to the provisions of the relevant ITU-R Recommendations pertaining to the DSC system.*

2 The DSC facility should comprise:

.1 means to decode and encode DSC messages;

.2 means necessary for composing the DSC message;

.3 means to verify the prepared message before it is transmitted;

.4 means to display the information contained in a received call in plain language;

.5 means for the manual entry of the position information; additionally, automatic entry may be provided; and

.6 means for the manual entry of the time at which the position was determined; additionally, automatic entry may be provided.

* Class A or B DSC equipment conforming to Recommendation ITU-R M.493 (see annex 3-2-7) should be used to meet this requirement.

3 DISTRESS MESSAGE STORAGE

3.1 If the received messages are not printed immediately, sufficient capacity should be provided to enable at least 20 received distress messages to be stored in the DSC facility.

3.2 These messages should be stored until readout.

4 It should be possible to initiate and make distress and safety calls from the position from which the ship is normally navigated. The means for initiating a distress call should be as prescribed in 2.5 of Part A.

5 Initiation of DSC distress calls should supersede any other operation of the facility.

6 Self-identification data should be stored in the DSC unit. It should not be possible for the user easily to change these data.

7 Means should be provided to enable routine testing of the DSC facilities without radiation of signals.

8 Provision should be made for a specific aural alarm and visual indication to indicate receipt of a distress or urgency call or a call having distress category. It should not be possible to disable this alarm and indication. Provision should be made to ensure that they can be reset only manually.

Annex 3-2-4
Resolution MSC.68(68), annex 2

(Adopted on 6 June 1997)

AMENDMENTS TO RESOLUTION A.804(19) – PERFORMANCE STANDARDS FOR MF RADIO INSTALLATIONS CAPABLE OF VOICE COMMUNICATION AND DIGITAL SELECTIVE CALLING

Modify paragraphs 2.4, 2.5 and 2.6 of Part D of the annex, as follows:

"".4 means to display, in plain language with a minimum of 160 characters in two or more lines, the information contained in a received call;

.5 facilities to automatically update the ship's position and the time at which the position was determined from a suitable electronic position-fixing aid which may be an integral part of the equipment. For equipment which does not have an integral position-fixing aid, such facilities should include a suitable interface conforming to the appropriate international standard;*

.6 means for manual entry of position information and the time at which the position was determined; and"

Add new paragraph 2.7 of Part D of the annex, as follows:

"".7 means to activate an alarm when no position data is received from the electronic position-fixing aid or, in the case of manual input, the position information is over 4 hours old. Any position information not updated for more than $23\frac{1}{2}$ hours should be erased."

Modify paragraph 3.2 of Part D of the annex, as follows:

"3.2 These messages should be stored until readout and should be erased 48 hours after their reception."

Modify the second sentence of paragraph 4 of Part D of the annex, as follows:

"4 . . . The means for initiating a distress alert should be as prescribed in 2.5 to 2.7 of Part A."

* IEC 1162.

Annex 3-2-5
Resolution A.806(19)

(Adopted on 23 November 1995)

PERFORMANCE STANDARDS FOR SHIPBORNE MF/HF RADIO INSTALLATIONS CAPABLE OF VOICE COMMUNICATION, NARROW-BAND DIRECT PRINTING AND DIGITAL SELECTIVE CALLING

THE ASSEMBLY,

RECALLING Article 15(j) of the Convention on the International Maritime Organization concerning the functions of the Assembly in relation to regulations and guidelines concerning maritime safety,

RECALLING ALSO regulations IV/10.2.1, 10.2.2, 10.2.4 and 14.1 of the 1988 amendments to the International Convention for the Safety of Life at Sea (SOLAS), 1974, concerning radiocommunications for the global maritime distress and safety system (GMDSS), which require, respectively, that ships be provided with a MF/HF radio installation capable of voice communication, narrow-band direct printing and digital selective calling, and that such MF/HF radio installations shall conform to appropriate performance standards not inferior to those adopted by the Organization,

RECOGNIZING the need to prepare performance standards for MF/HF radio installations capable of voice communication, narrow-band direct printing and digital selective calling to be used in the GMDSS in order to ensure the operational reliability of such equipment and to avoid, as far as practicable, adverse interaction between such equipment and other communication and navigation equipment on board ship,

HAVING CONSIDERED the recommendation made by the Maritime Safety Committee at its sixty-fifth session,

1. ADOPTS the Recommendation on Performance Standards for Shipborne MF/HF Radio Installations Capable of Voice Communication, Narrow-Band Direct Printing and Digital Selective Calling set out in the annex to the present resolution;

2. RECOMMENDS Governments to ensure that shipborne MF/HF radio installations capable of voice communication, narrow-band direct printing and digital selective calling which will form part of the GMDSS:

(a) if installed on or after 23 November 1996, conform to performance standards not inferior to those specified in the annex to the present resolution;

(b) if installed before 23 November 1996, conform to performance standards not inferior to those specified in the annex to resolution A.613(15);

3. REQUESTS the Maritime Safety Committee to keep these performance standards under review and to adopt amendments thereto, as necessary

Annex

RECOMMENDATION ON PERFORMANCE STANDARDS FOR SHIPBORNE MF/HF RADIO INSTALLATIONS CAPABLE OF VOICE COMMUNICATION, NARROW-BAND DIRECT PRINTING AND DIGITAL SELECTIVE CALLING

Part A
General

1 INTRODUCTION

The MF/HF radiotelephone, narrow-band direct printing and digital selective calling installation, in addition to meeting the requirements of the Radio Regulations, the relevant ITU-R Recommendations and the general requirements set out in resolution A.694(17), should comply with the following performance standards.

2 GENERAL

2.1 The installation, which may consist of more than one piece of equipment, should be capable of operating on single-frequency channels or on single- and two-frequency channels.

2.2 The equipment should provide for the following categories of calling, using both voice and digital selective calling (DSC):

.1 distress, urgency and safety;

.2 ship operational requirements; and

.3 public correspondence.

2.3 The equipment should provide for the following categories of communications, using both voice and narrow-band direct printing (NBDP):

.1 distress, urgency and safety;

.2 ship operational requirements; and

.3 public correspondence.

2.4 The equipment should comprise at least:

.1 a transmitter/receiver, including antenna(e);

.2 an integral control unit and/or one or more separate control units;

.3 a microphone with a press-to-transmit switch, which may be combined with a telephone in a handset;

.4 an internal or external loudspeaker;

.5 an integral or separate narrow-band direct printing facility;

.6 an integral or separate digital selective calling facility; and

.7 a dedicated DSC watchkeeping facility to maintain a continuous watch on distress channels only. Where a scanning receiver is employed to watch more than one DSC distress channel, all selected channels should be scanned within 2 s and the dwell time on each channel should be adequate to allow detection of the dot pattern which precedes each DSC call. The scan should only stop on detection of a 100 baud dot pattern.

2.5 A distress alert should be activated only by means of a dedicated distress button. This button should not be any key of an ITU-T digital input panel or an ISO keyboard provided on the equipment.

2.6 The dedicated distress button should:

.1 be clearly identified; and

.2 be protected against inadvertent operation.

2.7 The distress alert initiation should require at least two independent actions.

2.8 The equipment should indicate the status of the distress alert transmission.

2.9 It should be possible to interrupt and initiate distress alerts at any time.

3 POWER SUPPLY

The MF/HF radio installation should be powered from the ship's main source of electrical energy. In addition, it should be possible to operate the MF/HF installation from an alternative source of electrical energy.

4 CONTROL

It should be possible to conduct distress and safety communications from the position, or in the vicinity of the position, from which the ship is normally navigated.

Part B

Transmitter

1 FREQUENCIES AND CLASSES OF EMISSION

1.1 The transmitter should be capable of transmitting on all frequencies allocated to the maritime mobile service in the frequency band 1,605 kHz to 27,500 kHz. As a minimum, the following frequencies should be readily accessible to the operator: the voice frequencies 2,182, 4,125, 6,215, 8,291, 12,290 and 16,420 kHz; the NBDP frequencies 2,174.5, 4,177.5, 6,268, 8,376.5, 12,520 and 16,695 kHz; and the DSC frequencies 2,187.5, 4,207.5, 6,312, 8,414.5, 12,577 and 16,804.5 kHz.

1.2 Radiotelephone frequencies are designated in terms of the carrier frequency; NBDP and DSC frequencies are designated in terms of the assigned (centre) frequency. When NBDP and DSC signals are transmitted using a transmitter in the J2B mode, the (suppressed) carrier frequency should be adjusted so as to have the NBDP and the DSC signal transmitted on the assigned frequency. The selected transmitter frequency should be clearly identifiable on the control panel of the equipment.

1.3 The transmitter should be capable of transmitting (upper side-band signals, where appropriate) using classes of emission J3E, H3E and either J2B or F1B.

1.3.1 When switching to the preset distress frequency 2,182 kHz, the appropriate class of emission in accordance with the Radio Regulations should be selected automatically.*

1.3.2 When switching to the assigned (centre) frequencies for NBDP and DSC specified in 1.1 above, classes of emission F1B or J2B should be selected automatically.&star:

1.4 It should be possible to change the transmitter from any class of emission to another for which it is designed to operate by means of not more than one control.

1.5 It should be possible for the user to select transmission frequencies independent of any receiver setting. This does not preclude the use of transceivers.

1.6 It should be possible to change the transmitter quickly from operation on any frequency to operation on any other frequency, and in any event within a period not exceeding 15 s. The equipment should not be able to transmit during channel switching operations.

1.7 Means should be provided to prevent overmodulation automatically.

2 FREQUENCY ACCURACY AND STABILITY

The transmitter frequency should remain within 10 Hz of the required frequency at all times following the warming-up period.

3 OUTPUT POWER

3.1 During normal modulation, the peak envelope power in the case of J3E or H3E emissions, or the mean power in the case of J2B or F1B emissions, should be at least 60 W† at any frequency within the specified frequency range.

3.2 If the rated output power exceeds 400 W‡ in the band, provision should be made for reducing the output to 400 W or less. Generally, only the minimum power necessary should be used for all radio communications.

4 PERMISSIBLE WARMING-UP PERIOD

The equipment should be capable of operation within 1 min after switching on.

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* For existing transmitters, during the transition and amortization period, classes of emission may be selected manually.

† Note should be taken that in some areas of the world a 60 W value may not be adequate to ensure reliable communications. A value greater than 60 W may be required in these areas.

‡ The Radio Regulations (RR 4357) specify a 400 W maximum power for equipment operating in the MF band in region 1.

5 CONTINUOUS OPERATION

Continuous operation should be possible when the transmitter is adjusted to operate at its rated power.

6 CONTROLS AND INDICATORS

6.1 Provision should be made for indicating the antenna current or power delivered to the antenna. Failure of the indicating system should not interrupt the antenna circuit.

6.2 Manually tuned equipment should be fitted with a sufficient number of indicators to permit accurate and rapid tuning.

6.3 Operation of the transmit/receive control should not cause unwanted emissions.

6.4 All adjustment and controls necessary for switching the transmitter to operate on 2,182 kHz and 2,187.5 kHz should be clearly marked, in order that these operations may be performed readily.

7 SAFETY PRECAUTIONS

The equipment should be so designed and constructed that when the transmitter is providing power to the antenna, the transmitter is protected against damage resulting from disconnection of the antenna or short-circuiting of antenna terminals. If this protection is provided by means of a safety device, that device should automatically be reset following removal of the antenna open-circuit or short-circuit conditions.

8 POWER SUPPLY

8.1 If it is necessary to delay the application of voltage, for example anode voltage, to any part of the transmitter after switching on, this delay should be provided automatically.

8.2 If the transmitter includes parts which are required to be heated in order to operate correctly, for example crystal ovens, the power supplies to the heating circuits should be so arranged that they can remain operative when other supplies to or within the equipment are switched off. If a special switch for the heating circuits is provided, its function should be clearly indicated; it should normally be in the "on" position and be protected against inadvertent operation. The correct operating temperature should be reached within a period of 30 min after the application of power.

Part C

Receivers

1 FREQUENCIES AND CLASSES OF EMISSION

1.1 The receiver should be capable of being tuned throughout the bands between 1,605 kHz and 27.5 MHz. Tuning should be either continuous, or by incremental steps, or by the selection of a number of spot frequencies considered by the Administration as adequate for the operation of the ship, or by any combination of these methods. As a minimum, the following frequencies should be readily accessible to the operator: the carrier frequencies 2,182, 4,125, 6,215, 8,291, 12,290 and 16,420 kHz for radiotelephony; the NBDP frequencies 2,174.5, 4,177.5, 6,268, 8,376.5, 12,520 and 16,695 kHz; and the DSC frequencies 2,187.5, 4,207.5, 6,312, 8,414.5, 12,577 and 16,804.5 kHz.

1.2 Radiotelephone frequencies should be designated in terms of the carrier frequency; NBDP and DSC frequencies should be designated in terms of the assigned (centre) frequency. The selected receiver frequency should be clearly identifiable on the control panel of the equipment.

1.3 The receiver should be capable of receiving upper side-band signals as appropriate for classes of emission J3E, H3E, J2B and F1B.

1.4 The class of emission should be selectable by not more than one control.

1.5 It should be possible for the user to select reception frequencies independent of any transmitter setting. This does not preclude the use of transceivers.

1.6 The receiver should be capable of being tuned to different frequencies quickly, and in any event within a period not exceeding 15 s.

2 FREQUENCY STABILITY AND ACCURACY

The receiver frequency should at all times remain within 10 Hz of the required frequency following the warming-up period.

3 USABLE SENSITIVITY

For classes of emission J3E and F1B, the sensitivity of the receiver should be equal to or better than 6 μV e.m.f. at the receiver input for a signal-to-noise ratio of 20 dB. For NBDP and DSC an output character error rate of 10^{-2} or less should be obtained for a signal-to-noise ratio of 12 dB.

4 RECEIVER OUTPUT

4.1 For the reception of voice signals, the receiver should be suitable for use with a loudspeaker and a telephone handset and should be capable of providing power of at least 2 W to the loudspeaker and at least 1 mW to the handset.

4.2 An output should be provided for NBDP and DSC signals if the corresponding facility is not integrated.

5 PERMISSIBLE WARMING-UP PERIOD

The equipment should be capable of operating within 1 min after switching on.

6 IMMUNITY TO INTERFERENCE

The immunity to interference of the receiver should be such that the wanted signal is not seriously affected by unwanted signals.

7 CONTROLS

The receiver should be provided with automatic gain control.

8 POWER SUPPLY

If the receiver includes parts which are required to be heated in order to operate correctly, for example crystal ovens, the power supplies to the heating circuits should be so arranged that they can remain operative when other supplies to or within the equipment are switched off. If a special switch for the heating circuits is provided, its function should be clearly indicated; it should normally be in the ''on'' position and be protected against inadvertent operation. The correct operating temperature should be reached within a period of 30 min after the application of power.

Part D

Digital selective calling facility

1 The facility should conform to the provisions of the relevant ITU-R Recommendations pertaining to the DSC system.*

* Class A DSC equipment conforming to Recommendation ITU-M.493 (see annex 3-2-7) should be used to meet this requirement.

2 The DSC facility should comprise:

.1 means to decode and encode DSC messages;

.2 means necessary for composing the DSC message;

.3 means to verify the prepared message before it is transmitted;

.4 means to display the information contained in a received call in plain language;

.5 means for the manual entry of the position information; additionally, automatic entry may be provided; and

.6 means for the manual entry of the time at which the position was determined; additionally, automatic entry may be provided.

3 DISTRESS MESSAGE STORAGE

3.1 If the received messages are not printed immediately, sufficient capacity should be provided to enable at least 20 received distress messages to be stored in the DSC facility.

3.2 These messages should be stored until readout.

4 It should be possible to initiate and make distress and safety calls from the position from which the ship is normally navigated. The means for initiating a distress call should be as prescribed in 2.5 of Part A.

5 Initiation of DSC distress calls should take precedence over any other operation of the facility.

6 Self-identification data should be stored in the DSC unit. It should not be possible for the user easily to change these data.

7 Means should be provided to enable routine testing of the DSC facilities without radiation of signals.

8 Provision should be made for a specific aural alarm and visual indication to indicate receipt of a distress or urgency call or a call having a distress category. It should not be possible to disable this alarm and indication. Provision should be made to ensure that they can be reset only manually.

Part E

Narrow-band direct printing (NBDP) facility

1 The facility should conform to the relevant ITU-R Recommendations pertaining to the NBDP system.* It should provide for the use of maritime mobile service identities in accordance with appendix 43 of the ITU Radio Regulations. The facility should be capable of operating in the FEC and ARQ modes on the single-frequency channels allocated for distress NBDP operation.

2 Self-identification data should be stored in the NBDP unit. It should not be possible for the user easily to change these data.

3 The NBDP facility should comprise:

.1 means to decode and encode messages;

.2 means for composing and verifying messages to be transmitted; and

.3 means for providing a record of received messages.

* NBDP equipment conforming to Recommendation ITU-R M.476 (see annex 3-2-9) may be used until the cost is amortized. It is recommended that newly installed NBDP equipment should conform to Recommendation ITU-R M.625 (see annex 3-2-13).

Annex 3-2-6
Resolution MSC.68(68), annex 3

(Adopted on 6 June 1997)

AMENDMENTS TO RESOLUTION A.806(19) – PERFORMANCE STANDARDS FOR MF/HF RADIO INSTALLATIONS CAPABLE OF VOICE COMMUNICATION, NARROW-BAND DIRECT PRINTING AND DIGITAL SELECTIVE CALLING

Modify paragraphs 2.4, 2.5 and 2.6 of Part D of the annex, as follows:

"
.4 means to display, in plain language with a minimum of 160 characters in two or more lines, the information contained in a received call;

.5 facilities to automatically update the ship's position and the time at which the position was determined from a suitable electronic position-fixing aid which may be an integral part of the equipment. For equipment which does not have an integral position-fixing aid, such facilities should include a suitable interface conforming to the appropriate international standard;*

.6 means for manual entry of position information and the time at which the position was determined; and"

Add new paragraph 2.7 of Part D of the annex:

"
.7 means to activate an alarm when no position data is received from the electronic position-fixing aid or, in the case of manual input, the position information is over 4 hours old. Any position information not updated for more than $23\frac{1}{2}$ hours should be erased."

Modify paragraph 3.2 of Part D of the annex, as follows:

"3.2 These messages should be stored until readout and should be erased 48 hours after their reception."

Modify the second sentence of paragraph 4 of Part D of the annex, as follows:

"4 . . . The means for initiating a distress alert should be as prescribed in 2.5 to 2.7 of Part A."

* IEC 1162.

Annex 3-2-7

RECOMMENDATION ITU-R M.493-10*

DIGITAL SELECTIVE-CALLING SYSTEM FOR USE IN THE MARITIME MOBILE SERVICE

(Question ITU-R 9/8)

(1974-1978-1982-1986-1990-1992-1994-1995-1997-1997-2000)

The ITU Radiocommunication Assembly,

considering

a) that selective calling in the shore-to-ship, ship-to-ship and ship-to-shore directions would expedite the handling of traffic in the maritime mobile service;

b) that the International Maritime Organization (IMO) has listed a number of operational requirements that should be taken into account when designing a general purpose selective-calling system;

c) that Chapter IV of the International Convention for the Safety of Life at Sea (SOLAS), 1974, as amended, requires the use of digital selective-calling (DSC) for distress alerting and safety calling in the Global Maritime Distress and Safety System (GMDSS);

d) that neither the selective-calling system described in Recommendation ITU-R M.257, nor that forming part of the systems described in Recommendations ITU-R M.476 and ITU-R M.625, can fully meet the IMO recommended performance standards;

e) that several administrations have indicated an urgent need for a general purpose selective-calling system;

f) that several administrations have been developing different systems;

g) that the system should be applicable to the maritime mobile service, both for international and national needs;

h) that it is desirable that the selective-calling system fulfil the requirements of all types of vessels desiring to use it;

j) that Radio Regulations (RR) Appendix 43** adopted by the World Administrative Radio Conference for the Mobile Services (Geneva, 1983) (WARC Mob-83) has provided for the use of maritime mobile service identities by all administrations,

recommends

1 that where there is need for a general purpose DSC system, the system should be designed in accordance with the characteristics given in Annex 1;

2 that where there is need for simplified versions of DSC equipment, they should be designed in accordance with Annex 2;

3 that in a GMDSS coast radio station installation, sufficient separation should be provided between the DSC distress channel receiver antennas and any transmitting antennas within the installation. This is to avoid any de-sensitization of the DSC distress channel receivers if any transmitter is used at full power on any designated transmit frequency other than the DSC distress frequencies.

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* This Recommendation should be brought to the attention of the International Maritime Organization (IMO).

** *Note by the Secretariat* – See RR Article S19 and the Preface to List VIIA of the RR as revised by the World Radiocommunication Conference (Geneva, 1995) (WRC-95).

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ANNEX 1

General purpose equipment characteristics

1 General

1.1 The system is a synchronous system using characters composed from a ten-bit error-detecting code as listed in Table 1.

1.1.1 The first seven bits of the ten-bit code of Table 1 are information bits. Bits 8, 9 and 10 indicate, in the form of a binary number, the number of B elements that occur in the seven information bits, a Y element being a binary number 1 and a B element a binary number 0. For example, a BYY sequence for bits 8, 9 and 10 indicates 3 ($0 \times 4 + 1 \times 2 + 1 \times 1$) B elements in the associated seven information bit sequence; and a YYB sequence indicates 6 ($1 \times 4 + 1 \times 2 + 0 \times 1$) B elements in the associated seven information bit sequence. The order of transmission for the information bits is least significant bit first but for the check bits it is most significant bit first.

1.2 Time diversity is provided in the call sequence as follows:

1.2.1 Apart from the phasing characters, each character is transmitted twice in a time-spread mode; the first transmission (DX) of a specific character is followed by the transmission of four other characters before the re-transmission (RX) of that specific character takes place, allowing for a time-diversity reception interval of:

1.2.1.1 400 ms for HF and MF channels, and

1.2.1.2 33 1/3 ms for VHF radio-telephone channels.

1.3 The classes of emission, frequency shifts and modulation rates are as follows:

1.3.1 F1B or J2B 170 Hz and 100 Bd for use on HF and MF channels. When frequency-shift keying is effected by applying audio signals to the input of single-sideband transmitters (J2B), the centre of the audio-frequency spectrum offered to the transmitter is 1 700 Hz.

1.3.2 Frequency modulation with a pre-emphasis of 6 dB/octave (phase modulation) with frequency-shift of the modulating sub-carrier for use on VHF channels:

– frequency-shift between 1 300 and 2 100 Hz; the sub-carrier being at 1 700 Hz;

– the frequency tolerance of the 1 300 and 2 100 Hz tones is ± 10 Hz;

– the modulation rate is 1 200 Bd;

– the index of modulation is 2.0 ± 10%.

1.3.3 The radio-frequency tolerances of new designs of both transmitters and receivers in the MF and HF bands should be:

– coast station: ± 10 Hz,

– ship station: ± 10 Hz,

– receiver bandwidth: should not exceed 300 Hz.

1.4 The higher frequency corresponds to the B-state and the lower frequency corresponds to the Y-state of the signal elements.

1.5 The information in the call is presented as a sequence of seven-bit combinations constituting a primary code.

1.5.1 The seven information bits of the primary code express a symbol number from 00 to 127, as shown in Table 1, and where:

1.5.1.1 the symbols from 00 to 99 are used to code two decimal figures according to Table 2;

TABLE 1

Ten-bit error-detecting code

Symbol No.	Emitted signal and bit position 1 2 3 4 5 6 7 8 9 10	Symbol No.	Emitted signal and bit position 1 2 3 4 5 6 7 8 9 10	Symbol No.	Emitted signal and bit position 1 2 3 4 5 6 7 8 9 10
00	BBBBBBBYYY	43	YYBYBYBBYY	86	BYYBYBYBYY
01	YBBBBBBYYB	44	BBYYBYBYBB	87	YYYBYBYBYB
02	BYBBBBBYYB	45	YBYYBYBBYY	88	BBBYYBYYBB
03	YYBBBBBYBY	46	BYYYBYBBYY	89	YBBYYBYBYY
04	BBYBBBBYYB	47	YYYYBYBBYB	90	BYBYYBYBYY
05	YBYBBBBYBY	48	BBBBYYBYBY	91	YYBYYBYBYB
06	BYYBBBBYBY	49	YBBBYYBYBB	92	BBYYYBYBYY
07	YYYBBBBYBB	50	BYBBYYBYBB	93	YBYYYBYBYB
08	BBBYBBBYYB	51	YYBBYYBBYY	94	BYYYYBYBYB
09	YBBYBBBYBY	52	BBYBYYBYBB	95	YYYYYBYBBY
10	BYBYBBBYBY	53	YBYBYYBBYY	96	BBBBBYYYBY
11	YYBYBBBYBB	54	BYYBYYBBYY	97	YBBBBYYYBB
12	BBYYBBBYBY	55	YYYBYYBBYB	98	BYBBBYYYBB
13	YBYYBBBYBB	56	BBBYYYBYBB	99	YYBBBYYBYY
14	BYYYBBBYBB	57	YBBYYYBBYY	100	BBYBBYYYBB
15	YYYYBBBBYY	58	BYBYYYBBYY	101	YBYBBYYBYY
16	BBBBYBBYYB	59	YYBYYYBBYB	102	BYYBBYYBYY
17	YBBBYBBYBY	60	BBYYYYBBYY	103	YYYBBYYBYB
18	BYBBYBBYBY	61	YBYYYYBBYB	104	BBBYBYYYBB
19	YYBBYBBYBB	62	BYYYYYBBYB	105	YBBYBYYBYY
20	BBYBYBBYBY	63	YYYYYYBBBY	106	BYBYBYYBYY
21	YBYBYBBYBB	64	BBBBBBYYYB	107	YYBYBYYBYB
22	BYYBYBBYBB	65	YBBBBBYYBY	108	BBYYBYYBYY
23	YYYBYBBBYY	66	BYBBBBYYBY	109	YBYYBYYBYB
24	BBBYYBBYBY	67	YYBBBBYYBB	110	BYYYBYYBYB
25	YBBYYBBYBB	68	BBYBBBYYBY	111	YYYYBYYBBY
26	BYBYYBBYBB	69	YBYBBBYYBB	112	BBBBYYYYBB
27	YYBYYBBBYY	70	BYYBBBYYBB	113	YBBBYYYBYY
28	BBYYYBBYBB	71	YYYBBBYBYY	114	BYBBYYYBYY
29	YBYYYBBBYY	72	BBBYBBYYBY	115	YYBBYYYBYB
30	BYYYYBBBYY	73	YBBYBBYYBB	116	BBYBYYYBYY
31	YYYYYBBBYB	74	BYBYBBYYBB	117	YBYBYYYBYB
32	BBBBBYBYYB	75	YYBYBBYBYY	118	BYYBYYYBYB
33	YBBBBYBYBY	76	BBYYBBYYBB	119	YYYBYYYBBY
34	BYBBBYBYBY	77	YBYYBBYBYY	120	BBBYYYYBYY
35	YYBBBYBYBB	78	BYYYBBYBYY	121	YBBYYYYBYB
36	BBYBBYBYBY	79	YYYYBBYBYB	122	BYBYYYYBYB
37	YBYBBYBYBB	80	BBBBYBYYBY	123	YYBYYYYBBY
38	BYYBBYBYBB	81	YBBBYBYYBB	124	BBYYYYYBYB
39	YYYBBYBBYY	82	BYBBYBYYBB	125	YBYYYYYBBY
40	BBBYBYBYBY	83	YYBBYBYBYY	126	BYYYYYYBBY
41	YBBYBYBYBB	84	BBYBYBYYBB	127	YYYYYYYBBB
42	BYBYBYBYBB	85	YBYBYBYBYY		

B = 0
Y = 1

Order of bit transmission: bit 1 first.

1.5.1.2 the symbols from 100 to 127 are used to code service commands (see Table 3).

1.6 The receiver decoder should provide maximum utilization of the received signal, including use of the error-check character.

1.7 Where the distress call repetitions described in § 11 apply, the following conditions are considered necessary:

1.7.1 the transmitter encoder must provide repetitive transmission of the call sequence in accordance with § 11; and

1.7.2 the receiver decoder should provide maximum utilization of the received signal, including use of the error-check character and by using an iterative decoding process with adequate memory provision.

1.8 When the transmission of a DSC distress call is automatically repeated, ships' DSC equipments must be capable of automatically receiving a subsequent distress acknowledgement (see Recommendation ITU-R M.541, Annex 1, § 3.1.3.1, 3.1.3.2 and 3.3.5).

TABLE 2

Packing table for decimal numbers into ten-bit characters

The digits for the									
Thousands of millions D2	Hundreds of millions D1	Tens of millions D2	Millions D1	Hundreds of thousands D2	Tens of thousands D1	Thousands D2	Hundreds D1	Tens D2	Units D1
Character 5		Character 4		Character 3		Character 2		Character 1	

NOTE 1 – Character 1 is the last character transmitted

The digit sequence D2-D1 varies from 00 to 99 inclusive in each character (character 1 to 5 inclusive). The character that represents a particular two-decimal figure is transmitted as the symbol number (see Table 1) that is identical to that particular two-decimal figure.

When the number consists of an odd number of decimal digits, a zero shall be added in front of the most significant position to provide an integral number of ten-bit characters.

TABLE 3

Use of symbol Nos. 100 to 127

Symbol No.	Phasing and unique functions	Format specifier(1)	Category(1)	Nature of distress(1)	First telecommand(1)	Second telecommand(1)
100			Routine	Fire, explosion	F3E/G3E simplex TP	No reason given(2)
101				Flooding	F3E/G3E duplex TP	Congestion at maritime switching centre
102		Geographical area		Collision	(3)	Busy(2)
103		(4)	(4)	Grounding	Polling	Queue indication(2)
104	Phasing RX-0 position			Listing, in danger of capsizing	Unable to comply	Station barred(2)
105	Phasing RX-1 position			Sinking	End of call(5)	No operator available(2)
106	Phasing RX-2 position		Ship's business	Disabled and adrift	Data	Operator temporarily unavailable(2)
107	Phasing RX-3 position			Undesignated distress	(3)	Equipment disabled(2)
108	Phasing RX-4 position		Safety	Abandoning ship	(3)	Unable to use proposed channel(2)
109	Phasing RX-5 position			Piracy/armed robbery attack	J3E TP	Unable to use proposed mode(2)
110	Phasing RX-6 position	(6)	Urgency	Man over board	Distress acknowledgement	Ships and aircraft according to Resolution 18 (Mob-83)
111	Phasing RX-7 position				H3E TP	Medical transports (as defined in 1949 Geneva Conventions and additional Protocols)

TABLE 3 *(continued)*

Symbol No.	Phasing and unique functions	Format specifier(1)	Category(1)	Nature of distress(1)	First telecommand(1)	Second telecommand(1)
112		Distress	Distress	EPIRB emission	Distress relay	Pay-phone/public call office
113					F1B/J2B TTY-FEC	Facsimile/data according to Recommendation ITU-R M.1081
114		Ships having common interest			(3)	(3)
115					F1B/J2B TTY-ARQ	Data V.21
116		All ships			F1B/J2B TTY receive	Data V.22
117	Ack. RQ (EOS)				(7)	(7)
118					Test(8)	Data V.22 *bis*
119					F1B/J2B TTY	Data V.23
120		Individual stations			A1A Morse TR	Data V.26 *bis*
121		Reserved for national non-calling purposes e.g. Report ITU-R M.1159			Ship position or location registration updating	Data V.26 *ter*
122	Ack. BQ (EOS)				(7)	(7)
123		Individual station semi-automatic/ automatic service			A1A Morse	Data V.27 *ter*
124		(6)			F1C/F2C/F3C FAX	Data V.32
125	Phasing DX position				(7)	(7)
126	*				No information(9)	No information(9)
127	EOS				(7)	(7)

TR : tape recorder

TP : telephony

TTY : direct printing

ARQ : Rec. ITU-R M.476 or Rec. ITU-R M.625 equipment

FAX : facsimile

* Symbol transmitted in place of unused message information.

(1) To allow for future uses of currently unassigned symbols, equipments should not reject calls containing such symbols.

(2) Currently unassigned when used with first telecommands other than symbol No. 104 – for future use.

(3) Currently unassigned – for future use.

(4) Used for selective call to a group of ships in a specified VTS area (Rec. ITU-R M.825). Should not be used in any future expansion.

(5) Only used for semi-automatic/automatic service.

(6) Used in the automatic VHF/UHF service (Rec. ITU-R M.586). Should not be used in any future expansion.

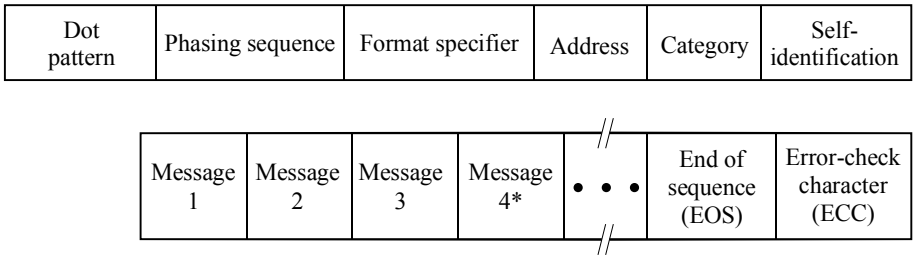
(7) Should not be used in any future expansion.

(8) See § 8.4.

(9) See § 8.2.1.1 and 8.2.1.2.

2 Technical format of a call sequence

2.1 The technical format of the call sequence is:



* Distress calls only.

0493-00

2.2 Examples of typical call sequences and the construction of the transmission format are given in Tables 4 to 7, and in Figs. 1 to 4.

2.3 The flow charts illustrating the operation of the DSC system are shown in Figs. 5a and 5b.

3 Dot pattern and phasing

3.1 The phasing sequence provides information to the receiver to permit correct bit phasing and unambiguous determination of the positions of the characters within a call sequence (see Note 1).

NOTE 1 – Acquisition of character synchronization should be achieved by means of character recognition rather than, for example, by recognizing a change in the dot pattern, in order to reduce false synchronization caused by a bit error in the dot pattern.

3.2 The phasing sequence consists of specific characters in the DX and RX positions transmitted alternatively. Six DX characters are transmitted.

3.2.1 The phasing character in the DX position is symbol No. 125 of Table 1.

3.2.2 The phasing characters in the RX position specify the start of the information sequence (i.e. the format specifier) and consist of the symbol Nos. 111, 110, 109, 108, 107, 106, 105 and 104 of Table 1, consecutively.

3.3 Phasing is considered to be achieved when two DXs and one RX, or two RXs and one DX, or three RXs in the appropriate DX or RX positions, respectively, are successfully received. These three phasing characters may be detected in either consecutive or non-consecutive positions but in both cases all bits of the phasing sequence should be examined for a correct 3-character pattern. A call should be rejected only if a correct pattern is not found anywhere within the phasing sequence.

3.4 To provide appropriate conditions for earlier bit synchronization and to allow for scanning methods to monitor several HF and MF frequencies by ship stations, the phasing sequence should be preceded by a dot pattern (i.e. alternating B-Y or Y-B sequence bit synchronization signals) with duration of:

3.4.1 200 bits

At HF and MF, for “distress”, “distress acknowledgement”, “distress relay” and “distress relay acknowledgement” calls and for all calling sequences to ship stations.

3.4.2 20 bits

At HF and MF, for all acknowledgement sequences (except distress acknowledgements and distress relay acknowledgements (see § 3.4.1 and Note 1)) and for all calling sequences to coast stations (except distress relay calls (see § 3.4.1)). At VHF for all calls.

NOTE 1 – In exceptional circumstances and only on national working frequencies the 200 bit dot pattern could also be included in acknowledgement sequences to ship stations.

4 Format specifier

4.1 The format specifier characters which are transmitted twice in both the DX and RX positions (see Fig. 1) are:

4.1.1 symbol No. 112 for a "distress" call (RR No. 3086 (Appendix S13, Part A3, § 1)); or

4.1.2 symbol No. 116 for an "all ships" call; or

4.1.3 symbol No. 114 for a selective call to a group of ships having a common interest (e.g. belonging to one particular country, or to a single shipowner, etc.); or

4.1.4 symbol No. 120 for a selective call to a particular individual station; or

4.1.5 symbol No. 102 for a selective call to a group of ships in a particular geographic area; or

4.1.6 symbol No. 123 for a selective call to a particular individual station using the semi-automatic/automatic service.

4.2 It is considered that receiver decoders must detect the format specifier character twice for "distress" calls and "all ships" calls to effectively eliminate false alerting. For other calls, the address characters provide additional protection against false alerting and, therefore, single detection of the format specifier character is considered satisfactory (see Table 8).

5 Address

5.1 "Distress" calls and "all ships" calls do not have addresses since these calls are implicitly addressed to all stations (ship stations and coast stations).

5.2 For a selective call directed to an individual ship, to a coast station or to a group of stations having a common interest, the address consists of the characters corresponding to the station's maritime mobile service identity, the sequence consisting of characters coded in accordance with Table 2 (see Note 1).

NOTE 1 – According to RR ex Appendix 43 (Article S19), maritime mobile service identities are formed of a series of nine digits, consisting of three digits of the Maritime Identification Digits (MID) and six more digits.

These identities are included in the address and self-identification parts of the call sequence and are transmitted as five characters $C_5C_4C_3C_2C_1$, comprising the ten digits of:

$$(X_1, X_2)\ (X_3, X_4)\ (X_5, X_6)\ (X_7, X_8) \text{ and } (X_9, X_{10})$$

respectively, whereas digit X_{10} is always the figure 0 unless the equipment is also designed in accordance with Recommendation ITU-R M.1080.

Example:

MID $X_4\ X_5\ X_6\ X_7\ X_8\ X_9$ being the ship station identity is transmitted by the DSC equipment as:

$$(M, I)\ (D, X_4)\ (X_5, X_6)\ (X_7, X_8)\ (X_9, 0)$$

5.3 For a selective call directed to a group of ships in a particular geographic area a numerical geographic coordinates address consisting of ten digits (i.e. 5 characters), is constructed as follows (see Fig. 6 and Note 1):

NOTE 1 – In order to comply with commonly accepted practice, the order of entry and read-out should be: first latitude and then longitude.

5.3.1 the designated geographic area will be a rectangle in Mercator projection;

5.3.2 the upper left-hand (i.e. North-West) corner of the rectangle is the reference point for the area;

5.3.3 the first digit indicates the azimuth sector in which the reference point is located, as follows:

5.3.3.1 quadrant NE is indicated by the digit "0",

5.3.3.2 quadrant NW is indicated by the digit "1",

5.3.3.3 quadrant SE is indicated by the digit "2",

5.3.3.4 quadrant SW is indicated by the digit "3";

5.3.4 the second and third digits indicate the latitude of the reference point in tens and units of degrees;

5.3.5 the fourth, fifth and sixth digits indicate the longitude of the reference point in hundreds, tens and units of degrees;

5.3.6 the seventh and eighth digits indicate the vertical (i.e. North-to-South) side of the rectangle, $\Delta\varphi$, in tens and units of degrees;

5.3.7 the ninth and tenth digits indicate the horizontal (i.e. West-to-East) side of the rectangle, $\Delta\lambda$, in tens and units of degrees.

6 Category

6.1 The "category" information is coded as shown in Table 9 and defines the degree of priority of the call sequence.

6.2 For a "distress" call the priority is defined by the format specifier and no category information is included in the call sequence.

6.3 For safety related calls, the "category" information specifies:

6.3.1 distress (RR No. 3143); or

6.3.2 urgency; or

6.3.3 safety.

6.4 For other calls, the "category" information specifies:

6.4.1 ship's business; to cater for shore-to-ship communications having priority category 6 as defined in RR No. 4441. Some coast stations do not use the ship's business priority category;

6.4.2 routine.

7 Self-identification

7.1 The maritime mobile service identity (MMSI) assigned to the calling station, coded as indicated in § 5.2 and its Note 1, is used for self-identification. The MMSI should be stored in the DSC unit and it should not be possible for the user to easily change it.

8 Messages

The messages that are included in a call sequence contain the following message elements, which are listed in the order in which they would appear in each message:

8.1 For a "distress" call (see Table 4 and Fig. 4a)) the distress information is contained in four messages in the following order:

8.1.1 Message 1 is the "nature of distress" message, coded as shown in Table 10, i.e.:

8.1.1.1 fire, explosion;

8.1.1.2 flooding;

8.1.1.3 collision;

8.1.1.4 grounding;

8.1.1.5 listing, in danger of capsizing;

8.1.1.6 sinking;

8.1.1.7 disabled and adrift;

8.1.1.8 undesignated distress;

8.1.1.9 abandoning ship;

8.1.1.10 piracy/armed robbery attack;

8.1.1.11 man over board;

8.1.1.12 emergency position-indicating radiobeacon (EPIRB) emission.

8.1.2 Message 2 is the "distress coordinates" message, consisting of ten digits indicating the location of the vessel in distress, coded on the principles described in Table 2, in pairs starting from the first and second digits (see Note 1 to § 5.3):

8.1.2.1 The first digit indicates the quadrant in which the incident has occurred, as follows:

8.1.2.1.1 quadrant NE is indicated by the digit "0",

8.1.2.1.2 quadrant NW is indicated by the digit "1",

8.1.2.1.3 quadrant SE is indicated by the digit "2",

8.1.2.1.4 quadrant SW is indicated by the digit "3".

8.1.2.2 The next four figures indicate the latitude in degrees and minutes.

8.1.2.3 The next five figures indicate the longitude in degrees and minutes.

8.1.2.4 If "distress coordinates" cannot be included, or if the position information has not been updated for $23^{½}$ hours, the 10 digits following the "nature of distress" should be automatically transmitted as the digit 9 repeated 10 times.

8.1.2.5 DSC equipment should be provided with facilities for automatic position updating in accordance with NMEA 0183 (or IEC-1162) for input of data from a navigation equipment.

8.1.3 Message 3 is the time indication (UTC) when the coordinates were valid consisting of four digits coded on the principles described in Table 2, in pairs starting from the first and second digits.

8.1.3.1 The first two digits indicate the time in hours.

8.1.3.2 The third and fourth digits indicate the part of the hours in minutes.

8.1.3.3 If the time cannot be included the four time indicating digits should be transmitted automatically as "8 8 8 8".

8.1.4 Message 4 is a single character to indicate the type of communication (telephone or teleprinter) which is preferred by the station in distress for subsequent exchange of distress traffic (RR No. 3143). This character is coded as shown in Table 11**.**

8.2 For other types of calls (see Table 5 and Figs. 2 and 3) except "distress relay", "distress relay acknowledgement" and "distress acknowledgement" calls (see § 8.3), two messages are included in the following order:

8.2.1 Message 1 is the "telecommand" information and consists of 2 characters (first and second telecommand) coded as shown in Tables 11 and 12;

8.2.1.1 if no information additional to that conveyed by the first telecommand character is required, then the second telecommand signal should be symbol No. 126 (no information) (see Table 12);

8.2.1.2 if no telecommand information is used, symbol No. 126 is transmitted twice.

8.2.2 Message 2 may contain two "channel or frequency message" elements, each of which always consists of three characters, "character 1", "character 2" and "character 3", indicating the proposed working frequency (in the F1B/J2B mode the assigned frequency should be used) in multiples of 100 Hz or the channel number (coded in accordance with Table 13) or the ship's position. The first frequency element (the RX field) in the call indicates the called station receive frequency and the second frequency element (the TX field) indicates the called station transmit frequency. In acknowledgements the RX and TX fields indicate the receive and transmit frequency of the acknowledging station respectively (see also Fig. 2 and Note 1).

NOTE 1 – If only one channel or frequency message element is used, this indicates the called station receive channel or frequency or a two-frequency (paired) channel. A second channel or frequency message element may be used to designate the called station transmit channel or frequency. If the calling station indicates only the called station receive

frequency (for broadcast mode transmissions) then the symbol No. 126 repeated three times should be transmitted instead of the called station transmit channel or frequency message element. If no "channel or frequency message" elements are used, the symbol No. 126 is transmitted six times. For calls using the semi-automatic/automatic VHF service (see Table 7) then only one "channel or frequency message" element is transmitted which indicates the paired channel number. In the absence of this element the symbol No. 126 should be transmitted three times.

8.2.2.1 Frequency information

The frequency (in the F1B/J2B mode the assigned frequency should be used) in multiples of 100 Hz may only be indicated as such when the frequency is below 30 MHz. The three characters provide for the required six decimal digits. Character 1 represents the units (U) and tens (T) of 100 Hz, character 2 the hundreds (H) and thousands (M) and character 3 the tens of thousands (TM) and hundreds of thousands (HM) of 100 Hz.

8.2.2.2 Channel information

8.2.2.2.1 HF and MF channels

If the HM digit is 3, this indicates that the number represented by the digits TM, M, H, T and U is the HF/MF working channel number (either single frequency or two frequency channels).

8.2.2.2.2 VHF channels

If the HM digit is 9, this indicates that the number represented by the values of the digits M, H, T and U is the VHF working channel number. If the M digit is 1, this indicates that the ship stations transmitting frequency is being used as a simplex channel frequency for both ship and coast stations. If the M digit is 2, this indicates that the coast stations transmitting frequency is being used as a simplex channel frequency for both ship and coast stations.

8.2.2.3 Ship's position information

8.2.2.3.1 Message 2 may contain the ship's position, consisting of the digit 5 repeated two times and ten digits (five characters) indicating this position, coded in accordance with § 8.1.2 to § 8.1.2.3 (see Table 14).

8.2.2.3.2 If a reply to a calling sequence requesting ship's position is required (see Fig. 3d) then message 2 consists of twelve digits (six symbols), the first of which should be coded in accordance with § 8.1.2 to § 8.1.2.3 followed by one symbol No. 126.

8.2.2.3.3 Message 3 follows message 2 in this case and contains the time (UTC) when the coordinates were valid, coded as indicated in § 8.1.3 to § 8.1.3.3.

8.2.3 Message 3 follows message 2 when using the DSC system for calls initiated by ship stations requiring a semi-automatic or automatic connection (see Table 7) and contains the public switched network number (e.g. telephone number). In this case the format specifier used is symbol No. 123.

8.2.3.1 This number is coded by up to nine symbols in a manner similar to that shown in Table 2, except that the first character transmitted should be either symbol No. 105 or No. 106 to indicate whether the network number contains an odd or even number of significant digits. As an example, the number 0012345 would be coded as symbol numbers 105 00 01 23 45 whereas the number 00123456 should be coded as symbol numbers 106 00 12 34 56.

8.3 For "distress relay" including shore-to-ship alerts, "distress relay acknowledgement" and "distress acknowledgement" calls, the message formats are indicated in Figs. 4b) and 4c) respectively.

8.3.1 For a distress relay where the identity of the station in distress is unknown, the "identification of the station in distress" should be automatically transmitted as the symbol No. 126 five times.

8.3.2 Distress call cancellation

To cancel an inadvertent transmitted "distress" call, a "distress cancellation" call in the format indicated in Fig. 4c) may be transmitted with the ship's own MMSI inserted as identification of ship in distress. This cancellation should be followed immediately by a voice cancellation procedure, as described in Recommendation ITU-R M.541.

8.4 For test calls on the exclusive distress and safety calling frequencies on MF and HF, the call sequence is given in Table 6 (see also Recommendation ITU-R M.541, Annex 1). Technical means should be included to prevent the transmission of this sequence on VHF. Furthermore, the first telecommand symbol No. 118 (see Table 3) should only be capable of being inserted into the sequence given in Table 6.

9 End of sequence

The "end of sequence" (EOS) character is transmitted three times in the DX position and once in the RX position (see Fig. 1b)). It is one of the three unique characters corresponding to symbol Nos. 117, 122 and 127 as follows:

9.1 symbol No. 117 if the call requires acknowledgement (Acknowledge RQ);

9.2 symbol No. 122 if the sequence is an answer to a call that requires acknowledgement (Acknowledge BQ);

9.3 symbol No. 127 for all other calls.

10 Error-check character

10.1 The error-check character (ECC) is the final character transmitted and it serves to check the entire sequence for the presence of errors which are undetected by the ten-unit error-detecting code and the time diversity employed.

10.2 The seven information bits of the ECC shall be equal to the least significant bit of the modulo-2 sums of the corresponding bits of all information characters (i.e. even vertical parity). The format specifier and the EOS characters are considered to be information characters. The phasing characters and the retransmission (RX) characters shall not be considered to be information characters. Only one format specifier character and one EOS character should be used in constructing the ECC. The ECC shall also be sent in the DX and RX positions.

10.3 Automatic acknowledgement transmissions should not start unless the ECC is received and decoded correctly. A received ECC which does not match that calculated from the received information characters may be ignored if this was due to an error detected in the ten-unit error-detecting code of the information characters which was correctable by use of the time diversity code.

11 Distress call attempt

11.1 Distress calls may be transmitted as a single frequency or a multi-frequency call attempt preceded by a dot pattern. Where a distress call attempt contains more than one consecutive distress call on the same frequency (see Recommendation ITU-R M.541, Annex 1, § 3.1.3), these consecutive calls may be transmitted with no gap between the end of one call and the start of the dot pattern of the following call to enable bit synchronization to be maintained (see Fig. 1c)).

11.2 A distress call should be activated only by means of a dedicated distress button which should be clearly identified and be protected against inadvertent operation. The initiation of a distress call should at least require two independent actions.

11.3 Calls with format specifier "distress" or category "distress", "urgency" and "safety" should be initiated manually only. This applies also for ships equipped for automatic DSC operation. For automatic repetition of distress calls see Recommendation ITU-R M.541, Annex 1, §§ 3.1.3 and 3.3.5.

12 Audible alarm

An audible alarm and visual indicator should be provided upon reception of a distress call or a call with category distress (see Recommendation ITU-R M.541, § 3).

FIGURE 1

Construction of call sequence

Dot pattern	DX/RX Phasing sequence	A Format specifier 2 identical characters	B Called party address 5 characters	C Category 1 character	D Self-identification 5 characters	E Telecommand message 2 characters	F Frequency message 3 characters	G Frequency message 3 characters	H End of sequence 3 identical DX characters 1 RX character	I Error-check character 1 character

a) Technical format of a typical routine message

Dot pattern	DX	RX7	DX	RX6	DX	RX5	DX	RX4	DX	RX3	DX	RX2	A	RX1	A	RX0	B1	A	B2	A	B3	B1	B4	B2	B5	B3	C	B4	D1	B5	D2	C	D3	D1	D4	D2	D5	D3	E1	D4	E2	D5	F1	E1	F2	E2	F3	F1	G1	F2	G2	F3	G3	G1	H	G2	I	G3	H	H	H	I

b) Transmission sequence corresponding to Fig. 1a)

	G1	F2	G2	F3	G3	G1	H	G2	I	G3	H	H	H	I	Dot pattern	DX	RX7	DX	RX6	DX	RX5	DX	RX4	DX	RX3	DX	RX2	A	RX1	A	RX0	B1	A	B2	A	B3	

c) Transmission sequence for repetition of a distress call according to § 11

0493-01

FIGURE 2

Examples of a calling sequence and reply sequences for typical individual calls

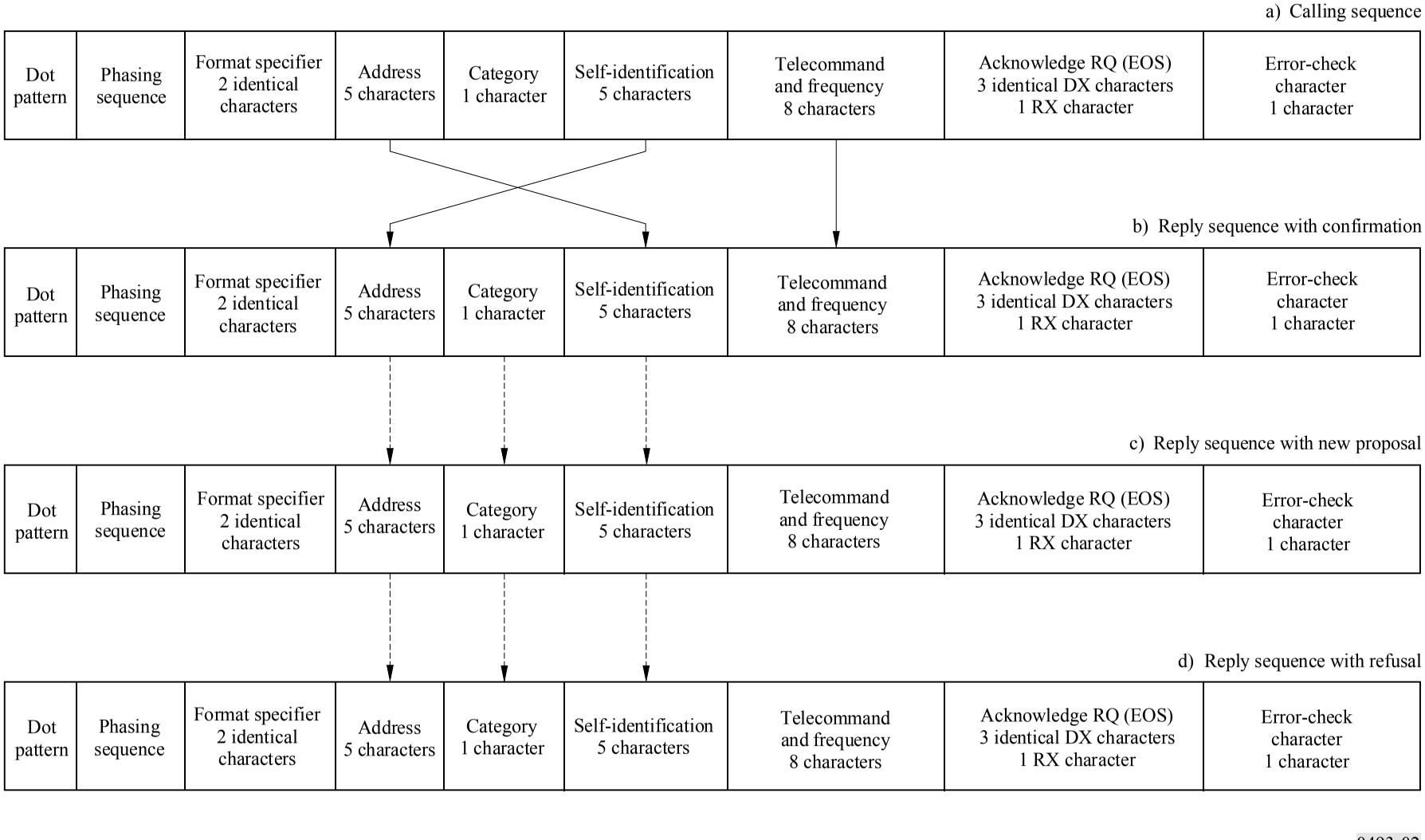
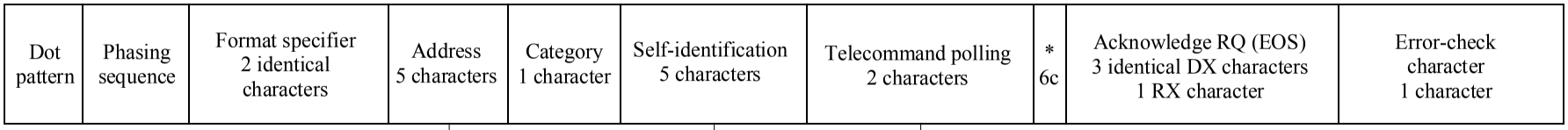


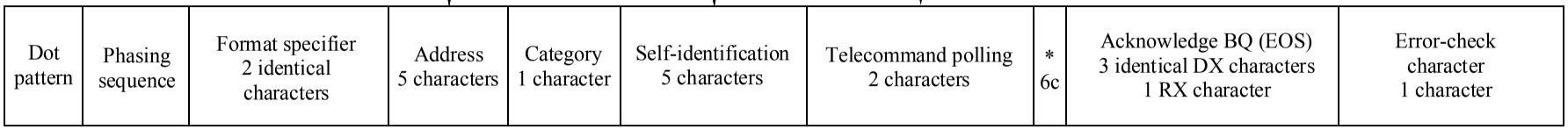
FIGURE 3

Calling sequences and reply sequences for polling and ship's position

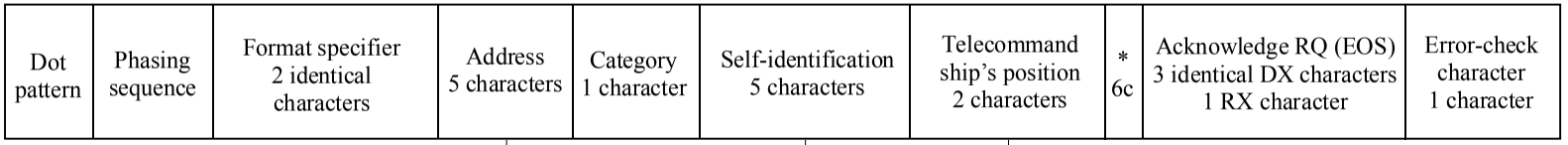
a) Calling sequence polling



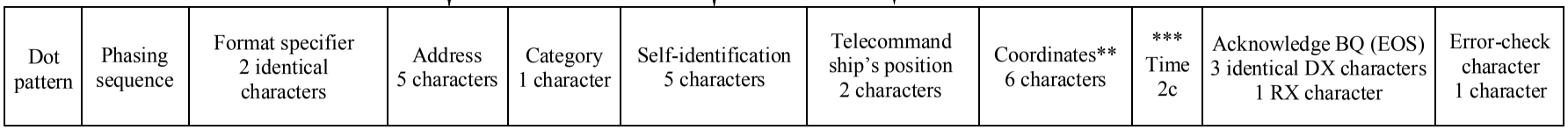
b) Reply sequence to polling



c) Calling sequence to request ship's position



d) Reply sequence to request for ship's position



* The symbol No. 126 repeated six times should be included (see § 8.2.2, Note 1).

** See § 8.2.2.3.2 (6 characters).

*** See § 8.2.2.3.3 (2 characters).

0493-03

FIGURE 4

Sequences of "distress call", distress relay call and distress acknowledgement and distress relay acknowledgement

a) "Distress call"

Dot pattern	Phasing sequence	Format specifier distress 2 identical characters	Self-identification 5 characters	Nature of distress 1 character	Distress coordinates 5 characters	Time 2 characters	Tele-command* 1 character	End of sequence 3 identical DX characters 1 RX character	Error-check character 1 character

****

b) Distress relay and distress relay acknowledgement

Dot pattern	Phasing sequence	Format specifier 2 identical characters	Address** 5 characters	Category (distress) 1 character	Self-identification 5 characters	Telecommand distress relay 1 character	Identification of ship in distress 5 characters	Nature of distress 1 character	Distress coordinates 5 characters	Time 2 characters	Tele-command* 1 character	End of sequence*** 3 identical DX characters 1 RX character	Error-check character 1 character

c) Distress acknowledgement

Dot pattern	Phasing sequence	Format specifier All ships 2 identical characters	Category (distress) 1 character	Self-identification 5 characters	Telecommand distress acknow-ledgement 1 character	Identification of ship in distress ***** 5 characters	Nature of distress 1 character	Distress coordinates 5 characters	Time 2 characters	Tele-command* 1 character	End of sequence*** 3 identical DX characters 1 RX character	Error-check character 1 character

* Type of subsequent communication (radiotelephony or teleprinter – see Table 11 and § 8.1.4).

** Address is not included if the format specifier is "all ships".

*** If the format specifier is "all ships" then the "end of sequence" character is symbol No. 127. For a distress relay call addressed to an individual coast station, the "end of sequence" character is RQ (symbol No. 117). For a distress relay acknowledgement call transmitted by a coast station, the "end of sequence" character is BQ (symbol No. 122).

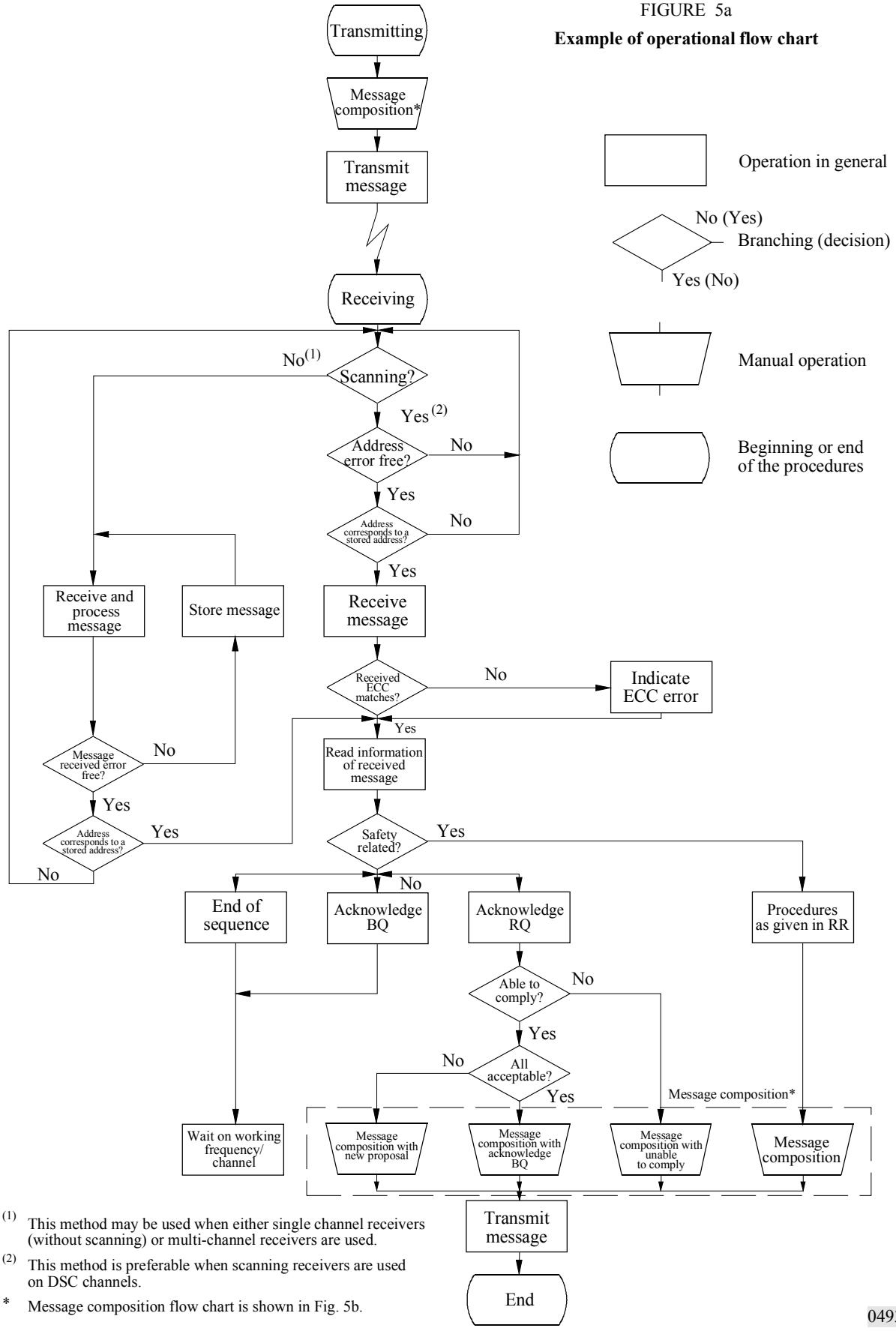
**** Sequences a) and b) demonstrate how a DSC distress relay call may be constructed from a received DSC distress call. It should also be possible to generate distress relay calls in response to a distress situation observed or notified by non-DSC means.

0493-04

***** In case of cancellation of an inadvertent transmitted "distress" call insert self-indication (own ship's MMSI).

FIGURE 5a

Example of operational flow chart



(1) This method may be used when either single channel receivers (without scanning) or multi-channel receivers are used.

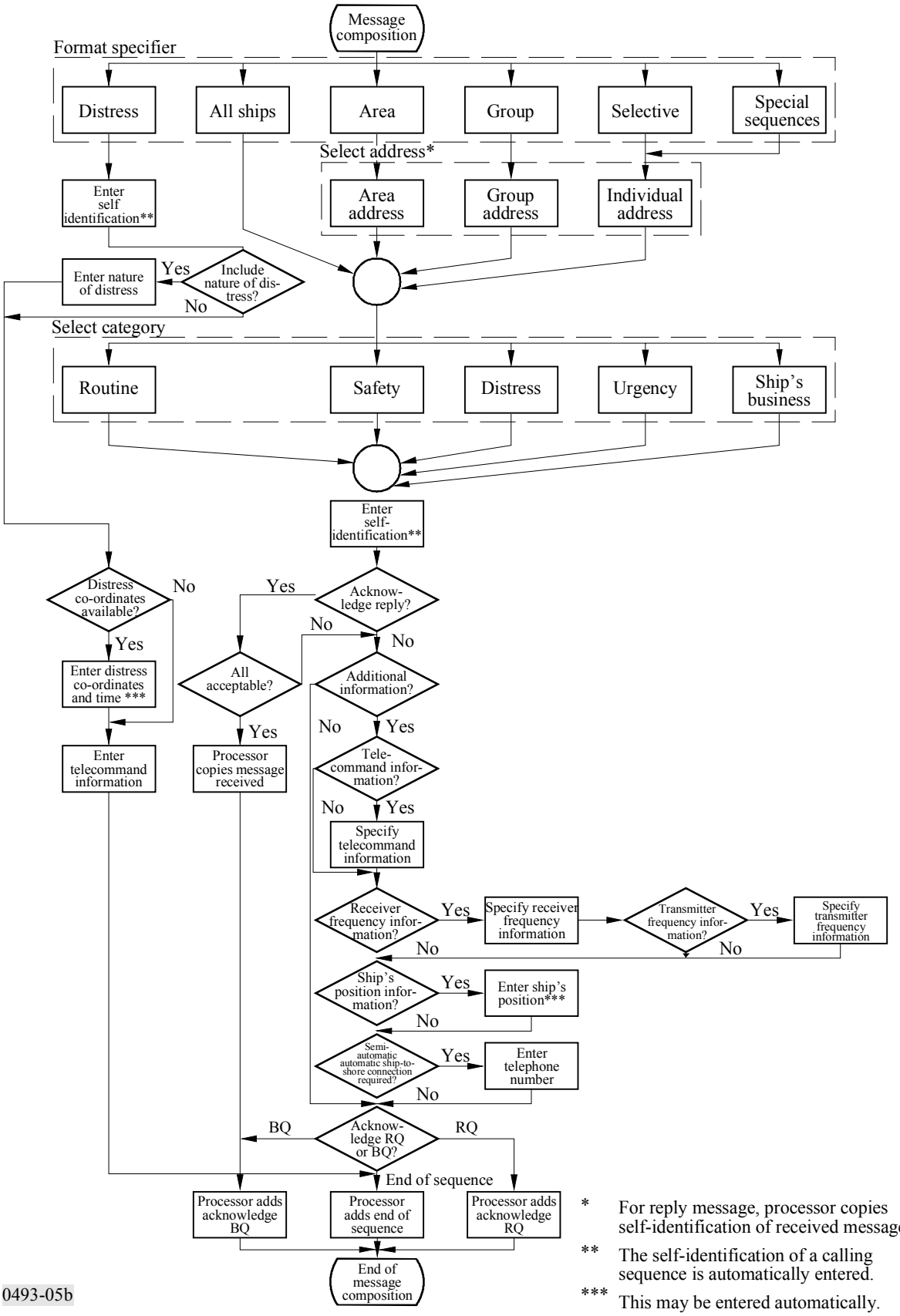
(2) This method is preferable when scanning receivers are used on DSC channels.

* Message composition flow chart is shown in Fig. 5b.

0493-05a

FIGURE 5b

Message composition flow chart



0493-05b

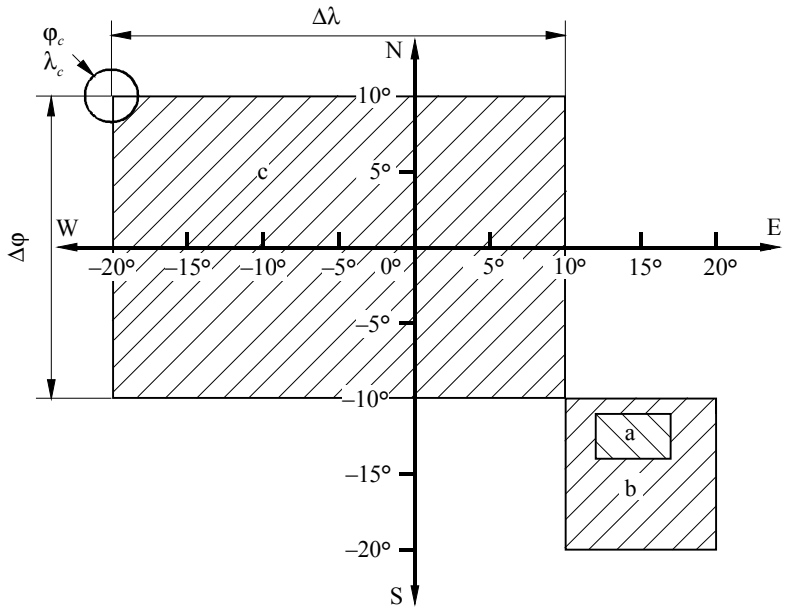
* For reply message, processor copies self-identification of received message.

** The self-identification of a calling sequence is automatically entered.

*** This may be entered automatically.

FIGURE 6

Geographic coordinates



a) $\varphi_a = -11°$ (South) $\lambda_a = 12°$ (East) $\Delta\varphi = 3°$ $\Delta\lambda = 5°$

Format specifier	2	1	1	0	1	2	0	3	0	5	Category
Sector		φ_a			λ_a			$\Delta\varphi$		$\Delta\lambda$	

b) $\varphi_b = -10°$ (South) $\lambda_b = 10°$ (East) $\Delta\varphi = 10°$ $\Delta\lambda = 10°$

Format specifier	2	1	0	0	1	0	1	0	1	0	Category

c) $\varphi_c = 10°$ (North) $\lambda_c = -20°$ (West) $\Delta\varphi = 20°$ $\Delta\lambda = 30°$

Format specifier	1	1	0	0	2	0	2	0	3	0	Category

0493-06

TABLE 4

Call sequences of "distress call" and "all ships call"

(2) Format specifier	(5) Address	(1) Category	(5) Self-identification	Message				(1)* EOS	(1) ECC
				1	2	3	4		
Distress call 112	_____	_____	00-------99	(1) Nature of distress 100---------124	(5) Distress coordinates 00----------99	(2) Time	(1)** Telecom-mand 100, 109 or 113	127	ECC
All ships call 116	_____	Distress 112 Urgency 110 Safety 108	00-------99	(2) Telecommand 100---------126 except 117, 122 and 125	(6) Frequency or channel 00----------99	Not used	Not used	EOS 127	ECC

( ): number of characters

* See § 9.

** Type of subsequent communication, see Table 11 and § 8.1.4.

TABLE 5

Call sequences of selective calls

(2) Format specifier	(5) Address	(1) Category	(5) Self-identification	Message *		(1)** EOS	(1) ECC
				1	2		
Geographical area call 102	00------99	Distress 112 Urgency 110 Safety 108	00-------99	(2) Telecommand 100---------126 except 117, 122 and 125	(6) Frequency, channel or ship's position *** 00----------99	EOS 127	ECC
Ships having common interest call 114	See § 5 of Annex 1	Ship's business 106					
Individual call 120		Routine 100				Ack. RQ 117 or Ack. BQ 122 EOS 127	

( ) : number of characters

* A message 3 is required for a reply sequence to a request for ship's position (see Fig. 3d)).

** See § 9.

*** See § 8.2.2.3.1 and 8.2.2.3.2.

TABLE 6

Call sequence of selective calls for testing the equipment used for distress and safety calls

(2) Format specifier	(5) Address	(1) Category	(5) Self-identification	Message		(1)* EOS	(1) ECC
				1	2		
Individual call 120	00------99	Safety 108	00----------99	(2) First telecommand 118; second telecommand 126	(6) Frequency or channel 126 transmitted six times	Ack. RQ 117 or Ack. BQ 122	ECC

( ) : number of characters

* See § 9.

TABLE 7

Call sequence of semi-automatic/automatic ship-to-shore call

(2) Format specifier	(5) Address	(1) Category	(5) Self-identification	Message			(1)* EOS	(1) ECC
				1	2	3		
123	00-----99	Routine 100	00---------99	(2) VHF calls – first telecommand 100, 101, 104, 105, 106, 121 or 124; calls – first telecommand 102 ... 124, except 110, 112, 117 or 122; second telecommand in accordance with Table 12	(6)** Frequency, channel or ship's position 00---------99	(2-9) Selection information 105 or 106, followed by 00----------99 see § 8.2.3.1	Ack. RQ 117 or Ack. BQ 122	ECC

( ) : number of characters

* See § 9.

** Only 3 for VHF calls.

TABLE 8

Format specifier

Symbol No.	Format specifier
112	Distress call
116	All ships call
	Selective call to:
120	– Individual stations
102	– Ships in a particular geographic area
114	– Ships having a common interest
123	Semi-automatic/automatic service

TABLE 9

Category

Symbol No.	Category
	Safety related:
112	Distress
110	Urgency
108	Safety
	Others:
106	Ship's business
100	Routine

TABLE 10

Nature of distress

Symbol No.	Nature of distress
100	Fire, explosion
101	Flooding
102	Collision
103	Grounding
104	Listing, in danger of capsizing
105	Sinking
106	Disabled and adrift
107	Undesignated distress
108	Abandoning ship
109	Piracy/armed robbery attack
110	Man overboard
112	EPIRB emission

TABLE 11

First telecommand character

Symbol No. (1)	Use and/or mode	Terminal equipment
100	F3E/G3E simplex	Telephone
101	F3E/G3E duplex	Telephone
102	(2)	–
103	Polling	–
104	Unable to comply(3)	–
105	End of call(4)	–
106	Data(5)	Modem
107	(2)	–
108	(2)	–
109	J3E	Telephone
110	Distress acknowledgement	–
111	H3E	Telephone
112	Distress relay	–
113	F1B/J2B FEC	Teleprinter(6)
114	(2)	–
115	F1B/J2B ARQ	Telex/teleprinter(6)
116	F1B/J2B receive	Teleprinter
118	Test(7)	–
119	F1B/J2B	Teleprinter
120	A1A Morse	Tape recorder
121	Ship position or location registration updating	–
123	A1A Morse	Morse key/head-set
124	F1C/F2C/F3C	Facsimile machine
126	No information(8)	–

(1) Symbols 117, 122, 125 and 127 should not be used.

(2) Currently unassigned – for future use.

(3) One of second telecommand symbols 100-109 must follow (see Table 12).

(4) Only used for semi-automatic/automatic service.

(5) One of second telecommand symbols 115-124 should follow (see Table 12).

(6) Equipment according to Recommendation ITU-R M.476 or Recommendation ITU-R M.625.

(7) See § 8.4.

(8) See § 8.2.1.2.

TABLE 12

Second telecommand character

Symbol No. (1)	Meaning	For use with the following first telecommand signals
100	No reason given(2)	
101	Congestion at maritime switching centre(2)	
102	Busy(2)	
103	Queue indication(2)	
104	Station barred(2)	104 (Unable to comply)(3)
105	No operator available(2)	
106	Operator temporarily unavailable(2)	
107	Equipment disabled(2)	
108	Unable to use proposed channel(2)	
109	Unable to use proposed mode(2)	
110	Ships and aircraft according to Resolution 18 (Mob-83)	Any except 104, 105, 106, 110, 112 or 118
111	Medical transport (as defined in 1949 Geneva Convention and additional Protocols)	
112	Pay-phone public call office	100, 101, 109, 115 or 124
113	Facsimile/data according to Recommendation ITU-R M.1081	106
114	(4)	–
115	Data V.21(5)	
116	Data V.22(5)	
118	Data V.22 *bis*(5)	
119	Data V.23(5)	106 (Data)
120	Data V.26 *bis*(5)	
121	Data V.26 *ter*(5)	
123	Data V.27 *ter*(5)	
124	Data V.32(5)	
126	No information(6)	Any except 104, 110 or 112

(1) Symbols 117, 122, 125 and 127 should not be used.

(2) Currently unassigned when used with first telecommands other than symbol No. 104 – for future use.

(3) When second telecommands 100-109 are given alternative assignments (see (2)), they may be used with first telecommands other than symbol No. 104.

(4) Currently unassigned – for future use.

(5) Data communication in accordance with these ITU-T Recommendations may require special provision at coast stations and may not be practicable in all frequency bands.

(6) See § 8.2.1.1.

TABLE 13

Frequency or channel information

Frequency	0 1 2	X X X	X X X	X X X	X X X	X X X	The frequency in multiples of 100 Hz as indicated by the figures for the digits HM, TM, M, H, T, U.
Channels	3	X	X	X	X	X	The HF/MF working channel number indicated by the values of the digits TM, M, H, T and U.
	8	X	X	X	X	X	Only used for Recommendation ITU-R M.586 equipment.
	9	O	X(1)	X	X	X	The VHF working channel number indicated by the values of the digits M, H, T and U.
	HM	TM	M	H	T	U	
	Character 3		Character 2		Character 1(2)		

(1) If the M digit is 1 this indicates that the ship stations transmitting frequency is being used as a simplex channel frequency for both ship and coast stations. If the M digit is 2 this indicates that the coast stations transmitting frequency is being used as a simplex channel frequency for both ship and coast stations.

(2) Character 1 is the last character transmitted.

TABLE 14

Position information (Annex 1, § 8.2.2.3)

	Quadrant digit NE = 0 NW = 1 SE = 2 SW = 3	Latitude				Longitude				
		Tens of degrees	Units of degrees	Tens of minutes	Units of minutes	Hundreds of degrees	Tens of degrees	Units of degrees	Tens of minutes	Units of minutes
55	X	X	X	X	X	X	X	X	X	X
Character 6	Character 5		Character 4		Character 3		Character 2		Character 1(1)	

(1) Character 1 is the last character transmitted.

ANNEX 2

Equipment classes

1 Class A equipment, which includes all the facilities defined in Annex 1, will comply with the IMO GMDSS carriage requirements for MF/HF installations.

Class B equipment providing minimum facilities for equipment on ships not required to use Class A equipment and complying with the minimum IMO GMDSS carriage requirements for MF and/or VHF installations.

Class D equipment is intended to provide minimum facilities for VHF DSC distress, urgency and safety as well as routing calling and reception, not necessarily in full accordance with IMO GMDSS carriage requirements for VHF installations.

Class E equipment is intended to provide minimum facilities for MF and/or HF DSC distress, urgency and safety as well as routine calling and reception, not necessarily in full accordance with IMO GMDSS carriage requirements for MF/HF installations.

NOTE 1 – Class C, F and G equipment as defined in earlier versions of this Recommendation (e.g., Recommendations ITU-R M.493-5 (Geneva, 1992) and ITU-R M.493-7 (Geneva, 1995)) did not provide vital minimum DSC functions (transmitting and receiving distress alerts) and have therefore been withdrawn.

2 The technical requirements for Class B, D and E are given in § 3, 4 and 5.

3 Class B (MF and/or VHF only)

3.1 Transmit capabilities

3.1.1 Format specifier:
Distress call
All ships call
Individual station call
Semi-automatic/automatic service call.

3.1.2 The numerical identification of the called station (address).

3.1.3 Category:
Distress
Urgency
Safety
Routine.

3.1.4 Self-identification (automatically inserted).

3.1.5 Messages

3.1.5 Messages

3.1.5.1 For distress calls:

Message 1: Nature of distress, defaulting to undesignated distress
Message 2: Distress coordinates
Message 3: Time for last position update
Message 4: Type of subsequent communication:
MF: H3E or J3E
VHF: F3E/G3E simplex.

3.1.5.2 For distress relay calls:

First telecommand: Distress relay
Identification of the ship: As defined in Annex 1
Messages 1 to 4: As § 3.1.5.1.

3.1.5.3 For distress acknowledgement calls:

First telecommand: Distress acknowledgement
Identification of the ship: As defined in Annex 1
Messages 1 to 4: As § 3.1.5.1.

3.1.5.4 For all other calls:

First telecommand:	Unable to comply
MF:	for individual station calls H3E, J3E or "test" (see Annex 1 § 8.4); for calls using the semi-automatic/automatic MF-services H3E, J3E or "end of call".
VHF:	for individual station calls F3E/G3E simplex or duplex; for calls using the semi-automatic/automatic VHF-services F3E/G3E simplex or duplex or "end of call".
Second telecommand:	No information
Frequency/channel or ship's position:	As defined in Annex 1
Selection information (semi-automatic/automatic service):	Telephone number of public telephone subscriber.

3.1.6 End of sequence character: as defined in Annex 1.

3.2 Receive capabilities

3.2.1 Receive and be capable of displaying all the information in calls listed in § 3.1 plus all distress relay calls having the format specifier "geographical area calls", all distress acknowledgement calls and all "unable to comply" calls.

3.2.2 Audible alarm upon reception of any DSC call.

4 Class D (VHF only)

4.1 Transmit capabilities

4.1.1 Format specifier: Distress call
All ships call
Individual station call.

4.1.2 The numerical identification of the called station (address).

4.1.3 Category: Distress
Urgency
Safety
Routine.

4.1.4 Self-identification (automatically inserted).

4.1.5 Messages

4.1.5.1 For distress calls:

Message 1: Nature of distress, defaulting to undesignated distress
Message 2: Distress coordinates
Message 3: Time for last position update
Message 4: Type of subsequent communication: F3E/G3E simplex.

4.1.5.2 For all other calls:

First telecommand:	F3E/G3E simplex Unable to comply
Second telecommand:	No information
Frequency/channel information:	VHF working channel, defaulting to channel 16 for urgency and safety calls.

4.1.6 End of sequence character: as defined in Annex 1.

4.2 Receive capabilities

Receive and be capable of displaying all the information in calls listed in § 4.1 plus all distress relay calls except those having the format specifier "geographical area calls", all distress acknowledgement calls and all "unable to comply" calls.

5 Class E (MF and/or HF only)

5.1 Transmit capabilities

5.1.1 Format specifier: Distress call
All ships call
Individual station call.

5.1.2 The numerical identification of the called station (address).

5.1.3 Category: Distress
Urgency
Safety
Routine.

5.1.4 Self-identification (automatically inserted).

5.1.5 Messages

5.1.5.1 For distress calls:

Message 1: Nature of distress, defaulting to undesignated distress
Message 2: Distress coordinates
Message 3: Time for last position update
Message 4: Type of subsequent communication: H3E or J3E

5.1.5.2 For all other calls:

First telecommand: J3E telephony
Unable to comply
No information

Second telecommand: No information

Frequency/channel information: MF/HF working channel, on MF defaulting to 2 182 kHz for urgency and safety calls.

5.1.6 End of sequence character: as defined in Annex 1.

5.2 Receive capabilities

Receive and be capable of displaying all the information in calls listed in § 5.1 plus all distress relay calls having the format specifier “geographical area calls”, all distress acknowledgement calls and all “unable to comply” calls.

Annex 3-2-8

RECOMMENDATION ITU-R M.541-8*

OPERATIONAL PROCEDURES FOR THE USE OF DIGITAL SELECTIVE-CALLING EQUIPMENT IN THE MARITIME MOBILE SERVICE

(Question ITU-R 9/8)

(1978-1982-1986-1990-1992-1994-1995-1996-1997)

Summary

The Recommendation contains the operational procedures for digital selective-calling (DSC) equipment whose technical characteristics are given in Recommendation ITU-R M.493. The Recommendation contains four annexes. In Annexes 1 and 2 the provisions and procedures are described for distress and safety calls and for non-distress and safety calls, respectively. In Annexes 3 and 4 the operational procedures for ships and for coast stations are described and Annex 5 lists the frequencies to be used for DSC.

The ITU Radiocommunication Assembly,

considering

a) Resolution No. 311 and Recommendation No. 312 of the World Administrative Radio Conference (Geneva, 1979) (WARC-79);

b) that digital selective-calling (DSC) will be used as described in Recommendation ITU-R M.493;

c) that the requirements of Chapter IV of the 1988 Amendments to the International Convention for the Safety of Life at Sea (SOLAS), 1974, for the Global Maritime Distress and Safety System (GMDSS) are based on the use of DSC for distress alerting on terrestrial frequencies and that operational procedures are necessary for transition to, and implementation of, that system;

d) that, as far as is practicable, operational procedures in all frequency bands and for all types of communications should be similar;

e) that DSC may provide a useful supplementary means of transmitting a distress call in addition to the provisions of transmitting the distress call by existing methods and procedures in the Radio Regulations (RR);

f) that conditions when alarms have to be actuated should be specified,

recommends

1 that the technical characteristics of equipment used for DSC in the maritime mobile service should be in conformity with the relevant ITU-R Recommendations;

2 that the operational procedures to be observed in the MF, HF and VHF bands for DSC should be in accordance with Annex 1 for distress and safety calls and Annex 2 for other calls;

3 that provisions should be made at stations equipped for DSC for:

3.1 the manual entry of address, type of call, category and various messages into a DSC sequence;

3.2 the verification and if necessary the correction of such manually formed sequences;

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* This Recommendation should be brought to the attention of the International Maritime Organization (IMO) and the ITU Telecommunication Standardization Sector (ITU-T).

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3.3 a specific aural alarm and visual indication to indicate receipt of a distress or urgency call or a call having distress category. It should not be possible to disable this alarm and indication. Provisions should be made to ensure that they can be reset only manually;

3.4 aural alarm(s) and visual indication for calls other than distress and urgency. The aural alarm(s) may be capable of being disabled;

3.5 such visual indicators to indicate:

3.5.1 type of received call address (to all stations, to a group of stations, geographical, individual);

3.5.2 category;

3.5.3 identity of calling station;

3.5.4 numerical or alpha-numerical type of information, e.g. frequency information and telecommand;

3.5.5 type of "end of sequence" character;

3.5.6 detection of errors, if any;

3.6 monitoring the VHF channel used for digital selective-calling purposes to determine the presence of a signal and, except for distress and safety calls, provide facilities for automatically preventing the transmission of a DSC call until the channel is free;

3.7 ship originated routine all-ships calls on VHF should be transmitted at a power level of 1 W or less. Integrated VHF DSC equipment should automatically reduce power for transmission of these calls;

4 that the equipment should be simple to operate;

5 that the operational procedures given in Annex 3, which are based on the relevant procedures from Annexes 1 and 2 and from the RR, be used as guidance for ships and coast stations;

6 that the frequencies used for distress and safety purposes using DSC are those contained in Annex 4 to this Recommendation (see also RR Article 38 (Appendix S13, Part A2)).

NOTE 1 – The following definitions are used throughout this Recommendation:

Single frequency: the same frequency is used for transmission and reception;

Paired frequencies: frequencies which are associated in pairs; each pair consisting of one transmitting and one receiving frequency;

International DSC frequencies: those frequencies designated in the RR for exclusive use for DSC on an international basis;

National DSC frequencies: those frequencies assigned to individual coast stations or a group of stations on which DSC is permitted (this may include working frequencies as well as calling frequencies). The use of these frequencies must be in accordance with the RR;

Automatic DSC operation at a ship station: a mode of operation employing automatic tunable transmitters and receivers, suitable for unattended operation, which provide for automatic call acknowledgements upon reception of a DSC and automatic transfer to the appropriate working frequencies;

Call attempt: one or a limited number of call sequences directed to the same stations on one or more frequencies and within a relatively short time period (e.g. a few minutes). A call attempt is considered unsuccessful if a calling sequence contains the symbol RQ at the end of the sequence and no acknowledgement is received in this time interval.

ANNEX 1

Provisions and procedures for distress and safety calls

1 Introduction

The terrestrial elements of the GMDSS adopted by the 1988 Amendments to the International Convention for SOLAS, 1974, are based on the use of DSC for distress and safety communications.

1.1 Method of calling

The provisions of Chapter NIX (SVII) are applicable to the use of DSC in cases of distress, urgency or safety.

2 DSC distress call and message

The DSC "distress call" provides for alerting, self-identification, ship's position including time, nature of distress and contains both the distress call (RR No. 3091 and 3092 (Appendix S13, Part A3, § 4)) and the distress message (RR No. 3093 and 3094 (Appendix S13, Part A3, § 5)) as defined in the RR.

3 Procedures for DSC distress calls

3.1 Transmission by a mobile unit in distress

3.1.1 The DSC equipment should be capable of being preset to transmit the distress call on at least one distress alerting frequency.

3.1.2 The distress call shall be composed in accordance with Recommendation ITU-R M.493; the ship's position information, the time at which it was taken and the nature of distress should be entered as appropriate. If the position of the ship cannot be entered, then the position information signals shall be transmitted automatically as the digit 9 repeated ten times. If the time cannot be included, then the time information signals shall be transmitted automatically as the digit 8 repeated four times.

3.1.3 Distress call attempt

At MF and HF a distress call attempt may be transmitted as a single frequency or a multi-frequency call attempt. At VHF only single frequency call attempts are used.

3.1.3.1 Single frequency call attempt

A distress call attempt should be transmitted as 5 consecutive calls on one frequency. To avoid call collision and the loss of acknowledgements, this call attempt may be transmitted on the same frequency again after a random delay of between 3 ½ and 4 ½ min from the beginning of the initial call. This allows acknowledgements arriving randomly to be received without being blocked by retransmission. The random delay should be generated automatically for each repeated transmission, however it should be possible to override the automatic repeat manually.

At MF and HF, single frequency call attempts may be repeated on different frequencies after a random delay of between 3 ½ and 4 ½ min from the beginning of the initial call. However, if a station is capable of receiving acknowledgements continuously on all distress frequencies except for the transmit frequency in use, then single frequency call attempts may be repeated on different frequencies without this delay.

3.1.3.2 Multi-frequency call attempt

A distress call attempt may be transmitted as up to 6 consecutive (see Note 1) calls dispersed over a maximum of 6 distress frequencies (1 at MF and 5 at HF). Stations transmitting multi-frequency distress call attempts should be able to receive acknowledgements continuously on all frequencies except for the transmit frequency in use, or be able to complete the call attempt within 1 min.

Multi-frequency call attempts may be repeated after a random delay of between 3 ½ and 4 ½ min from the beginning of the previous call attempt.

NOTE 1 – A VHF call may be transmitted simultaneously with an MF/HF call.

3.1.4 Distress

In the case of distress the operator should:

3.1.4.1 enter the desired mode of the subsequent communication and if time permits, enter the ship's position and time (see Note 1) it was taken and the nature of distress (see Note 1);

NOTE 1 – If these are not provided automatically.

3.1.4.2 select the distress frequency(ies) to be used (see Note 1 of § 3.1.4.1);

3.1.4.3 activate the “distress call” attempt by a dedicated distress button.

3.1.5 Cancellation of an inadvertent distress call

A station transmitting an inadvertent distress call shall immediately cancel the alert over each channel on which the distress call was transmitted. For this purpose, a "distress cancellation" call in the format indicated in Recommendation ITU-R M.493, Fig. 4c) may be transmitted with own ship’s maritime mobile service identity (MMSI) inserted as identification of ship in distress.

This distress cancellation should be followed immediately by the voice cancellation procedure as described in Annex 3 (§ 1.7).

3.2 Reception

The DSC equipment should be capable of maintaining a reliable watch on a 24-hour basis on appropriate DSC distress alerting frequencies.

3.3 Acknowledgement of distress calls

Acknowledgements of distress calls should be initiated manually.

Acknowledgements should be transmitted on the same frequency as the distress call was received.

3.3.1 Distress calls should normally be acknowledged by DSC only by appropriate coast stations. Coast stations should, in addition, set watch on radiotelephony and, if the «mode of subsequent communication» signal in the received distress call indicates teleprinter, also on narrow-band direct-printing (NBDP) (see Recommendation ITU-R M.493). In both cases, the radiotelephone and NBDP frequencies should be those associated with the frequency on which the distress call was received.

3.3.2 Acknowledgements by coast stations of DSC distress calls transmitted on MF or HF should be initiated with a minimum delay of 1 min after receipt of a distress call, and normally within a maximum delay of 2 ¾ min. This allows all calls within a single frequency or multi-frequency call attempt to be completed and should allow sufficient time for coast stations to respond to the distress call. Acknowledgements by coast stations on VHF should be transmitted as soon as practicable.

3.3.3 The acknowledgement of a distress call consists of a single DSC acknowledgement call which should be addressed to “all ships” and include the identification (see Recommendation ITU-R M.493) of the ship whose distress call is being acknowledged.

3.3.4 Ship stations should, on receipt of a distress call, set watch on an associated radiotelephone distress and safety traffic frequency and acknowledge the call by radiotelephony. If a ship station continues to receive a DSC distress call on an MF or VHF channel, a DSC acknowledgement should be transmitted to terminate the call and should inform a coast station or coast earth station by any practicable means.

3.3.5 The automatic repetition of a distress call attempt should be terminated automatically on receipt of a DSC distress acknowledgement.

3.3.6 When distress and safety traffic cannot be successfully conducted using radiotelephony, an affected station may indicate its intention (using an “all ships” DSC call, with the category distress, and normally indicating the frequency of the associated NBDP channel) to conduct subsequent communications on the associated frequency for NBDP telegraphy.

3.4 Distress relays

Distress relay calls should be initiated manually.

3.4.1 A distress relay call should use the telecommand signal “distress relay” in accordance with Recommendation ITU-R M.493 and the calling attempt should follow the procedures described in § 3.1.3 to 3.1.3.2 for distress calls.

3.4.2 Any ship, receiving a distress call on an HF channel which is not acknowledged by a coast station within 5 min, should transmit a distress relay call to the appropriate coast station.

3.4.3 Distress relay calls transmitted by coast stations, or by ship stations addressed to "all ships", should be acknowledged by ship stations using radiotelephony. Distress relay calls transmitted by ships should be acknowledged by a coast station transmitting a "distress relay acknowledgement" call in accordance with the procedures for distress acknowledgements given in § 3.3 to 3.3.3.

4 Procedures for DSC urgency and safety calls (see Note 1)

4.1 DSC, on the distress and safety calling frequencies, should be used by coast stations to advise shipping, and by ships to advise coast stations and/or ship stations, of the impending transmission of urgency, vital navigational and safety messages, except where the transmissions take place at routine times. The call should indicate the working frequency which will be used for the subsequent transmission of an urgent, vital navigational or safety message.

4.2 The announcement and identification of medical transports should be carried out by DSC techniques, using appropriate distress and safety calling frequencies. Such calls should use the category "urgency", and telecommand "medical transport" and be addressed to "all ships".

4.3 The operational procedures for urgency and safety calls should be in accordance with the relevant parts of Annex 2, § 2.1 or 2.2.

NOTE 1 – Use of the DSC distress and safety calling frequencies for urgency and safety calls is acceptable, technically, provided that the total channel loading is maintained below 0.1 E.

5 Testing the equipment used for distress and safety calls

Testing on the exclusive DSC distress and safety calling frequencies should be avoided as far as possible by using other methods. There should be no test transmissions on the DSC calling channel on VHF. However, when testing on the exclusive DSC distress and safety calling frequencies on MF and HF is unavoidable, it should be indicated that these are test transmissions (see RR No. N 3068 (S31.3)). The test call should be composed in accordance with Recommendation ITU-R M.493 (see Table 6) and the call should be acknowledged by the called coast station. Normally there would be no further communication between the two stations involved.

ANNEX 2

Provisions and procedures for calls other than distress and safety

1 Frequency/channels

1.1 As a rule, paired frequencies should be used at HF and MF, in which case an acknowledgement is transmitted on the frequency paired with the frequency of the received call. In exceptional cases for national purposes a single frequency may be used. If the same call is received on several calling channels, the most appropriate shall be chosen to transmit the acknowledgement. A single frequency channel should be used at VHF.

1.2 International calling

The paired frequencies listed in RR Appendix 31 (Appendix S17, Part A) and in Annex 5 of this Recommendation should be used for international DSC calling.

1.2.1 At HF and MF international DSC frequencies should only be used for shore-to-ship calls and for the associated call acknowledgements from ships fitted for automatic DSC operation where it is known that the ships concerned are not listening to the coast station's national frequencies.

1.2.2 All ship-to-shore DSC calling at HF and MF should preferably be done on the coast station's national frequencies.

1.3 National calling

Coast stations should avoid using the international DSC frequencies for calls that may be placed using national frequencies.

1.3.1 Ship stations should keep watch on appropriate national and international channels. (Appropriate measures should be taken for an even loading of national and international channels.)

1.3.2 Administrations are urged to find methods and negotiate terms to improve the utilization of the DSC channels available, e.g.:

– coordinated and/or joint use of coast station transmitters;

– optimizing the probability of successful calls by providing information to ships on suitable frequencies (channels) to be watched and by information from ships to a selected number of coast stations on the channels watched on-board.

1.4 Method of calling

1.4.1 The procedures set out in this section are applicable to the use of DSC techniques, except in cases of distress, urgency or safety, to which the provisions of RR Chapter NIX (SVII) are applicable.

1.4.2 The call shall contain information indicating the station or stations to which the call is directed, and the identification of the calling station.

1.4.3 The call should also contain information indicating the type of communication to be set up and may include supplementary information such as a proposed working frequency or channel; this information shall always be included in calls from coast stations, which shall have priority for that purpose.

1.4.4 An appropriate digital selective calling channel chosen in accordance with the provisions of RR Nos.43235 to 4323AB (S52.128 to S52.137) or Nos. 4323AJ to 4323AR (S52.145 to S52.153), as appropriate, shall be used for the call.

2 Operating procedures

The technical format of the call sequence shall be in conformity with the relevant ITU-R Recommendations.

The reply to a DSC requesting an acknowledgement shall be made by transmitting an appropriate acknowledgement using DSC techniques.

Acknowledgements may be initiated either manually or automatically. When an acknowledgement can be transmitted automatically, it shall be in conformity with the relevant ITU-R Recommendations.

The technical format of the acknowledgement sequence shall be in conformity with the relevant ITU-R Recommendations.

For communication between a coast station and a ship station, the coast station shall finally decide the working frequency or channel to be used.

The forwarding traffic and the control for working for radiotelephony shall be carried out in accordance with Recommendation ITU-R M.1171.

A typical DSC calling and acknowledgement sequence contains the following signals (see Recommendation ITU-R M.493).

Composition of a typical DSC calling and acknowledgement sequence

Signal	*Method of composition*
– format specifier	selected
– address	entered
– category	selected
– self-identification	pre-programmed
– telecommand information	selected

– frequency information (if appropriate) entered

– telephone number (semi-automatic/automatic ship-to-shore connections only) entered

– end of sequence signal selected (see Note 1).

NOTE 1 – If the calling sequence EOS signal incorporates a request for acknowledgement "RQ" (117) an acknowledgement is mandatory and shall incorporate the EOS signal "BQ" (122).

The method of composing a DSC sequence is illustrated in the flow diagram of Fig. 5.

2.1 Coast station initiates call to ship

Figures 1 and 2 illustrate the procedures below in flow chart and by time sequence diagram respectively.

2.1.1 There are two categories of calls for commercial communications:

– routine call;

– ship's business call (see Recommendation ITU-R M.493, Annex 1, § 6.4.1).

2.1.2 If a direct connection exists between the calling subscriber and the coast station, the coast station asks the calling subscriber for the approximate position of the ship.

2.1.3 If the ship's position cannot be indicated by the caller, the coast station operator tries to find the location in the information available at the coast station.

2.1.4 The coast station checks to see whether the call would be more appropriate through another coast station (see § 1.3.2).

2.1.5 The coast station checks to see whether the transmission of a DSC is inappropriate or restricted (e.g. ship not fitted with DSC or barred).

2.1.6 Assuming a DSC is appropriate the coast station composes the calling sequence as follows:

– selects format specifier,

– enters address of the ship,

– selects category,

– selects telecommand information,

– inserts working frequency information in the message part of the sequence, if appropriate,

– usually selects "end of sequence" signal "RQ". However, if the coast station knows that the ship station cannot respond or the call is to a group of ships the frequency is omitted and the end of sequence signal should be 127, in which case the following procedures (§ 2.1.13 to 2.1.15) relating to an acknowledgement are not applicable.

2.1.7 The coast station verifies the calling sequence.

The call shall be transmitted once on a single appropriate calling channel or frequency only. Only in exceptional circumstances may a call be transmitted simultaneously on more than one frequency.

2.1.8 The coast station operator chooses the calling frequencies which are most suitable for the ship's location.

2.1.8.1 After checking as far as possible that there are no calls in progress, the coast station operator initiates the transmission of the sequence on one of the frequencies chosen. Transmission on any one frequency should be limited to no more than 2 call sequences separated by intervals of at least 45 s to allow for reception of an acknowledgement from the ship, or exceptionally (see Recommendation ITU-R M.493) to one "call attempt" consisting of up to five transmissions.

2.1.8.2 If appropriate, a "call attempt" may be transmitted, which may include the transmission of the same call sequence on other frequencies (if necessary with a change of working frequency information to correspond to the same band as the calling frequency) made in turn at intervals of not less than 5 min, following the same pattern as in § 2.1.8.1.

2.1.9 If an acknowledgement is received further transmission of the call sequence should not take place.

The coast station shall then prepare to transmit traffic on the working channel or frequency it has proposed.

2.1.10 The acknowledgement of the received call should only be transmitted upon receipt of a calling sequence which terminates with an acknowledgement request.

2.1.11 When a station called does not reply, the call attempt should not normally be repeated until after an interval of at least 15 min. The same call attempt should not be repeated more than five times every 24 h. The aggregate of the times for which frequencies are occupied in one call attempt, should normally not exceed 1 min.

The following procedures apply at the ship:

2.1.12 Upon receipt of a calling sequence at the ship station, the received message is recorded and an appropriate indication is activated as to whether the call category is "routine" or "ship's business". The category does not affect the DSC procedures at the ship.

2.1.13 When a received call sequence contains an end of sequence signal RQ, an acknowledgement sequence should be composed and transmitted in accordance with § 2.

The format specifier and category information should be identical to that in the received calling sequence.

2.1.13.1 If the ship station is not equipped for automatic DSC operation, the ship's operator initiates an acknowledgement to the coast station after a delay of at least 5 s but no later than 4½ min of receiving the calling sequence, using the ship-to-shore calling procedures detailed in § 2.2. However the transmitted sequence should contain a "BQ" end of sequence signal in place of the "RQ" signal.

If such an acknowledgement cannot be transmitted within 5 min of receiving the calling sequence then the ship station should instead transmit a calling sequence to the coast station using the ship-to-shore calling procedure detailed in § 2.2.

2.1.13.2 If the ship is equipped for automatic DSC operation, the ship station automatically transmits an acknowledgement with an end of sequence signal "BQ". The start of the transmission of this acknowledgement sequence should be within 30 s for HF and MF or within 3 s for VHF after the reception of the complete call sequence.

2.1.13.3 If the ship is able to comply immediately the acknowledgement sequence should include a telecommand signal which is identical to that received in the calling sequence indicating that it is able to comply.

If no working frequency was proposed in the call, the ship station should include a proposal for a working frequency in its acknowledgement.

2.1.13.4 If the ship is not able to comply immediately the acknowledgement sequence should include the telecommand signal 104 (unable to comply), with a second telecommand signal giving additional information (see Recommendation ITU-R M.493).

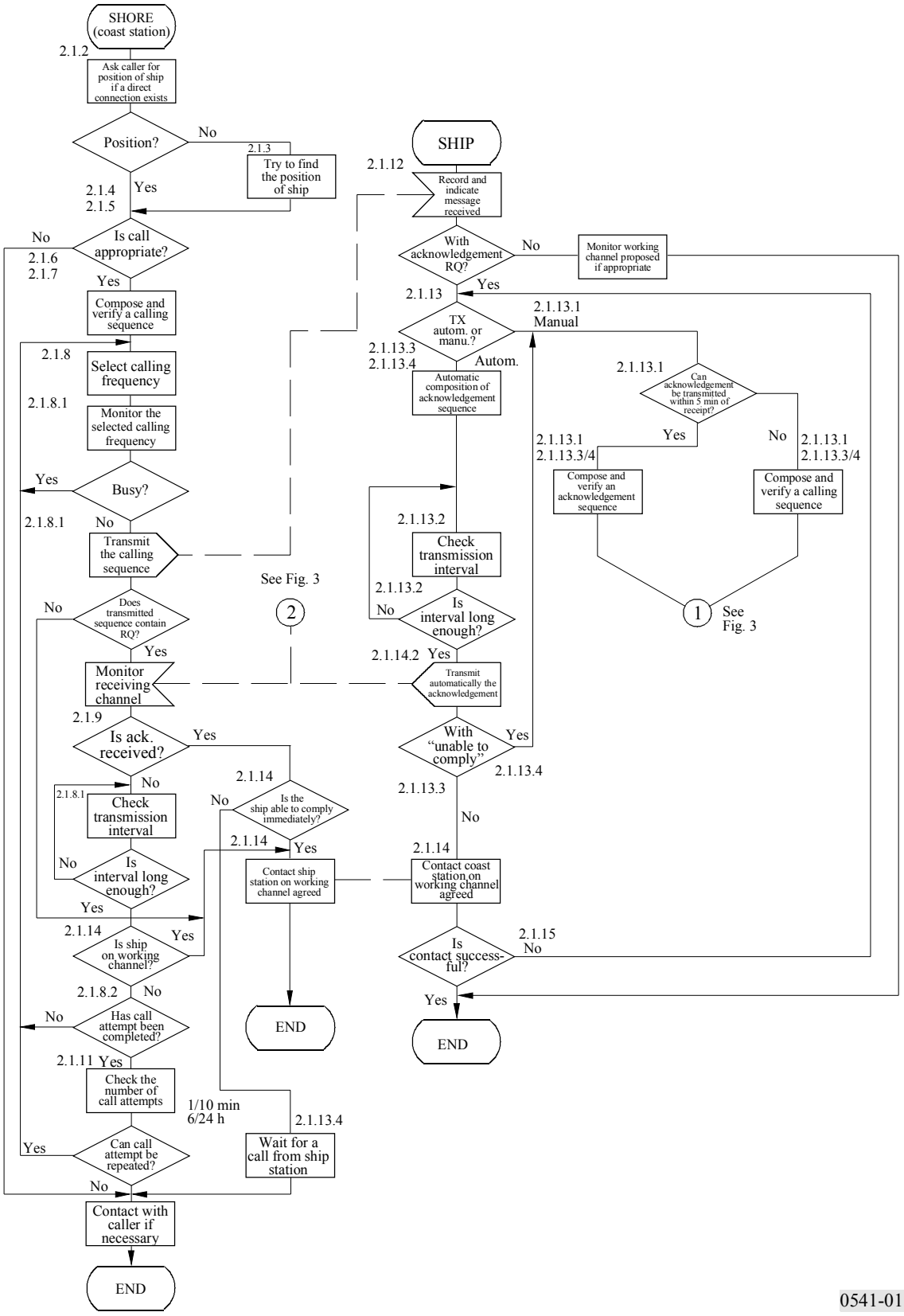
At some later time when the ship is able to accept the traffic being offered, the ship's operator initiates a call to the coast station using the ship-to-shore calling procedures detailed in § 2.2.

2.1.14 If a call is acknowledged indicating ability to comply immediately and communication between coast station and ship station on the working channel agreed is established, the DSC call procedure is considered to be completed.

2.1.15 If the ship station transmits an acknowledgement which is not received by the coast station then this will result in the coast station repeating the call (in accordance with § 2.1.11). In this event the ship station should transmit a new acknowledgement. If no repeated call is received the ship station should transmit an acknowledgement or calling sequence in accordance with § 2.1.13.1.

FIGURE 1

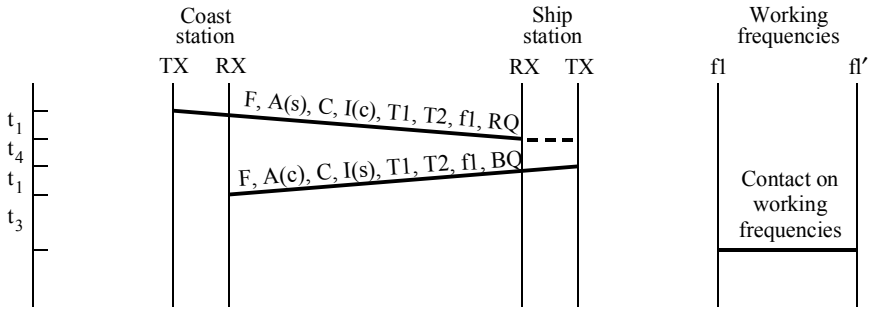
Flow chart of operational procedures for calling in the shore-to-ship direction



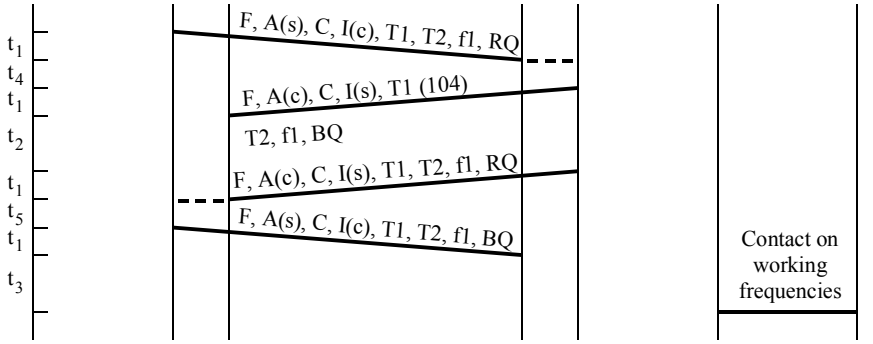
0541-01

FIGURE 2

Examples of timing diagrams for calling in shore-to-ship direction



a) Automated transmitter (able to comply)



b) Automated transmitter (unable to comply)



c) Ship transmitter not automated. Ship makes a delayed (>5 min) response to coast station and encounters queue on working frequency

t_1: transmission time of a DSC sequence
t_2: interval between the DSC reception at the ship and transmission from the ship after the operator's appearance in the radio room (from several minutes up to several hours)
t_3: transition time from calling to working frequency including, if necessary, the time for working channel clearing (queue waiting time)
t_4: as defined in § 2.1.13.2
t_5: time for coast station to prepare acknowledgement (see § 2.2.6)

F : format specifier
A : called station address
I : calling station self-identification } suffix (c) or (s) indicates coast station or ship station respectively
C : category
T1 : first telecommand signal, (104) indicates unable to comply
T2 : second telecommand signal, (103) indicates queue
f1, f1′ : working frequencies
RQ, BQ : end of sequence signals

0541-02

2.2 Ship station initiates call to coast station (see Note 1)

Figures 3 and 4 illustrate the procedures below in flow chart and by time sequence diagram respectively.

This procedure should also be followed both as a delayed response to a call received earlier from the coast station (see § 2.1.13.1) and to initiate traffic from the ship station.

NOTE 1 – See Recommendations ITU-R M.689 and ITU-R M.1082 for further details of procedures applicable only to the semi-automatic/automatic services.

2.2.1 The ship composes the calling sequence as follows:

– selects the format specifier,

– enters address,

– selects the category,

– selects the telecommand information,

– inserts working frequency information in the message part of the sequence if appropriate,

– inserts telephone number required (semi-automatic/automatic connections only),

– selects the "end of sequence" signal RQ.

2.2.2 The ship verifies the calling sequence.

2.2.3 The ship selects the single most appropriate calling frequency preferably using the coast station's nationally assigned calling channels, for which purpose it shall send a single calling sequence on the selected frequency.

2.2.4 The ship initiates the transmission of the sequence on the frequency selected after checking as far as possible that there are no calls in progress on that frequency.

2.2.5 If a called station does not reply, the call sequence from the ship station should not normally be repeated until after an interval of at least 5 min for manual connections, or 5 s or 25 s in the case of semi-automatic/automatic VHF or MF/HF connections respectively. These repetitions may be made on alternative frequencies if appropriate. Any subsequent repetitions to the same coast station should not be made until at least 15 min have elapsed.

2.2.6 The coast station should transmit an acknowledgement sequence (after checking as far as possible that there are no calls in progress on the frequency selected), after a delay of at least 5 s but not later than 4½ min for manual connections, or, within 3 s for semi-automatic/automatic connections, containing the format specifier, the address of the ship, the category, the coast station self-identification and:

– if able to comply immediately on the working frequency suggested, the same telecommand and frequency information as in the call request;

– if no working frequency was suggested by the ship station then the acknowledgement sequence should include a channel/frequency proposal;

– if not able to comply on the working frequency suggested but able to comply immediately on an alternative frequency, the same telecommand information as in the call request but an alternative working frequency;

– if unable to comply immediately the telecommand signal 104 with a second telecommand signal giving additional information. For manual connections only, this second telecommand signal may include a queue indication.

The end of sequence signal BQ should also be included.

2.2.7 For manual connections, if a working frequency is proposed in accordance with § 2.2.6 but this is not acceptable to the ship station, then the ship station should immediately transmit a call to the coast station indicating (by the use of telecommand signals 104 and 108) that it cannot comply on that frequency.

2.2.7.1 The coast station should then transmit an acknowledgement in accordance with § 2.2.6 either accepting the ship station's original suggested frequency or proposing a second alternative.

FIGURE 3

Flow chart of operational procedures for calling in the ship-to-shore direction

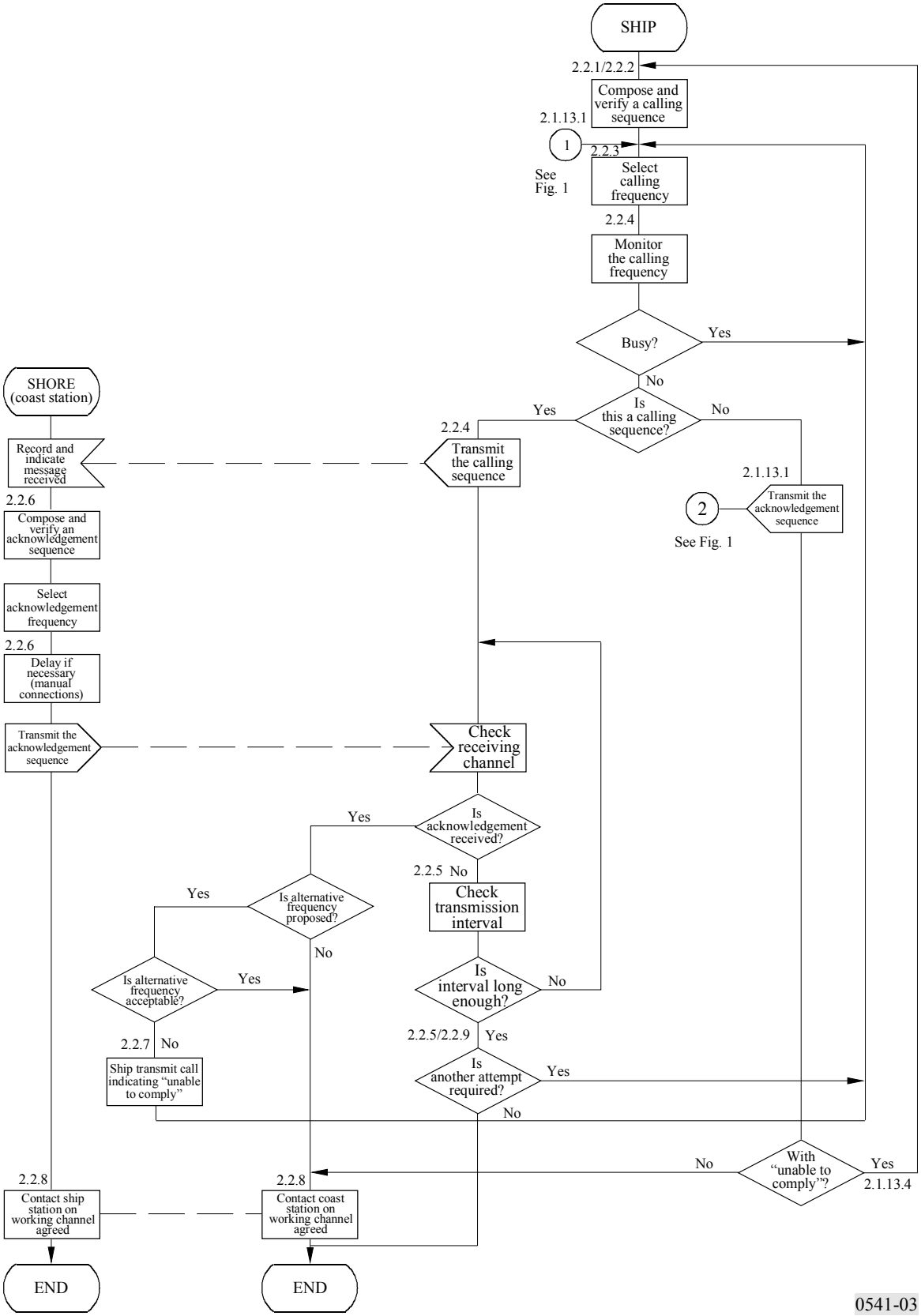
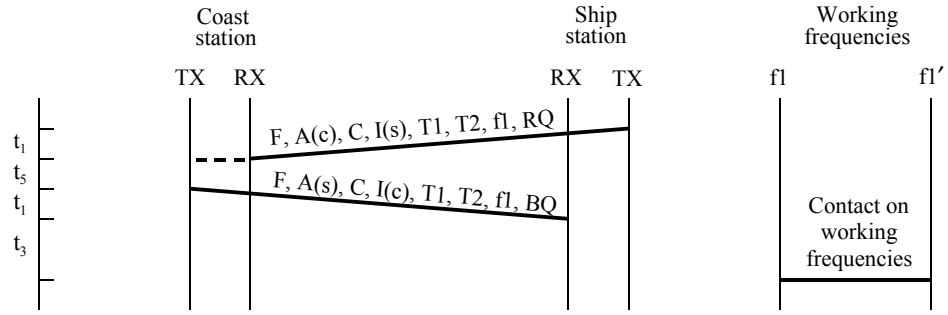
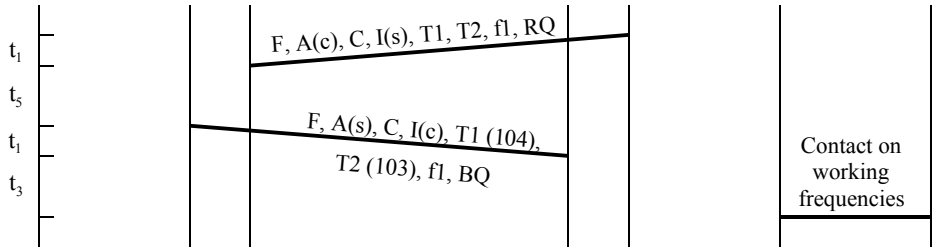


FIGURE 4

Examples of timing diagrams for calling in ship-to-shore direction



a) Able to comply immediately



b) Queue exists on working frequency

t_1 : transmission time of a DSC sequence
t_3 : transition time from calling to working frequency including, if necessary, the time for working channel clearing (queue waiting time)
t_5 : time for coast station to prepare acknowledgement (see § 2.2.6)
F : format specifier
A : called station address
I : calling station self-identification { suffix (c) or (s) indicates coast station or ship station respectively
C : category
T1 : first telecommand signal, (104) indicates unable to comply
T2 : second telecommand signal, (103) indicates queue
f1, f1′ : working frequencies
RQ, BQ : end of sequence signals

0541-04

2.2.8 If an acknowledgement is received further transmission of the call sequence should not take place. On receipt of an acknowledgement which indicates ability to comply, the DSC procedures are complete and both coast station and ship station should communicate on the working frequencies agreed with no further exchange of DSC calls.

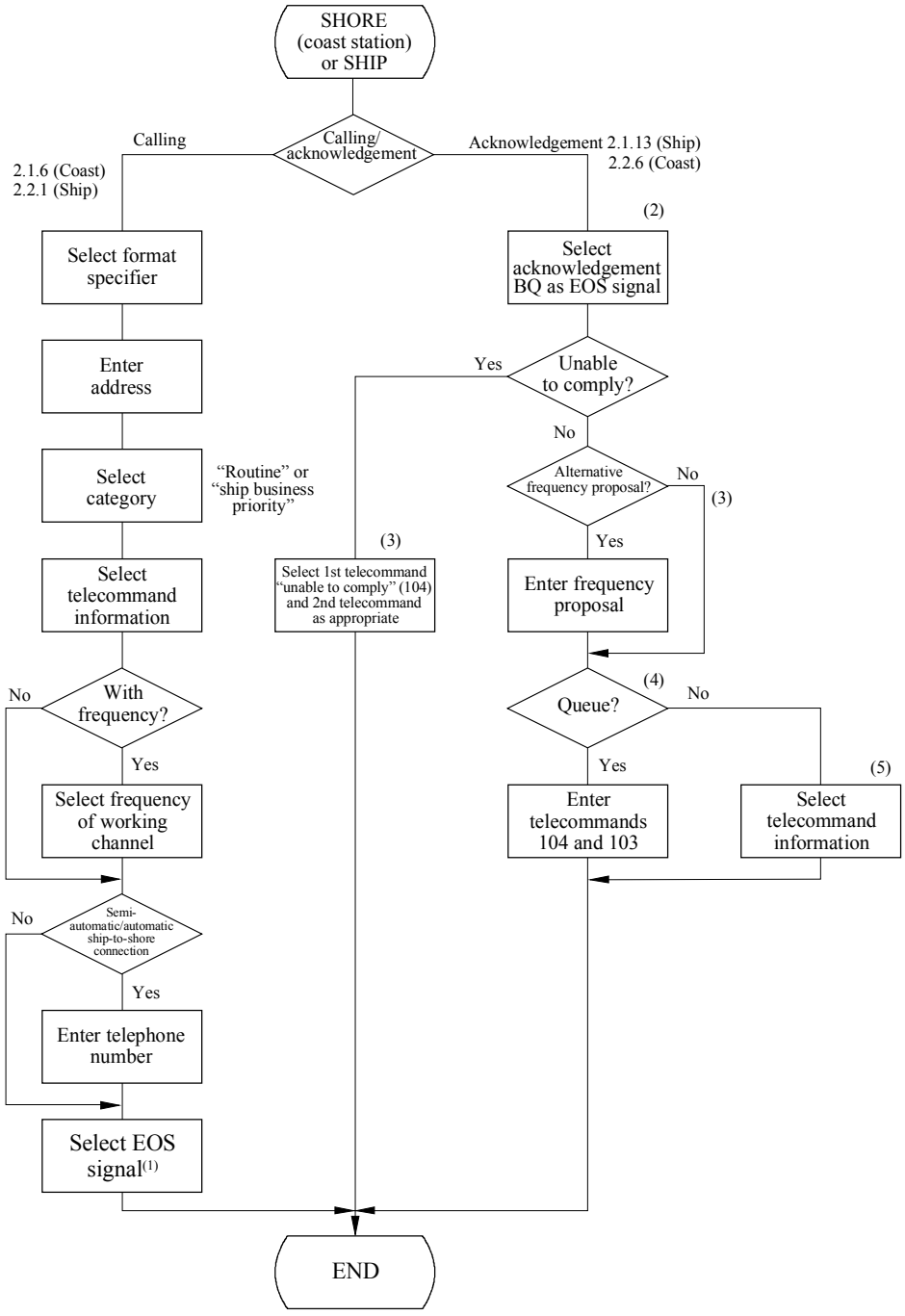
2.2.9 If the coast station transmits an acknowledgement which is not received at the ship station then the ship station should repeat the call in accordance with § 2.2.5.

2.3 Ship station initiates call to ship station

The ship-to-ship procedures should be similar to those given in § 2.2, where the receiving ship station complies with the procedures given for coast stations, as appropriate, except that, with respect to § 2.2.1, the calling ship should always insert working frequency information in the message part of the calling sequence.

FIGURE 5

Composition procedures for calling and acknowledgement sequences
(for calls other than distress and safety)



(1) Normally acknowledgement RQ may automatically be selected as an EOS signal of a calling sequence to an individual station.
(2) The format specifier and the category are automatically transferred from the received call.The self-ID in the received sequence is automatically transferred into the address part of acknowledgement sequence by selecting acknowledgement BQ.
(3) The frequency information is automatically transferred from the received call.
(4) This procedure is only for coast stations.
(5) When able to comply, and no queue exists, then the telecommand information is automatically transferred from the received call.

0541-05

ANNEX 3

Operational procedures for ships for DSC communications on MF, HF and VHF

Introduction

Procedures for DSC communications on MF and VHF are described in § 1 to 5 below.

The procedures for DSC communications on HF are in general the same as for MF and VHF. Special conditions to be taken into account when making DSC communications on HF are described in § 6 below.

1 Distress

1.1 Transmission of DSC distress alert

A distress alert should be transmitted if, in the opinion of the Master, the ship or a person is in distress and requires immediate assistance.

A DSC distress alert should as far as possible include the ship's last known position and the time (in UTC) when it was valid. The position and the time may be included automatically by the ship's navigational equipment or may be inserted manually.

The DSC distress alert is transmitted as follows:

– tune the transmitter to the DSC distress channel (2 187.5 kHz on MF, channel 70 on VHF (see Note 1)).

  NOTE 1 – Some maritime MF radiotelephony transmitters shall be tuned to a frequency 1 700 Hz lower than 2 187.5 kHz, i.e. 2 185.8 kHz, in order to transmit the DSC alert on 2 187.5 kHz;

– if time permits, key in or select on the DSC equipment keyboard

  – the nature of distress,

  – the ship's last known position (latitude and longitude),

  – the time (in UTC) the position was valid,

  – type of subsequent distress communication (telephony),

in accordance with the DSC equipment manufacturer's instructions;

– transmit the DSC distress alert (see Note 2);

– prepare for the subsequent distress traffic by tuning the transmitter and the radiotelephony receiver to the distress traffic channel in the same band, i.e. 2 182 kHz on MF, channel 16 on VHF, while waiting for the DSC distress acknowledgement.

  NOTE 2 – Add to the DSC distress alert, whenever practicable and at the discretion of the person responsible for the ship in distress, the optional expansion in accordance with Recommendation ITU-R M.821, with additional information as appropriate, in accordance with the DSC equipment manufacturer's instructions.

1.2 Actions on receipt of a distress alert (see Note 1)

Ships receiving a DSC distress alert from another ship should normally not acknowledge the alert by DSC since acknowledgement of a DSC distress alert by use of DSC is normally made by coast stations only.

Only if no other station seems to have received the DSC distress alert, and the transmission of the DSC distress alert continues, the ship should acknowledge the DSC distress alert by use of DSC to terminate the call. The ship should then, in addition, inform a coast station or a coast earth station by any practicable means.

Ships receiving a DSC distress alert from another ship should also defer the acknowledgement of the distress alert by radiotelephony for a short interval, if the ship is within an area covered by one or more coast stations, in order to give the coast station time to acknowledge the DSC distress alert first.

Ships receiving a DSC distress alert from another ship shall:

- watch for the reception of a distress acknowledgement on the distress channel (2 187.5 kHz on MF and channel 70 on VHF);
- prepare for receiving the subsequent distress communication by tuning the radiotelephony receiver to the distress traffic frequency in the same band in which the DSC distress alert was received, i.e. 2 182 kHz on MF, channel 16 on VHF;
- acknowledge the receipt of the distress alert by transmitting the following by radiotelephony on the distress traffic frequency in the same band in which the DSC distress alert was received, i.e. 2 182 kHz on MF, channel 16 on VHF:
  - "MAYDAY",
  - the 9-digit identity of the ship in distress, repeated 3 times,
  - "this is",
  - the 9-digit identity or the call sign or other identification of own ship, repeated 3 times,
  - "RECEIVED MAYDAY".

NOTE 1 – Ships out of range of a distress event or not able to assist should only acknowledge if no other station appears to acknowledge the receipt of the DSC distress alert.

1.3 Distress traffic

On receipt of a DSC distress acknowledgement the ship in distress should commence the distress traffic by radiotelephony on the distress traffic frequency (2 182 kHz on MF, channel 16 on VHF) as follows:

- "MAYDAY",
- "this is",
- the 9-digit identity *and* the call sign or other identification of the ship,
- the ship's position in latitude and longitude or other reference to a known geographical location,
- the nature of distress and assistance wanted,
- any other information which might facilitate the rescue.

1.4 Transmission of a DSC distress relay alert

A ship knowing that another ship is in distress shall transmit a DSC distress relay alert if

- the ship in distress is not itself able to transmit the distress alert,
- the Master of the ship considers that further help is necessary.

The DSC distress relay alert is transmitted as follows:

- tune the transmitter to the DSC distress channel (2 187.5 kHz on MF, channel 70 on VHF),
- select the distress relay call format on the DSC equipment,
- key in or select on the DSC equipment keyboard:
  - All Ships Call or the 9-digit identity of the appropriate coast station,
  - the 9-digit identity of the ship in distress, if known,
  - the nature of distress,
  - the latest position of the ship in distress, if known,
  - the time (in UTC) the position was valid (if known),
  - type of subsequent distress communication (telephony);

– transmit the DSC distress relay call;

– prepare for the subsequent distress traffic by tuning the transmitter and the radiotelephony receiver to the distress traffic channel in the same band, i.e. 2 182 kHz on MF and channel 16 on VHF, while waiting for the DSC distress acknowledgement.

1.5 Acknowledgement of a DSC distress relay alert received from a coast station (see Note 1 of § 1.2 of this Annex)

Coast stations, after having received and acknowledged a DSC distress alert, may if necessary, retransmit the information received as a DSC distress relay call, addressed to all ships, all ships in a specific geographical area, a group of ships or a specific ship.

Ships receiving a distress relay call transmitted by a coast station shall not use DSC to acknowledge the call, but should acknowledge the receipt of the call by radiotelephony on the distress traffic channel in the same band in which the relay call was received, i.e. 2 182 kHz on MF, channel 16 on VHF.

Acknowledge the receipt of the distress alert by transmitting the following by radiotelephony on the distress traffic frequency in the same band in which the DSC distress relay alert was received:

– "MAYDAY",

– the 9-digit identity or the call sign or other identification of the calling coast station,

– "this is",

– the 9-digit identity or call sign or other identification of own ship,

– "RECEIVED MAYDAY".

1.6 Acknowledgement of a DSC distress relay alert received from another ship

Ships receiving a distress relay alert from another ship shall follow the same procedure as for acknowledgement of a distress alert, i.e. the procedure given in § 1.2 above.

1.7 Cancellation of an inadvertent distress alert (distress call)

A station transmitting an inadvertent distress alert shall cancel the distress alert using the following procedure:

1.7.1 Immediately transmit a DSC "distress cancellation" if provided in accordance with Recommendation ITU-R M.493, § 8.3.2 e.g. with own ship's MMSI inserted as identification of ship in distress. In addition cancel the distress alert aurally over the telephony distress traffic channel associated with each DSC channel on which the "distress call" was transmitted.

1.7.2 Monitor the telephony distress traffic channel associated with the DSC channel on which the distress was transmitted, and respond to any communications concerning that distress alert as appropriate.

2 Urgency

2.1 Transmission of urgency messages

Transmission of urgency messages shall be carried out in two steps:

– announcement of the urgency message,

– transmission of the urgency message.

The announcement is carried out by transmission of a DSC urgency call on the DSC distress calling channel (2 187.5 kHz on MF, channel 70 on VHF).

The urgency message is transmitted on the distress traffic channel (2 182 kHz on MF, channel 16 on VHF).

The DSC urgency call may be addressed to all stations or to a specific station. The frequency on which the urgency message will be transmitted shall be included in the DSC urgency call.

The transmission of an urgency message is thus carried out as follows:

Announcement:

- tune the transmitter to the DSC distress calling channel (2 187.5 kHz on MF, channel 70 on VHF);
- key in or select on the DSC equipment keyboard:
  - All Ships Call or the 9-digit identity of the specific station,
  - the category of the call (urgency),
  - the frequency or channel on which the urgency message will be transmitted,
  - the type of communication in which the urgency message will be given (radiotelephony),

  in accordance with the DSC equipment manufacturer's instructions;
- transmit the DSC urgency call.

Transmission of the urgency message:

- tune the transmitter to the frequency or channel indicated in the DSC urgency call;
- transmit the urgency message as follows:
  - "PAN PAN", repeated 3 times,
  - "ALL STATIONS" or called station, repeated 3 times,
  - "this is",
  - the 9-digit identity *and* the call sign or other identification of own ship,
  - the text of the urgency message.

2.2 Reception of an urgency message

Ships receiving a DSC urgency call announcing an urgency message addressed to all ships shall NOT acknowledge the receipt of the DSC call, but should tune the radiotelephony receiver to the frequency indicated in the call and listen to the urgency message.

3 Safety

3.1 Transmission of safety messages

Transmission of safety messages shall be carried out in two steps:

- announcement of the safety message,
- transmission of the safety message.

The announcement is carried out by transmission of a DSC safety call on the DSC distress calling channel (2 187.5 kHz on MF, channel 70 on VHF).

The safety message is normally transmitted on the distress and safety traffic channel in the same band in which the DSC call was sent, i.e. 2 182 kHz on MF, channel 16 on VHF.

The DSC safety call may be addressed to all ships, all ships in a specific geographical area or to a specific station.

The frequency on which the safety message will be transmitted shall be included in the DSC call.

The transmission of a safety message is thus carried out as follows:

Announcement:

- tune the transmitter to the DSC distress calling channel (2 187.5 kHz on MF, channel 70 on VHF);
- select the appropriate calling format on the DSC equipment (all ships, area call or individual call);

- key in or select on the DSC equipment keyboard:
  - specific area or 9-digit identity of specific station, if appropriate,
  - the category of the call (safety),
  - the frequency or channel on which the safety message will be transmitted,
  - the type of communication in which the safety message will be given (radiotelephony),

  in accordance with the DSC equipment manufacturer's instructions;
- transmit the DSC safety call.

Transmission of the safety message:

- tune the transmitter to the frequency or channel indicated in the DSC safety call;
- transmit the safety message as follows:
  - "SECURITE", repeated 3 times,
  - "ALL STATIONS" or called station, repeated 3 times,
  - "this is",
  - the 9-digit identity *and* the call sign or other identification of own ship,
  - the text of the safety message.

3.2 Reception of a safety message

Ships receiving a DSC safety call announcing a safety message addressed to all ships shall NOT acknowledge the receipt of the DSC safety call, but should tune the radiotelephony receiver to the frequency indicated in the call and listen to the safety message.

4 Public correspondence

4.1 DSC channels for public correspondence

4.1.1 VHF

The VHF DSC channel 70 is used for DSC for distress and safety purposes as well as for DSC for public correspondence.

4.1.2 MF

International and national DSC channels separate from the DSC distress and safety calling channel 2 187.5 kHz are used for digital selective-calling on MF for public correspondence.

Ships calling a coast station by DSC on MF for public correspondence should preferably use the coast station's national DSC channel.

The international DSC channel for public correspondence may as a general rule be used between ships and coast stations of different nationality. The ships transmitting frequency is 2 189.5 kHz, and the receiving frequency is 2 177 kHz.

The frequency 2 177 kHz is also used for DSC between ships for general communication.

4.2 Transmission of a DSC call for public correspondence to a coast station or another ship

A DSC call for public correspondence to a coast station or another ship is transmitted as follows:

- tune the transmitter to the relevant DSC channel;
- select the format for calling a specific station on the DSC equipment;
- key in or select on the DSC equipment keyboard:
  - the 9-digit identity of the station to be called,
  - the category of the call (routine),

  - the type of the subsequent communication (normally radiotelephony),
  - a proposed working channel if calling another ship. A proposal for a working channel should NOT be included in calls to a coast station; the coast station will in its DSC acknowledgement indicate a vacant working channel,

  in accordance with the DSC equipment manufacturer's instructions;
- transmit the DSC call.

4.3 Repeating a call

A DSC call for public correspondence may be repeated on the same or another DSC channel, if no acknowledgement is received within 5 min.

Further call attempts should be delayed at least 15 min, if acknowledgement is still not received.

4.4 Acknowledgement of a received call and preparation for reception of the traffic

On receipt of a DSC call from a coast station or another ship, a DSC acknowledgement is transmitted as follows:

- tune the transmitter to the transmit frequency of the DSC channel on which the call was received,
- select the acknowledgement format on the DSC equipment,
- transmit an acknowledgement indicating whether the ship is able to communicate as proposed in the call (type of communication and working frequency),
- if able to communicate as indicated, tune the transmitter and the radiotelephony receiver to the indicated working channel and prepare to receive the traffic.

4.5 Reception of acknowledgement and further actions

When receiving an acknowledgement indicating that the called station is able to receive the traffic, prepare to transmit the traffic as follows:

- tune the transmitter and receiver to the indicated working channel;
- commence the communication on the working channel by:
  - the 9-digit identity or call sign or other identification of the called station,
  - "this is",
  - the 9-digit identity or call sign or other identification of own ship.

It will normally rest with the ship to call again a little later in case the acknowledgement from the coast station indicates that the coast station is not able to receive the traffic immediately.

In case the ship, in response to a call to another ship, receives an acknowledgement indicating that the other ship is not able to receive the traffic immediately, it will normally rest with the called ship to transmit a call to the calling ship when ready to receive the traffic.

5 Testing the equipment used for distress and safety

Testing on the exclusive DSC distress and safety calling frequency 2 187.5 kHz should be avoided as far as possible by using other methods.

No test transmission should be made on VHF DSC calling channel 70.

Test calls should be transmitted by the ship station and acknowledged by the called coast station. Normally there would be no further communication between the two stations involved.

A test call to a coast station is transmitted as follows:

- tune the transmitter to the DSC distress and safety calling frequency 2 187.5 kHz,
- key in or select the format for the test call on the DSC equipment in accordance with the DSC equipment manufacturer's instructions,
- key in the 9-digit identity of the coast station to be called,

– transmit the DSC call after checking as far as possible that no calls are in progress on the frequency,

– wait for acknowledgement.

6 Special conditions and procedures for DSC communication on HF

General

The procedures for DSC communication on HF are – with some additions described in § 6.1 to 6.5 below – equal to the corresponding procedures for DSC communications on MF/VHF.

Due regard to the special conditions described in § 6.1 to 6.5 should be given when making DSC communications on HF.

6.1 Distress

6.1.1 Transmission of DSC distress alert

DSC distress alert should be sent to coast stations – e.g. in A3 and A4 sea areas on HF – and on MF and/or VHF to other ships in the vicinity.

The DSC distress alert should as far as possible include the ship's last known position and the time (in UTC) it was valid. If the position and time is not inserted automatically from the ship's navigational equipment, it should be inserted manually.

Ship-to-shore distress alert

Choice of HF band

Propagation characteristics of HF radio waves for the actual season and time of the day should be taken into account when choosing HF bands for transmission of DSC distress alert.

As a general rule the DSC distress channel in the 8 MHz maritime band (8 414.5 kHz) may in many cases be an appropriate first choice.

Transmission of the DSC distress alert in more than one HF band will normally increase the probability of successful reception of the alert by coast stations.

DSC distress alert may be sent on a number of HF bands in two different ways:

a) either by transmitting the DSC distress alert on one HF band, and waiting a few minutes for receiving acknowledgement by a coast station;

   if no acknowledgement is received within 3 min, the process is repeated by transmitting the DSC distress alert on another appropriate HF band etc.;

b) or by transmitting the DSC distress alert at a number of HF bands with no, or only very short, pauses between the calls, without waiting for acknowledgement between the calls.

It is recommended to follow procedure a) in all cases, where time permits to do so; this will make it easier to choose the appropriate HF band for commencement of the subsequent communication with the coast station on the corresponding distress traffic channel.

Transmitting the DSC alert (see Note 1):

– tune the transmitter to the chosen HF DSC distress channel (4 207.5, 6 312, 8 414.5, 12 577, 16 804.5 kHz) (see Note 2);

– follow the instructions for keying in or selection of relevant information on the DSC equipment keyboard as described in § 1.1;

– transmit the DSC distress alert.

NOTE 1 – Ship-to-ship distress alert should normally be made on MF and/or VHF, using the procedures for transmission of DSC distress alert on MF/VHF described in § 1.1.

NOTE 2 – Some maritime HF transmitters shall be tuned to a frequency 1 700 Hz lower than the DSC frequencies given above in order to transmit the DSC alert on the correct frequency.

In special cases, for example in tropical zones, transmission of DSC distress alert on HF may, in addition to ship-to-shore alerting, also be useful for ship-to-ship alerting.

6.1.2 Preparation for the subsequent distress traffic

After having transmitted the DSC distress alert on appropriate DSC distress channels (HF, MF and/or VHF), prepare for the subsequent distress traffic by tuning the radiocommunication set(s) (HF, MF and/or VHF as appropriate) to the corresponding distress traffic channel(s).

If method b) described in § 6.1.1 has been used for transmission of DSC distress alert on a number of HF bands:

– take into account in which HF band(s) acknowledgement has been successfully received from a coast station;

– if acknowledgements have been received on more than one HF band, commence the transmission of distress traffic on one of these bands, but if no response is received from a coast station then the other bands should be used in turn.

The distress traffic frequencies are:

HF (kHz):

Telephony	4 125	6 215	8 291	12 290	16 420
Telex	4 177.5	6 268	8 376.5	12 520	16 695

MF (kHz):

Telephony	2 182
Telex	2 174.5

VHF: Channel 16 (156.800 MHz).

6.1.3 Distress traffic

The procedures described in § 1.3 are used when the distress traffic on MF/HF is carried out by *radiotelephony*.

The following procedures shall be used in cases where the distress traffic on MF/HF is carried out by *radiotelex*:

– The forward error correcting (FEC) mode shall be used unless specifically requested to do otherwise;

– all messages shall be preceded by:

  – at least one carriage return,

  – line feed,

  – one letter shift,

  – the distress signal MAYDAY;

– The ship in distress should commence the distress telex traffic on the appropriate distress telex traffic channel as follows:

  – carriage return, line feed, letter shift,

  – the distress signal “MAYDAY”,

  – “this is”,

  – the 9-digit identity and call sign or other identification of the ship,

  – the ship’s position if not included in the DSC distress alert,

  – the nature of distress,

  – any other information which might facilitate the rescue.

6.1.4 Actions on reception of a DSC distress alert on HF from another ship

Ships receiving a DSC distress alert on HF from another ship shall *not* acknowledge the alert, but should:

- watch for reception of a DSC distress acknowledgement from a coast station;
- while waiting for reception of a DSC distress acknowledgement from a coast station:

  prepare for reception of the subsequent distress communication by tuning the HF radiocommunication set (transmitter and receiver) to the relevant distress traffic channel in the same HF band in which the DSC distress alert was received, observing the following conditions:

  - if radiotelephony mode was indicated in the DSC alert, the HF radiocommunication set should be tuned to the radiotelephony distress traffic channel in the HF band concerned;
  - if telex mode was indicated in the DSC alert, the HF radiocommunication set should be tuned to the radiotelex distress traffic channel in the HF band concerned. Ships able to do so should additionally watch the corresponding radiotelephony distress channel;
  - if the DSC distress alert was received on more than one HF band, the radiocommunication set should be tuned to the relevant distress traffic channel in the HF band considered to be the best one in the actual case. If the DSC distress alert was received successfully on the 8 MHz band, this band may in many cases be an appropriate first choice;
  - if no distress traffic is received on the HF channel within 1 to 2 min, tune the HF radiocommunication set to the relevant distress traffic channel in another HF band deemed appropriate in the actual case;
  - if no DSC distress acknowledgement is received from a coast station within 3 min, and no distress communication is observed going on between a coast station and the ship in distress:
    - transmit a DSC distress relay alert,
    - inform a Rescue Coordination Centre (RCC) via appropriate radiocommunications means.

6.1.5 Transmission of DSC distress relay alert

In case it is considered appropriate to transmit a DSC distress relay alert:

- considering the actual situation, decide in which frequency bands (MF, VHF, HF) DSC distress relay alert(s) should be transmitted, taking into account ship-to-ship alerting (MF, VHF) and ship-to-shore alerting;
- tune the transmitter(s) to the relevant DSC distress channel, following the procedures described in § 6.1.1 above;
- follow the instructions for keying in or selection of call format and relevant information on the DSC equipment keyboard as described in § 1.4;
- transmit the DSC distress relay alert.

6.1.6 Acknowledgement of a HF DSC distress relay alert received from a coast station

Ships receiving a DSC distress relay alert from a coast station on HF, addressed to all ships within a specified area, should NOT acknowledge the receipt of the relay alert by DSC, but by *radiotelephony* on the telephony distress traffic channel in the same band(s) in which the DSC distress relay alert was received.

6.2 Urgency

Transmission of urgency messages on HF should normally be addressed:

- either to all ships within a specified geographical area,
- or to a specific coast station.

Announcement of the urgency message is carried out by transmission of a DSC call with category urgency on the appropriate DSC distress channel.

The transmission of the urgency message itself on HF is carried out by radiotelephony or radiotelex on the appropriate distress traffic channel in the same band in which the DSC announcement was transmitted.

6.2.1 Transmission of DSC announcement of an urgency message on HF

- choose the HF band considered to be the most appropriate, taking into account propagation characteristics for HF radio waves at the actual season and time of the day; the 8 MHz band may in many cases be an appropriate first choice;
- tune the HF transmitter to the DSC distress channel in the chosen HF band;
- key in or select call format for either geographical area call or individual call on the DSC equipment, as appropriate;
- in case of area call, key in specification of the relevant geographical area;
- follow the instructions for keying in or selection of relevant information on the DSC equipment keyboard as described in § 2.1, including type of communication in which the urgency message will be transmitted (radiotelephony or radiotelex);
- transmit the DSC call; and
- if the DSC call is addressed to a specific coast station, wait for DSC acknowledgement from the coast station. If acknowledgement is not received within a few minutes, repeat the DSC call on another HF frequency deemed appropriate.

6.2.2 Transmission of the urgency message and subsequent action

- tune the HF transmitter to the distress traffic channel (telephony or telex) indicated in the DSC announcement;
- if the urgency message is to be transmitted using *radiotelephony*, follow the procedure described in § 2.1;
- if the urgency message is to be transmitted by *radiotelex*, the following procedure shall be used:
  - use the forward error correcting (FEC) mode unless the message is addressed to a single station whose radiotelex identity number is known;
  - commence the telex message by:
    - at least one carriage return, line feed, one letter shift,
    - the urgency signal “PAN PAN”,
    - “this is”,
    - the 9-digit identity of the ship and the call sign or other identification of the ship,
    - the text of the urgency message.

Announcement and transmission of urgency messages addressed to all HF equipped ships within a specified area may be repeated on a number of HF bands as deemed appropriate in the actual situation.

6.2.3 Reception of an urgency message

Ships receiving a DSC urgency call announcing an urgency message shall NOT acknowledge the receipt of the DSC call, but should tune the radiocommunication receiver to the frequency and communication mode indicated in the DSC call for receiving the message.

6.3 Safety

The procedures for transmission of DSC safety announcement and for transmission of the safety message are the same as for urgency messages, described in § 6.2, *except* that:

- in the DSC announcement, the category SAFETY shall be used,
- in the safety message, the safety signal “SECURITE” shall be used instead of the urgency signal “PAN PAN”.

6.4 Public correspondence on HF

The procedures for DSC communication for public correspondence on HF are the same as for MF.

Propagation characteristics should be taken into account when making DSC communication on HF.

International and national HF DSC channels different from those used for DSC for distress and safety purposes are used for DSC for public correspondence.

Ships calling a HF coast station by DSC for public correspondence should preferably use the coast station's national DSC calling channel.

6.5 Testing the equipment used for distress and safety on HF

The procedure for testing the ship's equipment used for DSC distress, urgency and safety calls on HF by transmitting DSC test calls on HF DSC distress channels is the same as for testing on the MF DSC distress frequency 2 187.5 Hz.

ANNEX 4

Operational procedures for coast stations for DSC communications on MF, HF and VHF

Introduction

Procedures for DSC communications on MF and VHF are described in § 1 to 5 below.

The procedures for DSC communications on HF are in general the same as for MF and VHF. Special conditions to be taken into account when making DSC communications on HF are described in § 6 below.

1 Distress (see Note 1)

1.1 Reception of a DSC distress alert (distress call)

The transmission of a distress alert indicates that a mobile unit (a ship, aircraft or other vehicle) or a person is in distress and requires immediate assistance. The distress alert is a digital selective call using a distress call format (distress call).

Coast stations in receipt of a distress call shall ensure that it is routed as soon as possible to an RCC. The receipt of a distress call is to be acknowledged as soon as possible by the appropriate coast station.

NOTE 1 – These procedures assume that the RCC is sited remotely from the DSC coast station; where this is not the case, appropriate amendments should be made locally.

1.2 Acknowledgement of a DSC distress alert (distress call)

The coast station shall transmit the acknowledgement on the distress calling frequency on which the call was received and should address it to all ships. The acknowledgement shall include the identification of the ship whose distress call is being acknowledged.

The acknowledgement of a DSC distress call is transmitted as follows:

- use a transmitter which is tuned to the frequency on which the distress call was received;
- in accordance with the DSC equipment manufacturer's instructions, key in or select on the DSC equipment keyboard (see Note 1):
  - distress call acknowledgement,
  - 9-digit identity of the ship in distress,
  - nature of distress,
  - distress coordinates,
  - the time (in UTC) when the position was valid.

  NOTE 1 – Some or all of this information might be included automatically by the equipment;
- transmit the acknowledgement;
- prepare to handle the subsequent distress traffic by setting watch on radiotelephony and, if the "mode of subsequent communication" signal in the received distress call indicates teleprinter, also on NBDP, if the coast station is fitted with NBDP. In both cases, the radiotelephone and NBDP frequencies should be those associated with the frequency on which the distress call was received (on MF 2 182 kHz for radiotelephony and 2 174.5 kHz for NBDP, on VHF 156.8 MHz/channel 16 for radiotelephony; there is no frequency for NBDP on VHF).

1.3 Transmission of a DSC distress relay alert (distress relay call)

Coast stations shall initiate and transmit a distress relay call in any of the following cases:

- when the distress of the mobile unit has been notified to the coast station by other means and a broadcast alert to shipping is required by the RCC; and
- when the person responsible for the coast station considers that further help is necessary (close cooperation with the appropriate RCC is recommended under such conditions).

In the cases mentioned above, the coast station shall transmit a shore-to-ship distress relay call addressed, as appropriate, to all ships, to a selected group of ships, to a geographical area or to a specific ship.

The distress relay call shall contain the identification of the mobile unit in distress, its position and other information which might facilitate rescue.

The distress relay call is transmitted as follows:

- use a transmitter which is tuned to the frequency for DSC distress calls (2 187.5 kHz on MF, 156.525 MHz/channel 70 on VHF);
- in accordance with the DSC equipment manufacturer's instructions, key in or select on the DSC equipment keyboard (see Note 1 of § 1.2 of this Annex):
  - distress relay call,
  - the format specifier (all ships, group of ships, geographical area or individual station),
  - if appropriate, the address of the ship, group of ships or geographical area (not required if the format specifier is "all ships"),
  - 9-digit identity of the ship in distress, if known,
  - nature of distress,
  - distress coordinates,
  - the time (in UTC) when the position was valid;
- transmit the distress relay call;
- prepare for the reception of the acknowledgements by ship stations and for handling the subsequent distress traffic by switching over to the distress traffic channel in the same band, i.e. 2 182 kHz on MF, 156.8 MHz/channel 16 on VHF.

1.4 Reception of a distress relay alert (distress relay call)

If the distress relay call is received from a ship station, coast stations on receipt of the distress relay call shall ensure that the call is routed as soon as possible to an RCC. The receipt of the distress relay call is to be acknowledged as soon as possible by the appropriate coast station using a DSC distress relay acknowledgement addressed to the ship station. If the distress relay call is received from a coast station, other coast stations will normally not have to take further action.

2 Urgency

2.1 Transmission of a DSC announcement

The announcement of the urgency message shall be made on one or more of the distress and safety calling frequencies using DSC and the urgency call format.

The DSC urgency call may be addressed to all ships, to a selected group of ships, to a geographical area or to a specific ship. The frequency on which the urgency message will be transmitted after the announcement shall be included in the DSC urgency call.

The DSC urgency call is transmitted as follows:

- use a transmitter which is tuned to the frequency for DSC distress calls (2 187.5 kHz on MF, 156.525 MHz /channel 70 on VHF);
- in accordance with the DSC equipment manufacturer's instructions, key in or select on the DSC equipment keyboard (see Note 1 of § 1.2 of this Annex):
  - the format specifier (all ships call, group of ships, geographical area or individual station),
  - if appropriate, the address of the ship, group of ships or geographical area (not required if the format specifier is "all ships"),
  - the category of the call (urgency),
  - the frequency or channel on which the urgency message will be transmitted,
  - the type of communication in which the urgency message will be transmitted (radiotelephony);
- transmit the DSC urgency call.

After the DSC announcement, the urgency message will be transmitted on the frequency indicated in the DSC call.

3 Safety

3.1 Transmission of a DSC announcement

The announcement of the safety message shall be made on one or more of the distress and safety calling frequencies using DSC and the safety call format.

The DSC safety call may be addressed to all ships, to a group of ships, to a geographical area or to a specific ship. The frequency on which the safety message will be transmitted after the announcement shall be included in the DSC safety call.

The DSC safety call is transmitted as follows:

- use a transmitter which is tuned to the frequency for DSC distress calls (2 187.5 kHz on MF, 156.525 MHz/channel 70 on VHF);
- in accordance with the DSC equipment manufacturer's instructions, key in or select on the DSC equipment keyboard (see Note 1 of § 1.2 of this Annex):
  - the format specifier (all ships call, group of ships, geographical area or individual station),
  - if appropriate, the address of the ship, group of ships or geographical area (not required if the format specifier is "all ships"),
  - the category of the call (safety),

  - the frequency or channel on which the safety message will be transmitted,
  - the type of communication in which the safety message will be transmitted (radiotelephony);
- transmit the DSC safety call.

After the DSC announcement, the safety message will be transmitted on the frequency indicated in the DSC call.

4 Public correspondence

4.1 DSC frequencies/channels for public correspondence

4.1.1 VHF

The frequency 156.525 MHz/channel 70 is used for DSC for distress and safety purposes. It may also be used for calling purposes other than distress and safety, e.g. public correspondence.

4.1.2 MF

For public correspondence national and international frequencies are used which are different from the frequencies used for distress and safety purposes.

When calling ship stations by DSC, coast stations should use for the call, in the order of preference:

- a national DSC channel on which the coast station is maintaining watch;
- the international DSC calling channel, with the coast station transmitting on 2 177 kHz and receiving on 2 189.5 kHz. In order to reduce interference on this channel, it may be used as a general rule by coast stations to call ships of another nationality, or in cases where it is not known on which DSC frequencies the ship station is maintaining watch.

4.2 Transmission of a DSC call to a ship

The DSC call is transmitted as follows:

- use a transmitter which is tuned to the appropriate calling frequency;
- in accordance with the DSC equipment manufacturer's instructions, key in or select on the DSC equipment keyboard (see Note 1 of § 1.2 of this Annex):
  - the 9-digit identity of the ship to be called,
  - the category of the call (routine or ship's business),
  - the type of subsequent communication (radiotelephony),
  - working frequency information;
- after checking as far as possible that there are no calls in progress, transmit the DSC call.

4.3 Repeating a call

Coast stations may transmit the call twice on the same calling frequency with an interval of at least 45 s between the two calls, provided that they receive no acknowledgement within that interval.

If the station called does not acknowledge the call after the second transmission, the call may be transmitted again on the same frequency after a period of at least 30 min or on another calling frequency after a period of at least 5 min.

4.4 Preparation for exchange of traffic

On receipt of a DSC acknowledgement with the indication that the called ship station can use the proposed working frequency, the coast station transfers to the working frequency or channel and prepares to receive the traffic.

4.5 Acknowledgement of a received DSC call

Acknowledgements shall normally be transmitted on the frequency paired with the frequency of the received call. If the same call is received on several calling channels, the most appropriate channel shall be chosen for transmission of the acknowledgement.

The acknowledgement of a DSC call is transmitted as follows:

- use a transmitter which is tuned to the appropriate frequency;
- in accordance with the DSC equipment manufacturer's instructions, key in or select on the DSC equipment keyboard (see Note 1 of § 1.2 of this Annex):
  - the format specifier (individual station),
  - 9-digit identity of the calling ship,
  - the category of the call (routine or ship's business),
  - if able to comply immediately on the working frequency suggested by the ship station, the same frequency information as in the received call,
  - if no working frequency was suggested by the calling ship station, then the acknowledgement should include a channel/frequency proposal,
  - if not able to comply on the working frequency suggested, but able to comply immediately on an alternative frequency, the alternative working frequency,
  - if unable to comply immediately the appropriate information in that regard;
- transmit the acknowledgement (after checking as far as possible that there are no calls in progress on the frequency selected) after a delay of at least 5 s, but not later than 4½ min.

4.6 Preparation for exchange of traffic

After having transmitted the acknowledgement, the coast station transfers to the working frequency or channel and prepares to receive the traffic.

5 Testing the equipment used for distress and safety calls

Testing on the exclusive DSC distress and safety calling frequencies should be avoided as far as possible by using other methods. There should be no test transmissions on the DSC calling frequency 156.525 MHz/channel 70. However, when testing on the exclusive DSC distress and safety calling frequency 2 187.5 kHz is unavoidable, it should be indicated that these are test transmissions (e.g. special test calls).

Test calls should be transmitted by the ship station and acknowledged by the called coast station. Normally there would be no further communications between the two stations involved.

Acknowledgement of a DSC test call

The acknowledgement of a DSC test call is transmitted as follows:

- use a transmitter which is tuned to 2 187.5 kHz;
- in accordance with the DSC equipment manufacturer's instructions, key in or select on the DSC equipment keyboard:
  - test call acknowledgement,
  - 9-digit identity of the calling ship station;
- transmit the acknowledgement.

6 Special conditions and procedures for DSC communication on HF

General

The procedures for DSC communication on HF are – with some additions described in § 6.1 to 6.4 below – equal to the corresponding procedures for DSC communications on MF/VHF.

Due regard to the special conditions described in § 6.1 to 6.4 should be given when making DSC communications on HF.

6.1 Distress

6.1.1 Reception and acknowledgement of a DSC distress alert on HF

Ships in distress may in some cases transmit the DSC distress alert on a number of HF bands with only short intervals between the individual calls.

The coast station shall transmit DSC acknowledgement on all HF DSC distress channels on which the DSC alert was received in order to ensure as far as possible that the acknowledgement is received by the ship in distress and by all ships which received the DSC alert.

6.1.2 Distress traffic

The distress traffic should, as a general rule, be initiated on the appropriate distress traffic channel (radiotelephony or NBDP) in the same band in which the DSC alert was received.

For distress traffic by NBDP the following rules apply:

– all messages shall be preceded by at least one carriage return, line feed, one letter shift and the distress signal MAYDAY;

– FEC broadcast mode should normally be used.

  ARQ mode should be used only when considered advantageous to do so in the actual situation and provided that the radiotelex number of the ship is known.

6.1.3 Transmission of DSC distress relay alert on HF

HF propagation characteristics should be taken into account when choosing HF band(s) for transmission of DSC distress relay alert.

IMO Convention ships equipped with HF DSC for distress and safety purposes are required to keep continuous automatic DSC watch on the DSC distress channel in the 8 MHz band and on at least one of the other HF DSC distress channels.

In order to avoid creating on board ships uncertainty regarding on which band the subsequent establishment of contact and distress traffic should be initiated, the HF DSC distress relay alert should be transmitted on one HF band at a time and the subsequent communication with responding ships be established before eventually repeating the DSC distress relay alert on another HF band.

6.2 Urgency

6.2.1 Transmission of urgency announcement and message on HF

For urgency messages by NBDP the following apply:

– the urgency message shall be preceded by at least one carriage return, line feed, one letter shift, the urgency signal PAN PAN and the identification of the coast station;

– FEC broadcast mode should normally be used.

  ARQ mode should be used only when considered advantageous to do so in the actual situation and provided that the radiotelex number of the ship is known.

6.3 Safety

6.3.1 Transmission of safety announcements and messages on HF

For safety messages by NBDP the following apply:

– the safety message shall be preceded by at least one carriage return, line feed, one letter shift, the safety signal SECURITE and the identification of the coast station;

– FEC broadcast mode should normally be used.

  ARQ mode should be used only when considered advantageous to do so in the actual situation and provided that the radiotelex number of the ship is known.

6.4 Testing the equipment used for distress and safety

The procedures for ships testing their equipment used for DSC distress, urgency and safety calls on HF DSC distress channels and the acknowledgement of the test call by the coast station are the same as for testing on the MF DSC distress frequency 2 187.5 kHz.

ANNEX 5

Frequencies used for DSC

1 The frequencies used for distress and safety purposes using DSC are as follows (see also RR Article 38 (Appendix S13, Part A2)):

2 187.5 kHz
4 207.5 kHz
6 312 kHz
8 414.5 kHz
12 577 kHz
16 804.5 kHz
156.525 MHz (Note 1)

NOTE 1 – The frequency 156.525 MHz may also be used for DSC purposes other than distress and safety.

2 The frequencies assignable on an international basis to ship and coast stations for DSC, for purposes other than distress and safety, are as follows:

2.1 Ship stations (see Note 1)

458.5			kHz
2 177 (Note 2)	2 189.5		kHz
4 208	4 208.5	4 209	kHz
6 312,5	6 313	6 313.5	kHz
8 415	8 415.5	8 416	kHz
12 577.5	12 578	12 578.5	kHz
16 805	16 805.5	16 806	kHz
18 898.5	18 899	18 899.5	kHz
22 374.5	22 375	22 375.5	kHz
25 208.5	25 209	25 209.5	kHz
		156.525	MHz (Note 3)

2.2 Coast stations (see Note 1)

455.5			kHz
2 177			kHz
4 219.5	4 220	4 220.5	kHz
6 331	6 331.5	6 332	kHz
8 436.5	8 437	8 437.5	kHz
12 657	12 657.5	12 658	kHz
16 903	16 903.5	16 904	kHz
19 703.5	19 704	19 704.5	kHz
22 444	22 444.5	22 445	kHz
26 121	26 121.5	26 122	kHz
		156.525	MHz (Note 3)

NOTE 1 – The following (kHz) paired frequencies (for ship/coast stations) 4 208/4 219.5, 6 312.5/6 331, 8 415/8 436.5, 12 577.5/12 657, 16 805/16 903, 18 898.5/19 703.5, 22 374.5/22 444 and 25 208.5/26 121 are the first choice international frequencies for DSC.

NOTE 2 – The frequency 2 177 kHz is available to ship stations for intership calling only.

NOTE 3 – The frequency 156.525 MHz is also used for distress and safety purposes (see Note 1 of § 1 of this Annex).

3 In addition to the frequencies listed in § 2 above, appropriate working frequencies in the following bands may be used for DSC:

415-526.5	kHz	(Regions 1 and 3)
415-525	kHz	(Region 2)
1 606.5-4 000	kHz	(Regions 1 and 3)
1 605-4 000	kHz	(Region 2) (For the band 1 605-1 625 kHz, see RR No. 480 (S5.89))
4 000-27 500	kHz	
156-174	kHz	

Annex 3-2-9

RECOMMENDATION ITU-R M.476-5*

DIRECT-PRINTING TELEGRAPH EQUIPMENT IN THE MARITIME MOBILE SERVICE**

(Question ITU-R 5/8)

(1970-1974-1978-1982-1986-1995)

Summary

The Recommendation provides in Annex 1 characteristics for error detecting and correcting systems for existing direct-printing telegraph equipment. Annex 1 contains the technical characteristics of the transmission, the code and the modes of operation to be employed in the maritime-mobile service. New equipment should conform to Recommendation ITU-R M.625.

The ITU Radiocommunication Assembly,

considering

a) that there is a requirement to interconnect mobile stations, or mobile stations and coast stations, equipped with start-stop apparatus employing the ITU-T International Telegraph Alphabet No. 2, by means of radiotelegraph circuits;

b) that direct-printing telegraphy communications in the maritime mobile service can be listed in the following categories:

b.a telegraph service between a ship and a coast station;

b.b telegraph service between a ship and an extended station (ship's owner) via a coast station;

b.c telex service between a ship and a subscriber of the (international) telex network;

b.d broadcast telegraph service from a coast station to one or more ships;

b.e telegraph service between two ships or between one ship and a number of other ships;

c) that those categories are different in nature and that consequently different degrees of transmission quality may be required;

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* This Recommendation should be brought to the attention of the International Maritime Organization (IMO) and the Telecommunication Standardization Sector (ITU-T).

** This Recommendation is retained in order to provide information concerning existing equipment, but will probably be deleted at a later date. New equipment should conform to Recommendation ITU-R M.625 which provides for the exchange of identification signals, for the use of 9 digit maritime mobile service identification signals and for compatibility with existing equipment built in accordance with this Recommendation.

Note by the Secretariat: The references made to the Radio Regulations (RR) in this Recommendation refer to the RR as revised by the World Radiocommunication Conference 1995. These elements of the RR will come into force on 1 June 1998. Where applicable, the equivalent references in the current RR are also provided in square brackets.

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d) that the categories given in b.a, b.b and b.c above may require a higher transmission quality than categories b.d and b.e for the reason that data could be handled through the services in the categories b.a, b.b and b.c, while the messages passed through the service of category b.d, and via the broadcast service of category b.e are normally plain language, allowing a lower transmission quality than that required for coded information;

e) that the service in category b.d and the broadcast service in category b.e cannot take advantage of an ARQ method, as there is in principle no return path;

f) that for these categories of service which by their nature do not allow the use of ARQ, another mode, i.e. the forward error-correcting (FEC) mode should be used;

g) that the period for synchronization and phasing should be as short as possible and should not exceed 5 s;

h) that most of the ship stations do not readily permit simultaneous use of the radio transmitter and radio receiver;

j) that the equipment on board ships should be neither unduly complex nor expensive,

recommends

1 that when an error-detecting and correcting system is used for direct-printing telegraphy in the maritime mobile service, a 7-unit ARQ system or a 7-unit forward acting, error-correcting and indicating time-diversity system, using the same code, should be employed;

2 that equipment designed in accordance with § 1 should meet the characteristics laid down in Annex 1.

ANNEX 1

1 General (Mode A, ARQ and Mode B, FEC)

1.1 The system in both Mode A (ARQ) and Mode B (FEC) is a single-channel synchronous system using the 7-unit error-detecting code as listed in § 2 of this Annex.

1.2 FSK modulation is used on the radio link at 100 Bd. The equipment clocks controlling the modulation rate should have an accuracy of better than 30 parts in 10^6.

NOTE 1 – Some existing equipments may not conform to this requirement.

1.3 The terminal input and output must be in accordance with the 5-unit start-stop ITU-T International Telegraph Alphabet No. 2 at a modulation rate of 50 Bd.

1.4 The class of emission is F1B or J2B with a frequency shift on the radio link of 170 Hz. When frequency shift is effected by applying audio signals to the input of a single-sideband transmitter, the centre frequency of the audio spectrum offered to the transmitter should be 1 700 Hz.

NOTE 1 – A number of equipments are presently in service, using a centre frequency of 1 500 Hz. These may require special measures to achieve compatibility.

1.5 The radio frequency tolerance of the transmitter and the receiver should be in accordance with Recommendation ITU-R SM.1137. It is desirable that the receiver employs the minimum practicable bandwidth (see also Report ITU-R M.585).

NOTE 1 – The receiver bandwidth should preferably be between 270 and 340 Hz.

2 Table of conversion

2.1 Traffic information signals

TABLE 1

Combination No.	Letter case	Figure case	International Telegraph Alphabet No. 2 Code	Emitted 7-unit signal(1)
1	A	–	ZZAAA	BBBYYYB
2	B	?	ZAAZZ	YBYYBBB
3	C	:	AZZZA	BYBBBYY
4	D	⊠ (3)	ZAAZA	BBYYBYB
5	E	3	ZAAAA	YBBYBYB
6	F	(2)	ZAZZA	BBYBBYY
7	G	(2)	AZAZZ	BYBYBBY
8	H	(2)	AAZAZ	BYYBYBB
9	I	8	AZZAA	BYBBYYB
10	J	Audible signal	ZZAZA	BBBYBYY
11	K	(	ZZZZA	YBBBBYY
12	L	)	AZAAZ	BYBYYBB
13	M	.	AAZZZ	BYYBBBY
14	N	,	AAZZA	BYYBBYB
15	O	9	AAAZZ	BYYYBBB
16	P	0	AZZAZ	BYBBYBY
17	Q	1	ZZZAZ	YBBBYBY
18	R	4	AZAZA	BYBYBYB
19	S	’	ZAZAA	BBYBYYB
20	T	5	AAAAZ	YYBYBBB
21	U	7	ZZZAA	YBBBYYB
22	V	=	AZZZZ	YYBBBBY
23	W	2	ZZAAZ	BBBYYBY
24	X	/	ZAZZZ	YBYBBBY
25	Y	6	ZAZAZ	BBYBYBY
26	Z	+	ZAAAZ	BBYYYBB
27	←	(Carriage return)	AAAZA	YYYBBBB
28	≡	(Line feed)	AZAAA	YYBBYBB
29	↓	(Letter shift)	ZZZZZ	YBYBBYB
30	↑	(Figure shift)	ZZAZZ	YBBYBBY
31		Space	AAZAA	YYBBBYB
32		Unperforated tape	AAAAA	YBYBYBB

(1) B represents the higher emitted frequency and Y the lower.

(2) At present unassigned (see ITU-T Recommendation F.1 C8). Reception of these signals, however, should not initiate a request for repetition.

(3) The pictorial representation shown is a schematic of ✠ which may also be used when equipment allows (ITU-T Recommendation F.1).

2.2 Service information signals

TABLE 2

Mode A (ARQ)	Emitted signal	Mode B (FEC)
Control signal 1 (CS1)	BYBYYBB	
Control signal 2 (CS2)	YBYBYBB	
Control signal 3 (CS3)	BYYBBYB	
Idle signal β	BBYYBBY	
Idle signal α	BBBBYYY	Phasing signal 1
Signal repetition	YBBYYBB	Phasing signal 2

3 Characteristics

3.1 Mode A (ARQ) (see Figs. 1 and 2)

A synchronous system, transmitting blocks of three characters from an information sending station (ISS) towards an information receiving station (IRS), which stations can, controlled by the control signal 3 (see § 2.2), interchange their functions.

3.1.1 Master and slave arrangements

3.1.1.1 The station that initiates the establishment of the circuit (the calling station) becomes the "master" station, and the station that has been called will be the "slave" station;

this situation remains unchanged during the entire time in which the established circuit is maintained, regardless of which station, at any given time, is the information sending station (ISS) or information receiving station (IRS);

3.1.1.2 the clock in the master station controls the entire circuit (see circuit timing diagram, Fig. 1);

3.1.1.3 the basic timing cycle is 450 ms, and for each station consists of a transmission period followed by a transmission pause during which reception is effected;

3.1.1.4 the master station transmitting time distributor is controlled by the clock in the master station;

3.1.1.5 the slave station receiving time distributor is controlled by the received signal;

3.1.1.6 the slave station transmitting time distributor is phase-locked to the slave station receiving time distributor; i.e. the time interval between the end of the received signal and the start of the transmitted signal (t_E in Fig. 1) is constant;

3.1.1.7 the master station receiving time distributor is controlled by the received signal.

3.1.2 The information sending station (ISS)

3.1.2.1 Groups the information to be transmitted into blocks of three characters (3×7 signal elements), including, if necessary, "idle signals β" to complete or to fill blocks when no traffic information is available;

3.1.2.2 emits a "block" in 210 ms after which a transmission pause of 240 ms becomes effective, retaining the emitted block in memory until the appropriate control signal confirming correct reception by the information receiving station (IRS) has been received;

3.1.2.3 numbers successive blocks alternately "Block 1" and "Block 2" by means of a local numbering device. The first block should be numbered "Block 1" or "Block 2" dependent on whether the received control signal (see § 3.1.4.5) is a control signal 1 or a control signal 2. The numbering of successive blocks is interrupted at the reception of:

– a request for repetition; or

– a mutilated signal; or

– a control signal 3 (see § 2.2);

3.1.2.4 emits the information of Block 1 on receipt of control signal 1 (see § 2.2);

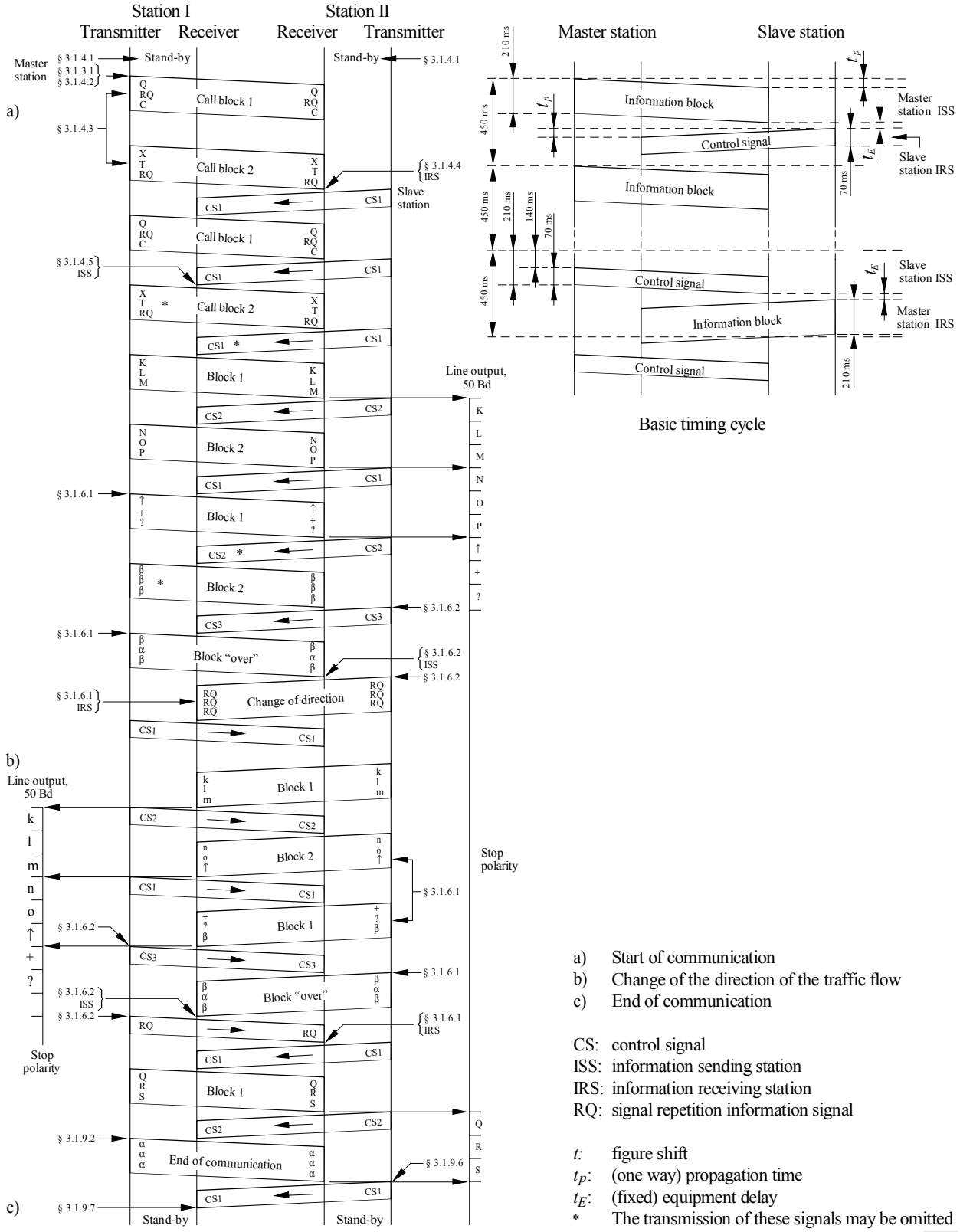
3.1.2.5 emits the information of Block 2 on receipt of control signal 2 (see § 2.2);

3.1.2.6 emits a block of three "signal repetitions" on receipt of a mutilated signal (see § 2.2).

FIGURE 1

A-Mode operation

Selective call No. 32610 transmitted as Q (RQ)C XT (RQ)
(see Recommendation ITU-R M.491 § 2, 3)



a) Start of communication
b) Change of the direction of the traffic flow
c) End of communication

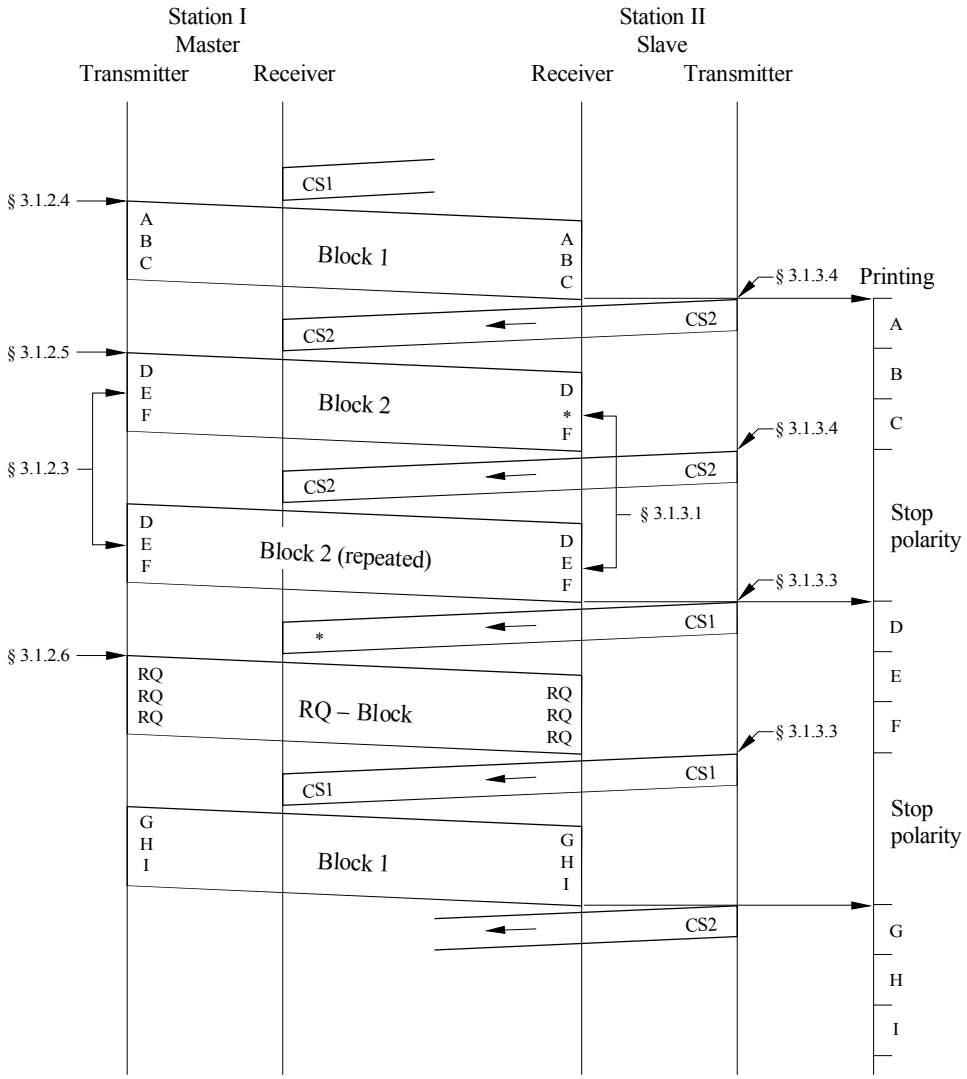
CS: control signal
ISS: information sending station
IRS: information receiving station
RQ: signal repetition information signal

t: figure shift
t_P: (one way) propagation time
t_E: (fixed) equipment delay
* The transmission of these signals may be omitted

D01

FIGURE 2

Mode A under error receiving conditions



* Detected error symbol

D02

3.1.3 The information receiving station (IRS)

3.1.3.1 Numbers the received blocks of three characters alternately "Block 1" and "Block 2" by a local numbering device, the numbering being interrupted at the reception of:

– a block in which one or more characters are mutilated; or

– a block containing at least one "signal repetition"; (§ 3.1.2.6)

3.1.3.2 after the reception of each block, emits one of the control signals of 70 ms duration after which a transmission pause of 380 ms becomes effective;

3.1.3.3 emits the control signal 1 at the reception of:

– an unmutilated "Block 2", or

– a mutilated "Block 1", or

– "Block 1" containing at least one "signal repetition";

3.1.3.4 emits the control signal 2 at reception of:

– an unmutilated "Block 1", or

– a mutilated "Block 2", or

– a "Block 2" containing at least one "signal repetition".

3.1.4 Phasing

3.1.4.1 When no circuit is established, both stations are in the "stand-by" position. In this stand-by position no ISS or IRS and no master or slave position is assigned to either of the stations;

3.1.4.2 the station desiring to establish the circuit emits the "call" signal. This "call" signal is formed by two blocks of three signals (see Note 1);

3.1.4.3 the call signal contains:

– in the first block: "signal repetition" in the second character place and any combination of information signals (see Note 2) in the first and third character place,

– in the second block: "signal repetition" in the third character place preceded by any combination of the 32 information signals (see Note 2) in the first and second character place;

3.1.4.4 on receipt of the appropriate call signal the called station changes from stand-by to the IRS position and emits the control signal 1 or the control signal 2;

3.1.4.5 on receipt of two consecutive identical control signals, the calling station changes into ISS and operates in accordance with § 3.1.2.4 and 3.1.2.5.

NOTE 1 – A station using a two block call signal, shall be assigned a number in accordance with RR Nos. S19.37, S19.83 and S19.92 to S19.95 [Nos. 2088, 2134 and 2143 to 2146];

NOTE 2 – The composition of these signals and their assignment to individual ships require international agreement (see Recommendation ITU-R M.491).

3.1.5 Rephasing (Note 1)

3.1.5.1 When reception of information blocks or of control signals is continuously mutilated, the system reverts to the "stand-by" position after a predetermined time (a preferable predetermined time would be the duration of 32 cycles of 450 ms), to be decided by the user, of continuous repetition; the station that is master station at the time of interruption immediately initiates rephasing along the same lines as laid down in § 3.1.4;

3.1.5.2 if, at the time of interruption, the slave station was in the IRS position, the control signal to be returned after phasing should be the same as that last sent before the interruption to avoid the loss of an information block upon resumption of the communication. (Some existing equipments may not conform to this requirement);

3.1.5.3 however, if, at the time of interruption, the slave station was in the ISS position, it emits, after having received the appropriate call blocks, either:

– the control signal 3; or

– the control signal 1 or 2 in conformity with § 3.1.4.4, after which control signal 3 is emitted to initiate changeover to the ISS position;

3.1.5.4 if rephasing has not been accomplished within the time-out interval of § 3.1.9.1, the system reverts to the stand-by position and no further rephasing attempts are made.

NOTE 1 – Some coast stations do not provide rephasing (see also Recommendation ITU-R M.492).

3.1.6 Change-over

3.1.6.1 The information sending station (ISS)

– Emits, to initiate a change in the direction of the traffic flow, the information signal sequence "Figure shift" – "Plus" ("figure case of *Z*") – "Question mark" ("figure case of B") (see Note 1) followed, if necessary, by one or more "idle signals β" to complete a block;

– emits, on receipt of a control signal 3, a block containing the signals "idle signal β" – "idle signal α" – "idle signal β";

– changes subsequently to IRS after the reception of a "signal repetition".

3.1.6.2 The information receiving station (IRS)

– Emits the control signal 3:

a) when the station wishes to change over to ISS,

b) on receipt of a block in which the signal information sequence "Figure shift" – "Plus" – (figure case of Z) – "Question mark" (figure case of B) terminates (see Note 1) or upon receipt of the following block. In the latter case, the IRS shall ignore whether or not one or more characters in the last block are mutilated:

– changes subsequently to ISS after reception of a block containing the signal sequence "idle signal β" – "idle signal α" – "idle signal β";

– emits one "signal repetition" as a master station, or a block of three "signal repetitions" as a slave station, after being changed into ISS.

NOTE 1 – In the Telex network, the signal sequence combination No. 26 – combination No. 2, sent whilst the teleprinters are in the figure case condition, is used to initiate a reversal of the flow of information. The IRS is, therefore, required to keep track of whether the traffic information flow is in the letter case or figure case mode to ensure proper end-to-end operation of the system.

3.1.7 Output to line

3.1.7.1 the signal offered to the line output terminal is a 5-unit start-stop signal at a modulation rate of 50 Bd.

3.1.8 Answerback

3.1.8.1 The WRU (Who are you?) sequence, which consists of combination Nos. 30 and 4 in the ITU-T International Telegraph Alphabet No. 2, is used to request terminal identification.

3.1.8.2 The information receiving station (IRS), on receipt of a block containing the WRU sequence, which will actuate the teleprinter answerback code generator:

– changes the direction of traffic flow in accordance with § 3.1.6.2;

– transmits the signal information characters derived from the teleprinter answerback code generator;

– after transmission of 2 blocks of "idle signals β" (after completion of the answerback code, or in the absence of an answerback code), changes the direction of traffic flow in accordance with § 3.1.6.1.

NOTE 1 – Some existing equipments may not conform to this requirement.

3.1.9 End of communication

3.1.9.1 When reception of information blocks or of control signals is continuously mutilated, the system reverts to the "stand-by" position after a predetermined time of continuous repetition, which causes the termination of the established circuit (a preferable predetermined time would be the duration of 64 cycles of 450 ms);

3.1.9.2 the station that wishes to terminate the established circuit transmits an "end of communication signal";

3.1.9.3 the "end of communication signal" consists of a block containing three "idle signal α":

3.1.9.4 the "end of communication signal" is transmitted by the ISS;

3.1.9.5 if an IRS wishes to terminate the established circuit it has to change over to ISS in accordance with § 3.1.6.2;

3.1.9.6 the IRS that receives an "end of communication signal" emits the appropriate control signal and reverts to the "stand-by" position;

3.1.9.7 on receipt of a control signal that confirms the unmutilated reception of the "end of communication signal", the ISS reverts to the "stand-by" position;

3.1.9.8 when after a predetermined number of transmissions (see Note 1) of the "end of communication signal" no control signal has been received confirming the unmutilated reception of the "end of communication signal", the ISS reverts to the stand-by position and the IRS times out in accordance with § 3.1.9.1.

NOTE 1 – A preferable predetermined number would be four transmissions of the "end of communication signal".

3.2 Mode B, forward error correction (FEC) (see Figs. 3 and 4)

A synchronous system, transmitting an uninterrupted stream of characters from a station sending in the collective B-mode (CBSS) to a number of stations receiving in the collective B-mode (CBRS), or from a station sending in the selective B-mode (SBSS) to one selected station receiving in the selective B-mode (SBRS).

3.2.1 The station sending in the collective or in the selective B-mode (CBSS or SBSS)

3.2.1.1 Emits each character twice: the first transmission (DX) of a specific character is followed by the transmission of four other characters, after which the retransmission (RX) of the first character takes place, allowing for time-diversity reception at 280 ms time space;

3.2.1.2 emits as a preamble to messages or to the call sign, alternately the phasing signal 1 (see § 2.2) and the phasing signal 2 (see § 2.2) whereby phasing signal 1 is transmitted in the RX, and phasing signal 2 in the DX position. At least four of these signal pairs (phasing signal 1 and phasing signal 2) should be transmitted.

3.2.2 The station sending in the collective B-mode (CBSS)

3.2.2.1 Emits during the breaks between two messages in the same transmission the phasing signals 1 and the phasing signals 2 in the RX and the DX position, respectively.

3.2.3 The station sending in the selective B-mode (SBSS)

3.2.3.1 Emits after the transmission of the required number of phasing signals (see § 3.2.1.2) the call sign of the station to be selected. This call sign is a sequence of four characters that represents the number code of the called station. The composition of this call sign should be in accordance with Recommendation ITU-R M.491. This transmission takes place in the time diversity mode according to § 3.2.1.1;

3.2.3.2 emits the call sign and all further signals in a 3B/4Y ratio, i.e. inverted with respect to the signals in Table 1 in the column "emitted 7-unit signal". Consequently, all signals, i.e. both traffic information signals and service information signals, following the phasing signals are transmitted in the 3B/4Y ratio;

3.2.3.3 emits the service information signal "idle signal β" during the idle time between the messages consisting of traffic information signals.

3.2.4 The station(s) receiving in the collective or in the selective B-mode (CBRS or SBRS)

3.2.4.1 Checks both characters (DX and RX), printing an unmutilated DX or RX character, or printing an error symbol or space, if both are mutilated.

3.2.5 Phasing

3.2.5.1 When no reception takes place, the system is in the "stand-by" position as laid down in § 3.1.4.1;

3.2.5.2 on receipt of the sequence *"phasing signal 1" – "phasing signal 2"*, or of the sequence *"phasing signal 2" – "phasing signal 1"*, in which phasing signal 2 determines the DX and phasing signal 1 determines the RX position, and at least one further phasing signal in the appropriate position, the system changes from "stand-by" to the CBRS position;

3.2.5.3 when started as CBRS the system changes to the SBRS (selectively called receiving station) position on receipt of the inverted characters representing its selective call number;

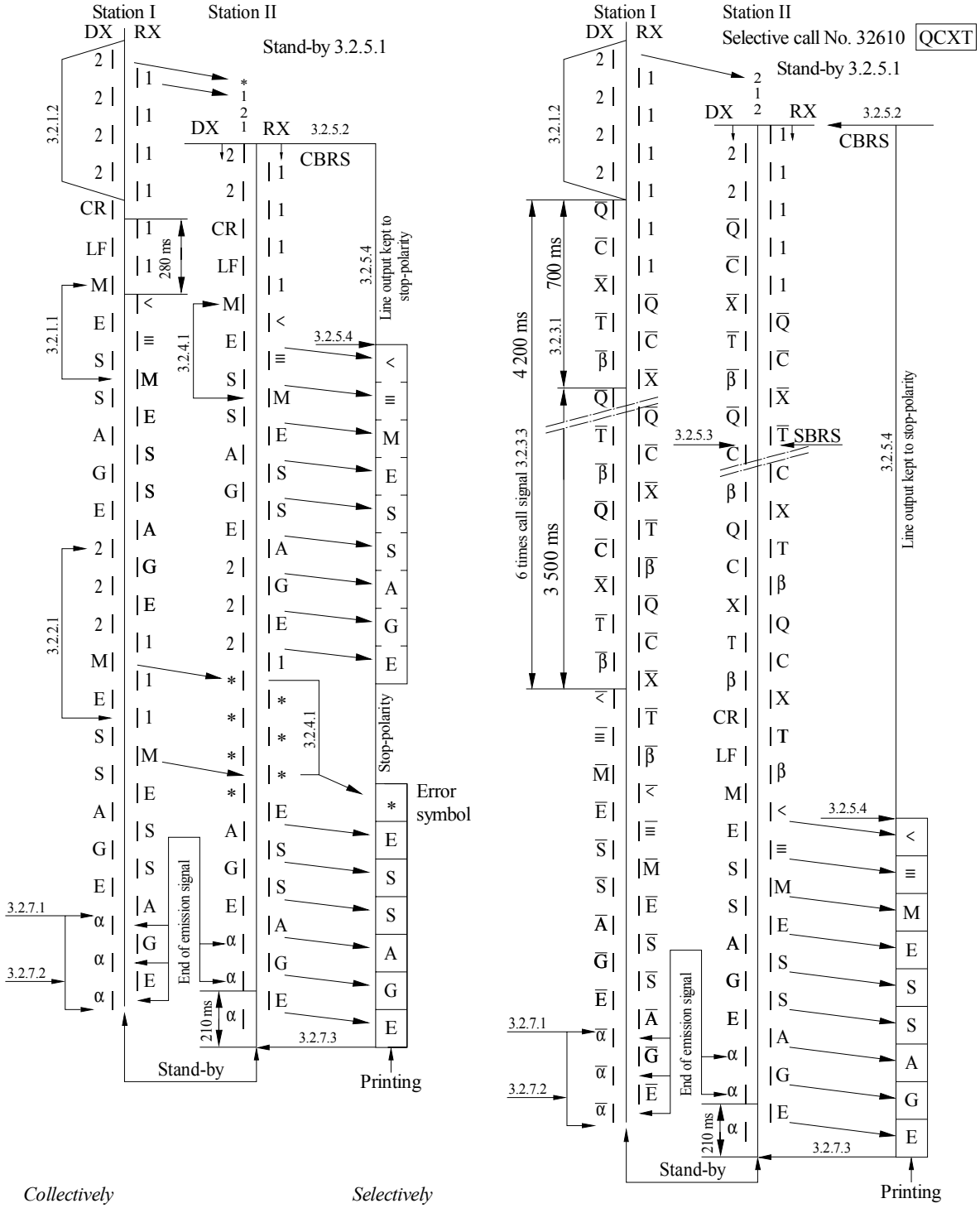
3.2.5.4 having been changed into the CBRS or into the SBRS position the system offers continuous stop-polarity to the line output terminal until either the signal "carriage return" or "line feed" is received;

3.2.5.5 when started as SBRS, the decoder re-inverts all the following signals received to the 3Y/4B ratio, so that these signals are offered to the SBRS in the correct ratio, but they remain inverted for all other stations;

3.2.5.6 both the CBRS and the SBRS revert to the stand-by position if, during a predetermined time, the percentage of mutilated signals received has reached a predetermined value.

FIGURE 3

B-mode operation



Collectively

1: phasing signal 1
2: phasing signal 2
<: carriage return (CR)
≡: line feed (LF)
∗ Detected error symbol

Selectively

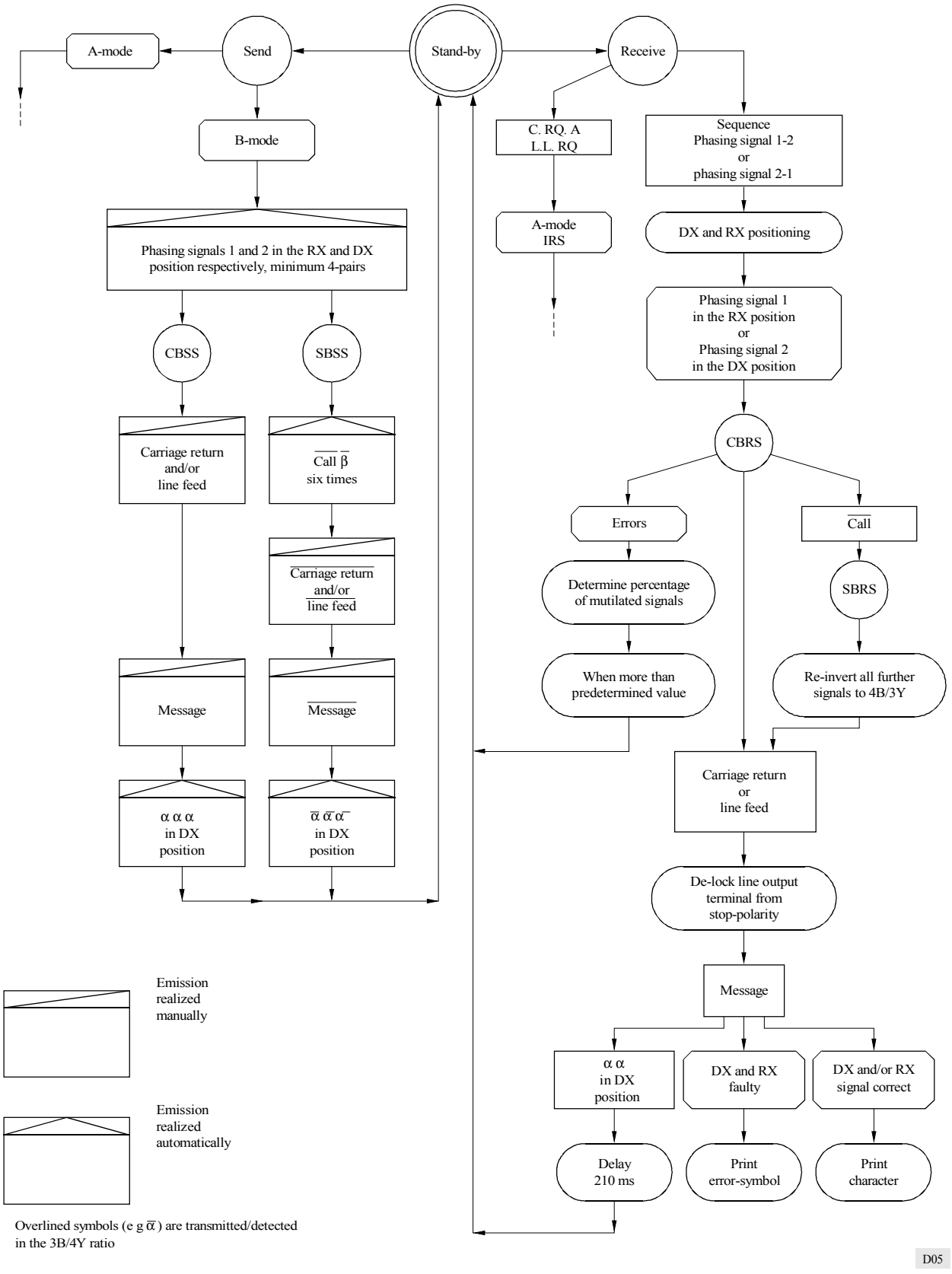
CBSS: B-mode - Sending collectively
CBRS: B-mode - Receiving collectively
SBSS: B-mode - Sending selectively
SBRS: B-mode - Receiving selectively

Overlined symbols (e.g. $\overline{M}$) are transmitted in the 3B/4Y ratio

D04

FIGURE 4

Flow chart showing processes in B-mode operation



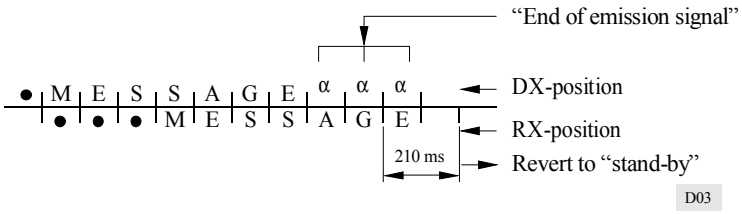
3.2.6 Output to line

3.2.6.1 The signal offered to the line output terminal is a 5-unit start-stop ITU-T International Telegraph Alphabet No. 2 signal at a modulation rate of 50 Bd.

3.2.7 End of emission

3.2.7.1 The station sending in the B-mode (CBSS or SBSS) that wishes to terminate the emission transmits the "end of emission signal";

3.2.7.2 the "end of emission signal" consists of three consecutive "idle signals α" (see § 2.2) transmitted in the DX position only, immediately after the last transmitted traffic information signal in the DX position, after which the station terminates its emission and reverts to the "stand-by" position;



3.2.7.3 the CBRS or the SBRS reverts to the "stand-by" position not less than 210 ms after receipt of at least two consecutive "idle signals α" in the DX position.

Annex 3-2-10

RECOMMENDATION 490

THE INTRODUCTION OF DIRECT-PRINTING TELEGRAPH EQUIPMENT IN THE MARITIME MOBILE SERVICE

Equivalence of terms

(Question 5/8)

(1974)

The CCIR,

CONSIDERING

(a) that the use of direct-printing telegraphy by ship and coast stations is rapidly expanding;

(b) that there is a need for standardizing the designation of the higher and lower F1B frequencies to ensure compatible world-wide operation when using the direct-printing telegraphy system;

UNANIMOUSLY RECOMMENDS

that the equivalence of terms as shown in the following table shall be adhered to (this Recommendation is in accordance with CCITT Recommendations U.1 and V.1.):

TABLE I

Frequency of emission	Circuits using teleprinter or punched tape equipment					
	International Telegraph Alphabet No. 2				Transmitted 7-unit signal	Telex
Higher frequency	Space	Start	No perforation	A (1)	B (2)	Free line condition
Lower frequency	Mark	Stop	Perforation	Z (1)	Y (2)	Idle circuit condition

(1) on a wire circuit.

(2) on a radio channel.

Annex 3-2-11

RECOMMENDATION 491-1

TRANSLATION BETWEEN AN IDENTITY NUMBER AND IDENTITIES FOR DIRECT-PRINTING TELEGRAPHY IN THE MARITIME MOBILE SERVICE

(Question 5/8)

(1974-1986)

The CCIR,

CONSIDERING

(a) that, according to Article 25 of the Radio Regulations, a station shall be identified either by a call sign or by other recognized means of identification, such as a ship station selective call number or signal, or coast station selective call number or signal;

(b) that the call signals described in Recommendations 476 and 625 effectively provide for selective-calling numbers for use with direct-printing telegraph equipment;

(c) that this signal is unique for each station and may therefore be used as its identification;

(d) that the use of this signal makes unattended operation of direct-printing equipment possible;

(e) that it would be convenient if the numbers assigned in accordance with Article 25, Sections V and VI of the Radio Regulations were used in the phasing procedure;

(f) that there is a need for a conversion scheme from numerical identification to the identification signals used in the call signal,

UNANIMOUSLY RECOMMENDS

1. that, in direct-printing telegraphy systems, the call signals described in Recommendations 476 and 625 may be used as identification of a radio station;

2. that the conversion from the numerical identification to the identification signals used in the call signal should be performed according to the Tables in Annexes I and II.

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ANNEX I

TRANSLATION BETWEEN A 5- OR 4-DIGIT IDENTITY NUMBER
AND A 4-SIGNAL IDENTITY

To translate a number, proceed as follows:

For a 5-digit number let the first digit determine which vertical column in Table I to use. Translate the last four digits to four alphabetic characters as indicated for each digit in the column selected in accordance with the table of conversion as given in Table I.

For a 4-digit number Table II should be used.

Examples:

The 5-digit number 32610 is transmitted as:	Q (RQ) C	X T (RQ)
The 4-digit number 1234 is transmitted as:	X (RQ) Q	K M (RQ)

TABLE I

5-digit numbers										
1st digit		0	1	2	3	4	5	6	7	8	9
2nd digit	0	T	V	V	V	T	T	T	V	V	V
	1	B	X	X	X	B	B	B	X	X	X
	2	U	Q	Q	Q	U	U	U	Q	Q	Q
	3	E	K	K	K	E	E	E	K	K	K
	4	O	M	M	M	O	O	O	M	M	M
	5	I	P	P	P	I	I	I	P	P	P
	6	R	C	C	C	R	R	R	C	C	C
	7	Z	Y	Y	Y	Z	Z	Z	Y	Y	Y
	8	D	F	F	F	D	D	D	F	F	F
	9	A	S	S	S	A	A	A	S	S	S
3rd digit	0	V	T	V	V	T	V	V	T	T	V
	1	X	B	X	X	B	X	X	B	B	X
	2	Q	U	Q	Q	U	Q	Q	U	U	Q
	3	K	E	K	K	E	K	K	E	E	K
	4	M	O	M	M	O	M	M	O	O	M
	5	P	I	P	P	I	P	P	I	I	P
	6	C	R	C	C	R	C	C	R	R	C
	7	Y	Z	Y	Y	Z	Y	Y	Z	Z	Y
	8	F	D	F	F	D	F	F	D	D	F
	9	S	A	S	S	A	S	S	A	A	S
4th digit	0	V	V	T	V	V	T	V	T	V	T
	1	X	X	B	X	X	B	X	B	X	B
	2	Q	Q	U	Q	Q	U	Q	U	Q	U
	3	K	K	E	K	K	E	K	E	K	E
	4	M	M	O	M	M	O	M	O	M	O
	5	P	P	I	P	P	I	P	I	P	I
	6	C	C	R	C	C	R	C	R	C	R
	7	Y	Y	Z	Y	Y	Z	Y	Z	Y	Z
	8	F	F	D	F	F	D	F	D	F	D
	9	S	S	A	S	S	A	S	A	S	A
5th digit	0	V	V	V	T	V	V	T	V	T	T
	1	X	X	X	B	X	X	B	X	B	B
	2	Q	Q	Q	U	Q	Q	U	Q	U	U
	3	K	K	K	E	K	K	E	K	E	E
	4	M	M	M	O	M	M	O	M	O	O
	5	P	P	P	I	P	P	I	P	I	I
	6	C	C	C	R	C	C	R	C	R	R
	7	Y	Y	Y	Z	Y	Y	Z	Y	Z	Z
	8	F	F	F	D	F	F	D	F	D	D
	9	S	S	S	A	S	S	A	S	A	A

TABLE II

4-digit numbers		
1st digit	0	V
	1	X
	2	Q
	3	K
	4	M
	5	P
	6	C
	7	Y
	8	F
	9	S
2nd digit	0	V
	1	X
	2	Q
	3	K
	4	M
	5	P
	6	C
	7	Y
	8	F
	9	S
3rd digit	0	V
	1	X
	2	Q
	3	K
	4	M
	5	P
	6	C
	7	Y
	8	F
	9	S
4th digit	0	V
	1	X
	2	Q
	3	K
	4	M
	5	P
	6	C
	7	Y
	8	F
	9	S

ANNEX II

TRANSLATION BETWEEN A 9-DIGIT IDENTITY NUMBER
AND A 7-SIGNAL IDENTITY

A 9-digit identity number is translated into a 7-signal identity by following the procedure described below:

Step 1 : Divide the 9-digit number by 20 resulting in an integer I 1 and a remainder R1;

Step 2 : If the resulting integer is unequal to zero, divide the integer again by 20 resulting in a new integer (I 2) and a new remainder (R2);

Step 3 : Repeat Step 2 until the resulting integer becomes zero; this will require up to seven divisions;

Step 4 : If the integer becomes zero before seven divisions have been carried out, the remainders yet to be obtained shall be set to zero (e.g. if I 4 is the first integer which is zero, then R5, R6 and R7 will all be zero);

Step 5 : Translate the remainders R1, R2, R3, R4, R5, R6 and R7, into the identification signals IS7, IS6, IS5, IS4, IS3, IS2 and IS1, respectively, in accordance with Table III.

A 7-signal identity is converted into a 9-digit identity number by following the procedure described below:

Step 1 : Convert IS1-IS7 to the numerical values R7-R1 respectively using Table III.

Step 2 : The 9-digit identity number is then given by the following formula:

$$\text{9-digit No.} = 20^0R1 + 20R2 + 20^2R3 + 20^3R4 + 20^4R5 + 20^5R6 + 20^6R7.$$

TABLE III

Remainder (R)	Identification signal (IS)
0	V
1	X
2	Q
3	K
4	M
5	P
6	C
7	Y
8	F
9	S
10	T
11	B
12	U
13	E
14	O
15	I
16	R
17	Z
18	D
19	A

Example:

The 9-digit number 364775427 is transmitted as:

Call block 1:	P (RQ) E
Call block 2:	(RQ) A R
Call block 3:	D B Y

364775427 divided by 20 results in I 1 = 18238771 and R1 = 7 → IS7 = Y
18238771 divided by 20 results in I 2 = 911938 and R2 = 11 → IS6 = B
911938 divided by 20 results in I 3 = 45596 and R3 = 18 → IS5 = D
45596 divided by 20 results in I 4 = 2279 and R4 = 16 → IS4 = R
2279 divided by 20 results in I 5 = 113 and R5 = 19 → IS3 = A
113 divided by 20 results in I 6 = 5 and R6 = 13 → IS2 = E
5 divided by 20 results in I 7 = 0 and R7 = 5 → IS1 = P

Annex 3-2-12

RECOMMENDATION ITU-R M.492-6*

OPERATIONAL PROCEDURES FOR THE USE OF DIRECT-PRINTING TELEGRAPH EQUIPMENT IN THE MARITIME MOBILE SERVICE

(Question ITU-R 5/8)

(1974-1978-1982-1986-1990-1992-1995)

Summary

The Recommendation provides in Annex 1 operational procedures for the use of direct-printing telegraph equipment in communication between a ship and a coast station in the selective ARQ-mode on a fully automated or semi-automated basis and to a number of ship stations or a single ship in the broadcast FEC-mode. It also specifies interworking between equipments in accordance with technical characteristics given in Recommendations ITU-R M.476 and ITU-R M.625. Appendix 1 contains procedures for setting up of calls.

The ITU Radiocommunication Assembly,

considering

a) that narrow-band direct-printing telegraph services are in operation using equipment as described in Recommendations ITU-R M.476, ITU-R M.625 and ITU-R M.692;

b) that an improved narrow-band direct-printing telegraph system providing automatic identification and capable of using the 9-digit ship station identity is described in Recommendation ITU-R M.625;

c) that the operational procedures necessary for such services should be agreed upon;

d) that, as far as possible, these procedures should be similar for all services and for all frequency bands (different operational procedures may be required in frequency bands other than the HF and MF bands);

e) that a large number of equipments complying with Recommendation ITU-R M.476 exist;

f) that interworking between equipments in accordance with Recommendations ITU-R M.476 and ITU-R M.625 is required, at least for a transitionary period,

recommends

1 that the operational procedures given in Annex 1 be observed for the use of narrow-band direct-printing telegraph equipment in accordance with either Recommendation ITU-R M.476 or ITU-R M.625 in the MF and HF bands of the maritime mobile service;

2 that when using direct-printing telegraphy or similar systems in any of the frequency bands allocated to the maritime mobile service, the call may, by prior arrangement, be made on a working frequency available for such systems.

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* This Recommendation should be brought to the attention of the International Maritime Organization (IMO) and the Telecommunication Standardization Sector (ITU-T).

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ANNEX 1

Operational procedures

1 Mode A (ARQ)

1.1 Methods used for setting up narrow-band direct-printing telegraph communications between a ship station and a coast station in the ARQ-mode should be on a fully automatic or semi-automatic basis, insofar that a ship station should have direct access to a coast station on a coast station receiving frequency and a coast station should have direct access to a ship station on a coast station transmitting frequency.

1.2 However, where necessary, prior contact by Morse telegraphy, radiotelephony or other means is not precluded.

1.3 Through connection to a remote teleprinter station over a dedicated circuit or to a subscriber of the international telex network may be achieved by manual, semi-automatic or automatic means.

NOTE 1 – Before an international automatic service can be introduced, agreement has to be reached on a numbering plan, traffic routing and charging. This should be considered by both the ITU-T and the ITU-R.

NOTE 2 – Recommendations ITU-R M.476 (see § 3.1.5) and ITU-R M.625 (see § 3.8) make provision for automatic re-establishment of radio circuits by rephasing in the event of interruption. However, it has been reported that this procedure has, in some countries, resulted in technical and operational problems when radio circuits are extended into the public switched network or to certain types of automated switching or store-and-forward equipments. For this reason, some coast stations do not accept messages if the rephasing procedure is used.

NOTE 3 – When a connection is set up in the ARQ mode with the international telex network via a coast station, where practicable the general requirements specified in ITU-T Recommendation U.63 should be met.

1.4 When, by prior arrangement, unattended operation is required for communication from a coast station to a ship station, or between two ship stations, the receiving ship station should have a receiver tuned to the other station's transmitting frequency and a transmitter tuned or a transmitter capable of being tuned automatically to the appropriate frequency and ready to transmit on this frequency.

1.5 For unattended operation a ship station should be called selectively by the initiating coast or ship station as provided for by Recommendations ITU-R M.476 and ITU-R M.625. The ship station concerned could have available traffic stored ready for automatic transmission on demand of the calling station.

1.6 At the "over" signal, initiated by the calling station, any available traffic in the ship's traffic store could be transmitted.

1.7 At the end of the communication, an "end of communication" signal should be transmitted, whereupon the ship's equipment should automatically revert to the "stand-by" condition.

1.8 A "free channel" signal may be transmitted by a coast station where necessary to indicate when a channel is open for traffic. The "free channel" signals should preferably be restricted to only one channel per HF band and their duration should be kept as short as possible. In accordance with Article 18 of the Radio Regulations and recognizing the heavy loading of the frequencies available for narrow-band direct printing in the HF bands, "free channel" signals should not be used in future planned systems.

1.9 The format of the "free channel" signal should be composed of signals in the 7-unit error detecting code as listed in § 2 of Annex 1 to Recommendation ITU-R M.476 and § 2 of Annex 1 to Recommendation ITU-R M.625. Three of these signals should be grouped into a block, the middle signal being the "signal repetition" (RQ), the first signal of the block being any of the signals VXKMCF TBOZA and the third signal of the block being any of the signals VMPCYFS OIRZDA (see Recommendation ITU-R M.491). These signals should be indicated in the ITU List of Coast Stations.

Selections of new signals should preferably be chosen to correspond to the first two digits of that coast station's 4-digit identification number. If this is not possible because the characters needed are not listed above, or if this is not desired because this combination is already in use by another coast station, it is preferred that a combination of characters be selected from those listed above in the second part of each row, i.e. TBOZA for the first signal and OIRZDA for the third signal of the free channel block. The signals in the block are transmitted at a modulation rate of 100 Bd and the blocks are separated by pauses of 240 ms. For manual systems this "free channel" signal should be interrupted either by a period of no signal or by a signal or signals, that would enable an operator to recognize the "free channel" condition by ear. An aurally recognizable signal, e.g. a Morse signal, may be used alone as the "free channel" signal in manual systems. At least 8 blocks of the 7-unit signal should be transmitted before interruption.

1.10 In the case of single frequency operation, as described in Recommendation ITU-R M.692, the free channel signal should be interrupted by listening periods of at least 3 s.

1.11 General operational procedures for setting up calls between ship stations and between ship stations and coast stations are given below and specific procedures are given in Appendix 1.

1.12 Manual procedures

1.12.1 Ship to coast station

1.12.1.1 The operator of the ship station establishes communication with the coast station by A1A Morse telegraphy, telephony or by other means using normal calling procedures. The operator then requests direct-printing communication, exchanges information regarding the frequencies to be used and, when applicable, gives the ship station the direct-printing selective call number assigned in accordance with Recommendation ITU-R M.476 or ITU-R M.625 as appropriate, or the ship station identity assigned in accordance with the Preface to List VII A.

1.12.1.2 The operator of the coast station then establishes direct-printing communication on the frequency agreed, using the appropriate identification of the ship.

1.12.1.3 Alternatively the operator of the ship station, using the direct-printing equipment, calls the coast station on a predetermined coast station receive frequency using the identification of the coast station assigned in accordance with Recommendation ITU-R M.476 or ITU-R M.625 as appropriate, or the coast station identity assigned in accordance with the Preface to List VII A.

1.12.1.4 The operator of the coast station then establishes direct-printing communication on the corresponding coast station transmit frequency.

1.12.2 Coast station to ship

1.12.2.1 The operator of the coast station calls the ship station by A1A Morse telegraphy, telephony or other means, using normal calling procedures.

1.12.2.2 The operator of the ship station then applies the procedures of § 1.12.1.1 or § 1.12.1.3.

1.12.3 Intership

1.12.3.1 The operator of the calling ship station establishes communication with the called ship station by A1A Morse telegraphy, telephony, or by other means, using normal calling procedures. The operator then requests direct-printing communication, exchanges information regarding the frequencies to be used and, when applicable, gives the direct-printing selective call number of the calling ship station assigned in accordance with Recommendation ITU-R M.476 or ITU-R M.625 as appropriate, or the ship station identity assigned in accordance with the Preface to List VII A.

1.12.3.2 The operator of the called ship station then establishes direct-printing communication on the frequency agreed, using the appropriate identification of the calling ship.

1.13 Procedures for automatic operation

1.13.1 Ship to coast station

1.13.1.1 The ship station calls the coast station on a predetermined coast station receive frequency, using the direct-printing equipment and the identification signal of the coast station assigned in accordance with Recommendation ITU-R M.476 or ITU-R M.625 as appropriate, or the coast station identity assigned in accordance with the Preface to List VII A.

1.13.1.2 The coast station's direct-printing equipment detects the call and the coast station responds directly on the corresponding coast station transmit frequency, either automatically or under manual control.

1.13.2 Coast station to ship

1.13.2.1 The coast station calls the ship station on a predetermined coast station transmit frequency, using the direct-printing equipment and the ship station direct-printing selective call number assigned in accordance with Recommendation ITU-R M.476 or ITU-R M.625 as appropriate, or the ship station identity assigned in accordance with the Preface to List VII A.

1.13.2.2 The ship station's direct-printing equipment tuned to receive the predetermined coast station transmit frequency detects the call, whereupon the reply is given in one of the following ways:

a) the ship station replies either immediately on the corresponding coast station receive frequency or at a later stage, using the procedure of § 1.12.1.3; or

b) the ship station's transmitter is automatically started on the corresponding coast station receive frequency and the direct-printing equipment responds by sending appropriate signals to indicate readiness to receive traffic automatically.

1.14 Message format

1.14.1 Where the appropriate facilities are provided by the coast station, traffic may be exchanged with the telex network:

a) in a conversational mode where the stations concerned are connected directly, either automatically or under manual control; or

b) in a store-and-forward mode where traffic is stored at the coast station until the circuit to the called station can be set up, either automatically or under manual control.

1.14.2 In the shore-to-ship direction, the message format should conform to normal telex network practice (see also Appendix 1, § 2).

1.14.3 In the ship-to-shore direction, the message format should conform to the operational procedures specified in Appendix 1, § 1.

2 Mode B (FEC)

2.1 Messages may, by prior arrangement, be sent in the B mode from a coast station or a ship station to a number of ships or to a single ship, preceded if desired by the selective call code of the ship(s) concerned where:

2.1.1 a receiving ship station is not permitted or not able to use its transmitter, or

2.1.2 communications are intended for more than one ship, or

2.1.3 unattended reception of the B mode is required and automatic acknowledgement is not necessary.

In such cases, the ship station receivers should be tuned to the appropriate coast or ship station transmitting frequency.

2.2 All B mode messages should start with "carriage return" and "line feed" signals.

2.3 When the ship station receives phasing signals in the B mode, its teleprinter should start automatically and should stop automatically when reception of the emission ceases.

2.4 Ship stations may acknowledge the reception of B mode messages by A1A Morse telegraphy, telephony or by other means.

3 Inter-working between equipments in accordance with Recommendations ITU-R M.476 and ITU-R M.625

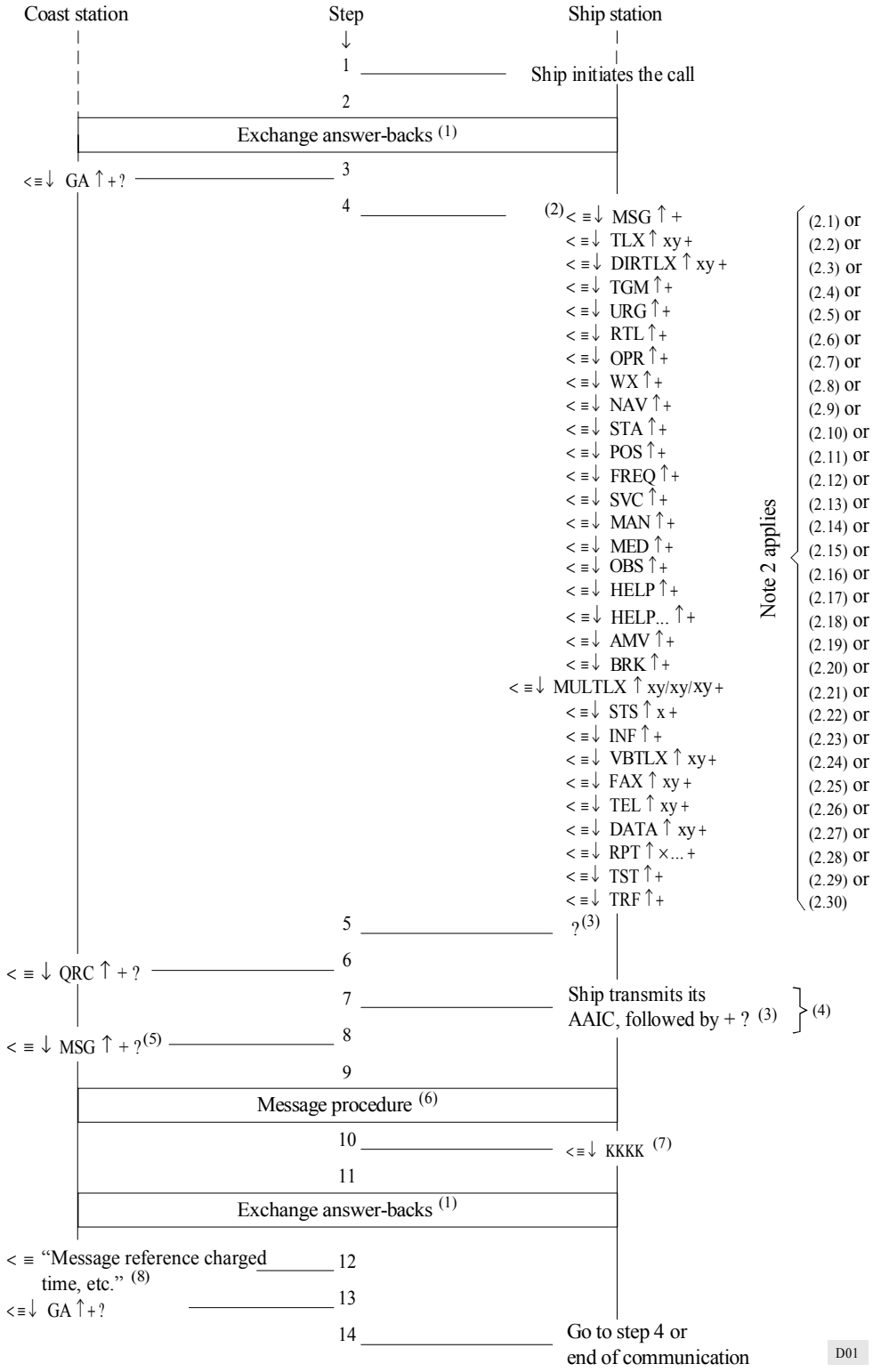
3.1 Recommendation ITU-R M.625 provides for automatic inter-working with equipment which is in accordance with Recommendation ITU-R M.476. The criteria for determining whether one or both stations are of the Recommendation ITU-R M.476 type are the length of the call signal and the composition of the call blocks.

3.2 If both stations have equipment in accordance with Recommendation ITU-R M.625, automatic station identification is a part of the automatic call set-up procedures. However, if one or both stations have equipment in accordance with Recommendation ITU-R M.476, no automatic station identification takes place. For this reason, and because Recommendation ITU-R M.625 accommodates the use of the 9-digit ship station identity for the direct-printing equipment call signal, it is desirable that all new equipment be in accordance with Recommendation ITU-R M.625 at the earliest practicable time.

3.3 In order to attain full compatibility with the large number of existing equipment, it will be necessary to assign both a 9-digit and a 5- (or 4-) digit identity (i.e. 7- and 4-signal call signals) to such new stations. Ship and coast station lists should contain both signals.

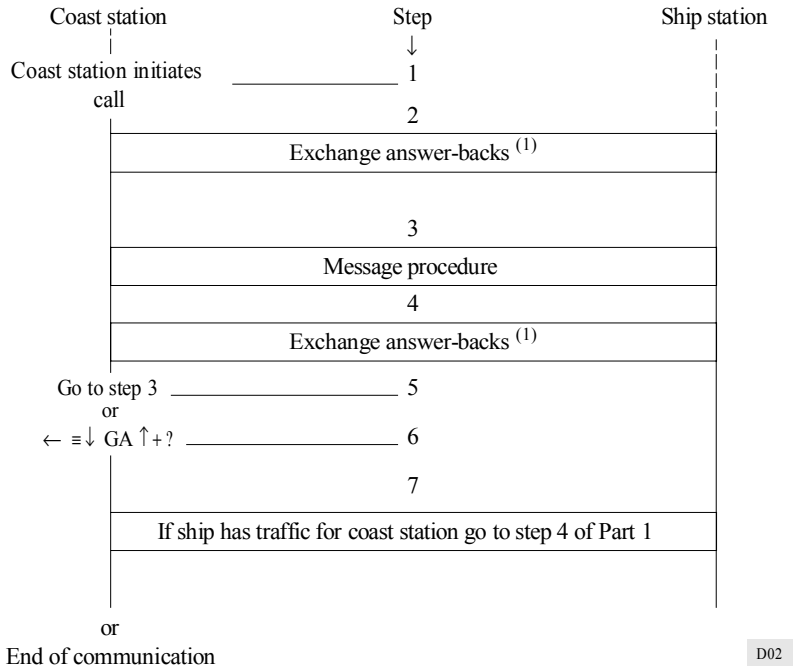
APPENDIX 1

1 Procedure for setting up a call in the ship-to-coast station direction



2 Procedure for setting up a call in the coast-to-ship station direction

Operation in the direction coast station to ship may need to be in the store-and-forward mode owing to the fact that radio propagation conditions may not allow the setting up of a call at the intended time.



Notes relative to § 1 and 2:

(1) a) In automatic operation the answer-back exchange is initiated and controlled by the coast station. For calls set up by the ship station the answer-back exchange in manual operation may be initiated by the ship station.

For calls set up by the coast station the answer-back exchange in manual operation is initiated by the coast station, thereby defining the order in which the exchange takes place.

b) Answer-back code as defined in ITU-T Recommendations F.130 for ship stations and F.60 for coast stations.

(2) A coast station need not provide all of the facilities indicated. However, where specific facilities are provided, the facility codes indicated should be used. The facility "HELP" should always be available.

(2.1) MSG indicates that the ship station needs to immediately receive any messages held for it at the coast station.

(2.2) TLX ↑ xy indicates that the following message is for immediate connection to a store-and-forward facility located at the coast station.

y indicates the subscriber's national telex number.

x is used where applicable to indicate the country code (ITU-T Recommendation F.69) preceded by 0 (when applicable). (Where the store-and-forward system is remote from the coast station, TLX alone may be used.)

TLXA may optionally be used instead of TLX which indicates that ship wishes to be advised (using the normal shore-to-ship procedures) when the message has been delivered to the indicated telex number.

(2.3) DIRTLX ↑ xy indicates that a direct telex connection is required.

y indicates the subscriber's national telex number.

x is used where applicable to indicate the country code (ITU-T Recommendation F.69) preceded by 0 (when applicable).

RDL + may optionally be used to indicate that the last DIRTLX ↑ xy telex number should be redialled.

(2.4) TGM indicates that the following message is a radio telegram.

(2.5) URG indicates that the ship station needs to be connected immediately to a manual assistance operator and an audible alarm may be activated. This code should only be used in case of emergency.

(2.6) RTL indicates that the following message is a radio telex letter.

(2.7) OPR indicates that connection to a manual assistance operator is required.

(2.8) WX indicates that the ship station needs to immediately receive weather information.

(2.9) NAV indicates that the ship station needs to immediately receive navigational warnings.

(2.10) STA indicates that the ship station needs to immediately receive a status report of all store-and-forward messages which have been sent by that ship station, but which the ship station has not already received on retransmitted or non-delivered information (see also (6)). STA ↑ x may also be used where the ship station needs to immediately receive a status report of such a message where x indicates the message reference provided by the coast station.

(2.11) POS indicates that the following message contains the ship's position. Some administrations use this information to assist in the subsequent automatic transmission or reception of messages (e.g. for calculating the optimum traffic frequency and/or the appropriate directional antennas to use).

(2.12) FREQ indicates that the following message indicates the frequency on which the ship is keeping watch.

(2.13) SVC indicates that the following message is a service message (for subsequent manual attention).

(2.14) MAN indicates that the following message is to be stored and manually forwarded to a country which cannot be accessed automatically.

(2.15) MED indicates that an urgent medical message follows.

(2.16) OBS indicates that the following message is to be sent to the meteorological organization.

(2.17) HELP indicates that the ship station needs to immediately receive a list of available facilities within the system.

(2.18) If information is needed on the application of procedures for individual facilities at a coast station, request for further details concerning the specific procedure can be obtained by the facility code HELP followed by the appropriate facility code for which the information is needed, e.g.: < ≡ ↓HELP DIRTLX ↑ + indicates that the ship station needs information on the procedures (action by ship operator) for ordering a dialogue-mode connection with a telex network subscriber via the coast station.

(2.19) AMV indicates that the following message is to be sent to the AMVER organization.

(2.20) BRK indicates that the use of the radio path is to be immediately discontinued (for use where the ship's operator can only use a teleprinter for controlling the ARQ equipment).

(2.21) MULTLX ↑ xy/xy/xy€+ indicates that the following message is a multiple address message for immediate connection to a store-and-forward facility located at the coast station.

y indicates the subscriber's national telex number.

x is used where applicable to indicate the country code (ITU-T Recommendation F.69) preceded by 0 (when applicable).

Each separate xy indicates a different telex number to which the same message should be forwarded. At least two separate telex numbers should be included.

MULTLXA may optionally be used instead of MULTLX which indicates that the ship wishes to be advised (using the normal shore-to-ship procedures) when the messages have been delivered to the indicated telex numbers.

(2.22) STS ↑ x + indicates that the following message is for transmission to a ship using a store-and-forward facility located at the coast station. x indicates the addressed ship's 5- or 9-digit identity number.

(2.23) INF indicates that the ship station needs to immediately receive information from the coast station's database. Some administrations provide a variety of different database information in which case INF returns a directory listing and a subsequent facility code is used to select the desired information.

(2.24) VBTLX ↑ xy indicates that the following message should be dictated, by the coast station, to a voicebank (voice messaging) telephone number for subsequent retrieval by the addressee, and that a copy of the message should be forwarded to telex number xy. The voicebank telephone number should be included in the first line of the message text.

(2.25) FAX ↑ xy indicates that the following message should be forwarded, via the PSTN, by facsimile to the telephone number xy.

(2.26) TEL ↑ xy indicates that the following message should be telephoned, by the coast station, to the telephone number xy.

(2.27) DATA ↑ xy indicates that the following message should be forwarded by the coast station using data facilities to the subscriber number xy (via the PSTN).

(2.28) RPT ↑ xy… indicates that the ship needs to receive, using the ARQ mode, a specific identified message (e.g., earlier transmitted in the FEC mode), if still available for automatic retransmission. x… is used as the message identifier.

(2.29) TST indicates that the ship needs to receive an automatically transmitted test text (e.g. "the quick brown fox …").

(2.30) TRF indicates that the ship needs to receive information, automatically transmitted, on tariffs currently applicable to the coast station.

(3) The symbol "?" is not necessary where the coast station is automatic. It is normally required only for manual systems.

(4) In cases where the coast station requires information about the relevant Accounting Authority Identification Code (AAIC), this information should be provided by the ship operator on receipt of the combination < ≡ ↓ QRC ↑ + from the coast station.

Some coast stations may request additional information, e.g. ship's name, call sign, etc.

(5) This sequence may be preceded where necessary by suitable prompts or facility selection information and, if appropriate, any consequent ship station reply, or may be deleted where not applicable (e.g. where facility codes WX, NAV, STA, MSG or HELP are input at step 4). Where facility code DIRTLX ↑ xy was input at step 4, this sequence may be replaced by the distant end answer-back or by any service signal (e.g. NC, OCC, etc.) received from the telex network.

(6) Message procedures depend on which facility is used:

For TLX where the store-and-forward system is remote from the coast station, ITU-T Recommendation F.72 may apply. Where the store-and-forward system is located at the coast station, the complete information content of the message sent at this step will be forwarded to the subscriber whose telex number is given by xy.

For DIRTLX, see ITU-T Recommendation F.60.

For TGM, see ITU-T Recommendations F.1 and F.31.

For SVC and MED, the message will normally be plain text and no specific message procedure is required.

For RTL, the message will be plain text but should include the postal address of the addressee.

For STA, the appropriate status information is returned to the ship in accordance with ITU-T Recommendation F.72, § 11.3 and 11.4.

For POS and FREQ, specific national procedures may apply.

(7) This sequence of 4 K's "KKKK" (4 combination No. 11 signals in the letter case) indicates that any network connection should be cleared but that the radio path should be maintained and that the procedure should immediately proceed to step 11. This sequence may be used elsewhere in the procedure in which case the procedure reverts to step 3.

(8) This step is optional and may not apply to all facilities.

Annex 3-2-13

RECOMMENDATION ITU-R M.625-3*

DIRECT-PRINTING TELEGRAPH EQUIPMENT EMPLOYING AUTOMATIC IDENTIFICATION IN THE MARITIME MOBILE SERVICE**

(Question ITU-R 5/8)

(1986-1990-1992-1995)

Summary

The Recommendation provides in Annex 1 characteristics of direct-printing telegraph equipment employing a 7-unit ARQ method for selective communication, a 7-unit FEC method for broadcast mode and automatic identification to be used for newly developed equipment to provide compatibility with existing equipment conforming to Recommendation ITU-R M.476.

The ITU Radiocommunication Assembly,

considering

a) that there is a requirement to interconnect ship stations or ship stations and coast stations, equipped with start-stop apparatus employing the ITU-T International Telegraph Alphabet No. 2, by means of radiotelegraph circuits;

b) that direct-printing telegraph equipment in the maritime mobile service is used for:

– telex and/or telegraph service between a ship station and a subscriber of the (international) telex network;

– telegraph service between a ship station and a coast station or between two ship stations;

– telegraph service between a ship station and an extended station (ship owner) via a coast station;

– telegraph service in a broadcast mode from a coast station, or a ship station, to one or more ship stations;

c) that the broadcast mode cannot take advantage of an ARQ method, as a return path is not used;

d) that for the broadcast mode a forward error-correcting (FEC) method should be used;

e) that the period for synchronization and phasing should be as short as possible;

f) that most of the ship stations do not readily permit the simultaneous use of radio transmitter and receiver;

g) that a direct-printing telegraph system employing error-detecting and error-correcting methods in accordance with Recommendation ITU-R M.476, is in actual operation;

h) that the increased use of direct-printing telegraph equipment has emphasized the importance of an unambiguous identification of both stations when a circuit is established or re-established;

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* This Recommendation should be brought to the attention of the International Maritime Organization (IMO) and the Telecommunication Standardization Sector (ITU-T).

** Newly developed equipment should conform to the present Recommendation which provides for compatibility with existing equipment built in accordance with Recommendation ITU-R M.476.

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j) that unambiguous identification could be accomplished by the exchange of self-identification signals between the ARQ equipments at the 7-unit level;

k) that Appendix 43 of the Radio Regulations (RR), Recommendation ITU-R M.585 and ITU-T Recommendations E.210 and F.120 provide for a comprehensive system of assigning maritime mobile service identities;

l) that, in the interest of having a unique identity assigned to each ship station for distress and safety and other telecommunication purposes, the address capability should allow the use of maritime mobile service identities in accordance with the provisions of Appendix 43 of the RR;

m) that equipment built in accordance with Recommendation ITU-R M.476 cannot provide for the use of maritime mobile service identities mentioned in § k);

n) that there is a need to provide for compatibility to the extent possible with equipments built in accordance with Recommendation ITU-R M.476; however, unambiguous identification of both stations cannot be achieved when circuits are established with equipments built in accordance with Recommendation ITU-R M.476,

recommends

1 that for direct-printing telegraph circuits in the maritime mobile service, a 7-unit ARQ method should be employed;

2 that for the direct-printing telegraph service in the broadcast mode, a 7-unit forward acting error-correcting method, using time diversity, should be employed;

3 that equipment designed in accordance with § 1 and 2 should employ automatic identification and have the characteristics given in Annex 1.

ANNEX 1

CONTENTS

			Page
1	General (mode A (ARQ) and mode B (FEC))		4
2	Conversion tables		4
	2.1	General	4
	2.2	Traffic information signals	4
	2.3	Service information signals	4
	2.4	Identification and check-sum numbers and signals	6
	2.5	Check-sum signal derivation	6
3	Characteristics, mode A (ARQ)		7
	3.1	General	7
	3.2	Master and slave arrangements	7
	3.3	The information sending station (ISS)	7
	3.4	The information receiving station (IRS)	7
	3.5	Phasing procedure	8
	3.6	Automatic identification	9
	3.7	Traffic flow	11
	3.8	Rephasing procedure	12
	3.9	Summary of service blocks and service information signals	14
4	Characteristics, mode B (FEC)		14
	4.1	General	14
	4.2	The sending station (CBSS and SBSS)	14
	4.3	The receiving station (CBRS and SBRS)	15
	4.4	Phasing procedure	15
	4.5	Selecting calling procedure (selective B-mode)	15
	4.6	Traffic flow	15

Page

Appendix 1 – SDL diagrams (mode A) 27

Appendix 2 – Phasing procedure with automatic identification in the case of a 7-signal call identity (calling station) 31

Appendix 3 – Rephasing procedure with automatic identification in the case of a 7-signal call identity (calling station) 34

Appendix 4 – Phasing procedure without automatic identification in the case of a 4-signal call identity (calling station) 37

Appendix 5 – Rephasing procedure without automatic identification in the case of a 4-signal call identity (calling station) 38

Appendix 6 – Phasing procedure with automatic identification in the case of a 7-signal call identity (called station) 39

Appendix 7 – Rephasing procedure with automatic identification in the case of a 7-signal call identity (called station) 42

Appendix 8 – Phasing procedure without automatic identification in the case of a 4-signal call identity (called station) 45

Appendix 9 – Rephasing procedure without automatic identification in the case of a 4-signal call identity (called station)..... 46

Appendix 10 – Traffic flow in the case of a 4-signal call identity and in the case of a 7-signal call identity (station is in the ISS position) 47

Appendix 11 – Traffic flow in the case of a 4-signal call identity and in the case of a 7-signal call identity (station is in the IRS position)..... 50

Appendix 12 – State overview diagrams 52

Sheet 1 – Phasing procedure with automatic identification in the case of a 7-signal call identity (calling station) and traffic flow if the station is in the ISS position..... 52

Sheet 2 – Rephasing procedure with automatic identification in the case of a 7-signal call identity (calling station) and traffic flow if the station is in the ISS position..... 53

Sheet 3 – Phasing procedure without automatic identification in the case of a 4-signal call identity (calling station) and traffic flow if the station is in the ISS position..... 54

Sheet 4 – Rephasing procedure without automatic identification in the case of a 4-signal call identity (calling station) and traffic flow if the station is in the ISS position..... 55

Sheet 5 – Phasing procedure with automatic identification in the case of a 7-signal call identity (called station) and traffic flow if the station is in the IRS position 56

Sheet 6 – Rephasing procedure with automatic identification in the case of a 7-signal call identity (called station) and traffic flow if the station is in the IRS position 57

Sheet 7 – Phasing procedure without automatic identification in the case of a 4-signal call identity (called station) and traffic flow if the station is in the IRS position 58

Sheet 8 – Rephasing procedure without automatic identification in the case of a 4-signal call identity (called station) and traffic flow if the station is in the IRS position 59

1 General (mode A (ARQ) and mode B (FEC))

1.1 The system in both Mode A (ARQ) and Mode B (FEC) is a single-channel synchronous system using the 7-unit constant ratio error-detecting code as listed in § 2.2 and 2.3.

1.2 FSK modulation is used on the radio link at 100 Bd. The equipment clock controlling the modulation rate should have an accuracy of 30 parts in 10^6 or better.

1.3 The class of emission is F1B or J2B with a frequency shift on the radio link of 170 Hz. When frequency shift is effected by applying audio signals to the input of a single-sideband transmitter, the centre frequency of the audio spectrum applied to the transmitter should be 1 700 Hz.

1.4 The radio-frequency tolerance of the transmitter and the receiver should be in accordance with Recommendation ITU-R SM.1137. It is desirable that the receiver employs the minimum practicable bandwidth (see also Report ITU-R M.585).

NOTE 1 – The receiver 6 dB bandwidth should preferably be between 270 and 340 Hz.

1.5 For direct connection to the international telex network, the line input and output signals should be in accordance with the 5-unit start-stop International Telegraph Alphabet No. 2, at a modulation rate of 50 Bd.

1.6 Equipment designed in accordance with this Recommendation is likely to contain high speed digital circuitry. Special care should be taken to avoid interference to other equipment and to minimize susceptibility to interference from other equipment or electrical lines on board ship (see also Recommendation ITU-R M.218).

1.7 When operating in mode A (ARQ), the called station employs a constant time interval between the end of the received signal and the start of the transmitted signal (t_E in Fig. 1). In the case of long propagation distances it is essential to have this t_E as short as practicable. However, in the case of short distances it may be desirable to introduce a longer time interval, e.g. 20-40 ms, to accommodate receiver desensitization at the calling station. This time interval can be introduced at the called station either in the ARQ equipment or in the radio equipment.

2 Conversion tables

2.1 General

Several kinds of "signals" are used in the system, such as:

– traffic information signals,

– service information signals (control signals, idle signals, signal repetition),

– identification signals,

– check-sum signals.

2.2 Traffic information signals

These signals are used during communication to convey the message information which is passed from an information sending station to one or more information receiving stations. Table 1 lists the traffic information signals which may be used.

2.3 Service information signals

These signals are used to control the procedures taking place over the radio circuit and do not form part of the transmitted messages. Service information signals are not normally printed or displayed. Table 2 lists the service information signals which may be used.

TABLE 1

Combination No.	Traffic information signals		International Telegraph Alphabet No. 2 Code (1)	Transmitted 7-unit signal (2)
	Letter-case	Figure case	Bit position (3) 1 2 3 4 5	Bit position (3) 1 2 3 4 5 6 7
1	A	–	ZZAAA	BBBYYYB
2	B	?	ZAAZZ	YBYYBBB
3	C	:	AZZZA	BYBBBYY
4	D	⌧ (4)	ZAAZA	BBYYBYB
5	E	3	ZAAAA	YBBYBYB
6	F	(5)	ZAZZA	BBYBBYY
7	G	(5)	AZAZZ	BYBYBBY
8	H	(5)	AAZAZ	BYYBYBB
9	I	8	AZZAA	BYBBYYB
10	J	⍾ (Audible signal)	ZZAZA	BBBYBYY
11	K	(	ZZZZA	YBBBBYY
12	L	)	AZAAZ	BYBYYBB
13	M	.	AAZZZ	BYYBBBY
14	N	,	AAZZA	BYYBBYB
15	O	9	AAAZZ	BYYYBBB
16	P	0	AZZAZ	BYBBYBY
17	Q	1	ZZZAZ	YBBBYBY
18	R	4	AZAZA	BYBYBYB
19	S	’	ZAZAA	BBYBYYB
20	T	5	AAAAZ	YYBYBBB
21	U	7	ZZZAA	YBBBYYB
22	V	=	AZZZZ	YYBBBBY
23	W	2	ZZAAZ	BBBYYBY
24	X	/	ZAZZZ	YBYBBBY
25	Y	6	ZAZAZ	BBYBYBY
26	Z	+	ZAAAZ	BBYYYBB
27	← (Carriage return)		AAAZA	YYYBBBB
28	≡ (Line feed)		AZAAA	YYBBYBB
29	↓ (Letter shift)		ZZZZZ	YBYBBYB
30	↑ (Figure shift)		ZZAZZ	YBBYBBY
31	△ (Space)		AAZAA	YYBBBYB
32	□ No information		AAAAA	YBYBYBB

(1) A represents start polarity, Z represents stop polarity (see also Recommendation ITU-R M.490).

(2) B represents the higher emitted frequency and Y the lower (see also Recommendation ITU-R M.490).

(3) The bit in bit position 1 is transmitted first; B = 0, Y = 1.

(4) The pictorial representation shown is a schematic of ✠ which may also be used when equipment allows (ITU-T Recommendation F.1, § C9).

(5) At present unassigned (see ITU-T Recommendation F.1, § C8). Reception of these signals, however, should not initiate a request for repetition.

TABLE 2

Mode A (ARQ)	Transmitted signal	Mode B (FEC)
Control signal 1 (CS1)	BYBYYBB	
Control signal 2 (CS2)	YBYBYBB	
Control signal 3 (CS3)	BYYBBYB	
Control signal 4 (CS4)	BYBYBBY	
Control signal 5 (CS5)	BYYBYBB	
Idle signal β	BBYYBBY	Idle signal β
Idle signal α	BBBBYYY	Phasing signal 1, Idle signal α
Signal repetition (RQ)	YBBYYBB	Phasing signal 2

2.4 Identification and check-sum numbers and signals

Identification and check-sum numbers and signals are used in the automatic identification procedure in order to provide a means by which, during the establishment or re-establishment of a radio circuit, the stations concerned are clearly and unambiguously identified to each other. The relationship between the transmitted identification signals and their equivalent numbers is shown in Table 3a; Table 3b indicates the conversion from check-sum numbers to the transmitted check-sum signals.

TABLE 3a

Identification signal (IS)	Equivalent number (N)
A	19
B	11
C	6
D	18
E	13
F	8
I	15
K	3
M	4
O	14
P	5
Q	2
R	16
S	9
T	10
U	12
V	0
X	1
Y	7
Z	17

TABLE 3b

Check-sum number (CN)	Check-sum signal (CK)
0	V
1	X
2	Q
3	K
4	M
5	P
6	C
7	Y
8	F
9	S
10	T
11	B
12	U
13	E
14	O
15	I
16	R
17	Z
18	D
19	A

2.5 Check-sum signal derivation

These identification signals IS1, IS2, IS3, IS4, IS5, IS6 and IS7 are converted into their equivalent numbers N1, N2, N3, N4, N5, N6 and N7 respectively, in accordance with Table 3a. The three numbers N1, N2 and N3 are added and the sum is translated into one check-sum number CN1 using modulo 20-addition. This process is repeated for the numbers N3, N4 and N5 resulting in a check-sum number CN2 and for the numbers N5, N6 and N7 resulting in a check-sum number CN3, as follows:

$$N1 \oplus N2 \oplus N3 = CN1$$

$$N3 \oplus N4 \oplus N5 = CN2$$

$$N5 \oplus N6 \oplus N7 = CN3$$

where $\oplus$ denotes modulo 20-addition.

The last conversion is from check-sum numbers CN1, CN2 and CN3 into “check-sum signal 1”, “check-sum signal 2” and “check-sum signal 3” respectively, in accordance with Table 3b.

Example:

The seven identification signals of station 364775427 are: P E A R D B Y (see Recommendation ITU-R M.491).

The check-sum derivation will be as follows:

P E A R D B Y $\rightarrow$ 5 13 19 16 18 11 7

5 $\oplus$ 13 $\oplus$ 19 = 17 (37-20)

19 $\oplus$ 16 $\oplus$ 18 = 13 (53-20-20)

18 $\oplus$ 11 $\oplus$ 7 = 16 (36-20)

17 13 16 $\rightarrow$ Z E R

where $\oplus$ denotes modulo 20-addition.

Result:

CK1 becomes "Z" (combination No. 26, see Table 1)

CK2 becomes "E" (combination No. 5, see Table 1)

CK3 becomes "R" (combination No. 18, see Table 1)

3 Characteristics, mode A (ARQ)

3.1 General

The system operates in a synchronous mode transmitting blocks of three signals from an information sending station (ISS) towards an information receiving station (IRS). A control signal is transmitted from the IRS to the ISS after reception of each block indicating correct reception or requesting retransmission of the block. These stations can interchange their functions.

3.2 Master and slave arrangements

3.2.1 The station that initiates the establishment of the radio circuit (the calling station) becomes the "master" station, and the station being called will be the "slave" station. This situation remains unchanged during the entire time that the established radio circuit is maintained, regardless of which station, at any given time, is the information sending station (ISS) or the information receiving station (IRS).

3.2.2 The clock in the master station controls the timing of the entire circuit (see circuit timing diagram, Fig. 1). This clock should have an accuracy of 30 parts in 10^6 or better.

3.2.3 The basic timing cycle is 450 ms and consists for each station of a transmission period followed by a transmission pause during which reception is effected.

3.2.4 The master station transmit timing is controlled by the clock in the master station.

3.2.5 The clock controlling the timing of the slave station is phase-locked to the signal received from the master station, i.e. the time interval between the end of the received signal and the start of the transmitted signal (t_E in Fig. 1) is constant (see also § 1.7).

3.2.6 The master station receive timing is phase-locked to the signal received from the slave station.

3.3 The information sending station (ISS)

3.3.1 The ISS groups the information to be transmitted into blocks of three signals (3 × 7 signal elements).

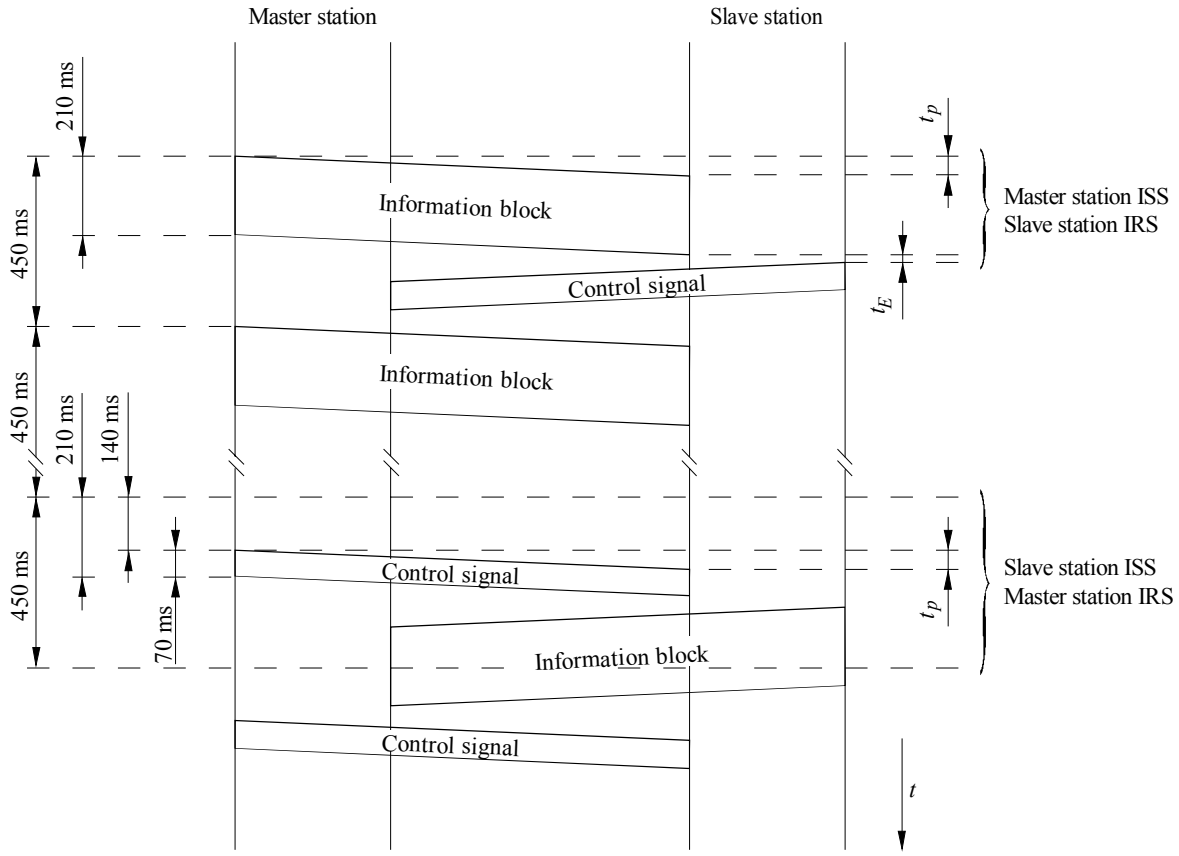
3.3.2 The ISS sends a block in 210 ms (3 × 70 ms) after which a transmission pause of 240 ms becomes effective.

3.4 The information receiving station (IRS)

3.4.1 After the reception of each block the IRS sends one signal of 70 ms duration (7-signal elements), after which a transmission pause of 380 ms becomes effective.

FIGURE 1

Basic timing diagram



t_p : (one-way) propagation time
t_E : equipment delay (see also § 1.7)

D01

3.5 Phasing procedure

3.5.1 When no circuit is established, both stations are in the "stand-by" condition. In this condition neither of the stations is designated master, slave, ISS or IRS.

3.5.2 The "call signal" contains either four or seven identification signals as applicable. The identification signals are listed in Table 3a. The composition of these "call signals" should be in accordance with Recommendation ITU-R M.491.

3.5.2.1 The equipment should be capable of operating with both 4-signal and 7-signal identity procedures and automatically employing the appropriate procedure for either, as indicated by the composition of the "call signal" received from a calling station or by the number of digits (4, 5 or 9) supplied to the equipment of a calling station to identify the station to be called.

3.5.3 The "call signal" (Note 1) contains:

– in "call block 1": in the first, second and third character places respectively: the first identification signal, the service information signal "signal repetition" and the second identification signal of the called station;

– in "call block 2": in the first, second and third character places respectively, either:

  – in the case of a 4-signal call identity: the third and the fourth identification signals of the called station and "signal repetition"; or

  – in the case of a 7-signal call identity: "signal repetition", and the third and fourth identification signals of the called station;

– in the case of a 7-signal call identity in "call block 3": the last three identification signals of the called station.

NOTE 1 – A station using a two block call signal shall be assigned a number in accordance with RR Nos. 2088, 2134 and 2143 to 2146.

A station capable of using a three block call signal, shall employ the maritime identification digits required in accordance with RR Appendix 43 when communicating with stations also capable of using a three block call signal.

3.5.4 The station required to establish the circuit becomes the master station and sends the "call signal" until it receives an appropriate control signal; however, if the circuit has not been established within 128 cycles (128 × 450 ms), the station changes into the "stand-by" condition and waits for a time of at least 128 cycles before sending the same "call signal" again.

3.5.5 The called station becomes the slave station and changes from the "stand-by" to the IRS condition:

– in the case of a 4-signal call identity following the consecutive reception of "call block 1" and "call block 2", after which it sends "control signal 1" until the first information block has been received;

– in the case of a 7-signal call identity following the reception of the three call blocks in succession after which it sends "control signal 4" until "identification block 1" has been received.

3.5.6 On receipt of two consecutive identical signals "control signal 1" or "control signal 2" the calling station changes to the ISS condition and proceeds directly with the transmission of traffic information (see § 3.7) without automatic identification.

NOTE 1 – Equipment built in accordance with Recommendation ITU-R M.476 sends "control signal 1" or "control signal 2" on receipt of the appropriate "call signal".

3.5.7 On receipt of "control signal 3" during the phasing procedure, the calling station immediately changes to the "stand-by" condition, and waits 128 cycles before sending the same "call signal" again.

NOTE 1 – Equipment built in accordance with Recommendation ITU-R M.476 may send "control signal 3" on receipt of the appropriate "call signal", if the called station is rephasing and was in the ISS condition at the moment of interruption.

3.5.8 On receipt of "control signal 5" during the phasing procedure, the calling station starts the "end-of-communication" procedure in accordance with § 3.7.14, and waits at least 128 cycles before sending the same "call signal" again. During this waiting time the station is in the "stand-by" condition.

3.6 Automatic identification

Only applicable in the case of a 7-signal call identity.

3.6.1 On receipt of "control signal 4" the calling station changes to the ISS condition and starts the identification procedure. During the identification cycle, information is exchanged about the identities of both stations; the ISS transmits its identification blocks and the IRS returns the check-sum signals derived from its identity in accordance with § 2.5. On receipt of each check-sum signal, the calling station compares this signal with the appropriate check-sum signal locally derived from the identification signals transmitted in the call blocks. If they are identical, the calling station continues with the following procedure, otherwise the procedure of § 3.6.12 is followed.

3.6.2 The ISS sends "identification block 1" containing its own first identification signal, "idle signal α" and its second identification signal in the first, second and third character places respectively.

3.6.3 On receipt of "identification block 1" the called station sends "check-sum signal 1", derived from its identity.

3.6.4 On receipt of "check-sum signal 1" the calling station sends "identification block 2" containing the first, second and third character places respectively, "idle signal α", its third identification signal and its fourth identification signal.

3.6.5 On receipt of "identification block 2" the called station sends "check-sum signal 2", derived from its identity.

3.6.6 On receipt of "check-sum signal 2" the calling station sends "identification block 3" containing its fifth, sixth and seventh identification signals in the first, second and third character places respectively.

3.6.7 On receipt of "identification block 3" the called station sends "check-sum signal 3", derived from its identity.

3.6.8 On receipt of the last check-sum signal the calling station sends the "end-of-identification block" containing three "signal repetition" signals.

3.6.9 On receipt of the "end-of-identification block" the called station sends, either:

– "control signal 1", thus starting the traffic flow in accordance with § 3.7; or

– "control signal 3", if the called station is required to start the traffic flow in the ISS condition (in accordance with § 3.7.11).

3.6.10 On receipt of "control signal 1" the calling station ends the identification cycle and starts the traffic flow by transmitting "information block 1" in accordance with § 3.7.

3.6.11 On receipt of "control signal 3" the calling station ends the identification cycle and starts the traffic flow with the change-over procedure in accordance with § 3.7.11.

3.6.12 If any received check-sum signal is not identical to the locally derived check-sum signal, the calling station retransmits the previous identification block. On receipt of this identification block, the called station sends the appropriate check-sum signal once more.

On receipt of this check-sum signal the calling station compares again. If they are still not identical, and the received check-sum signal is the same as the previous one, the calling station initiates the "end of communication" procedure in accordance with § 3.7.14; otherwise the calling station transmits the previous identification block again. Any identification block should not be retransmitted more than four times due to reception of wrong check-sum signals, after which, if the required check-sum signal is still not received, the calling station reverts to the "stand-by" condition.

3.6.13 If, due to mutilated reception, the calling station does not receive:

– "control signal 4", it continues transmitting the "call signal";

– "check-sum signal 1", it retransmits "identification block 1";

– "check-sum signal 2", it retransmits "identification block 2";

– "check-sum signal 3", it retransmits "identification block 3";

– "control signal 1" or "control signal 3", it retransmits the "end-of-identification block",

taking into account the time limit mentioned in § 3.6.18.

3.6.14 If, due to mutilated reception, the called station does not receive a block during the identification cycle, it transmits a "signal repetition", taking into account the time limit mentioned in § 3.6.18.

3.6.15 If during the identification cycle the calling station receives a "signal repetition", it retransmits the previous block.

3.6.16 If, due to retransmission of an identification block by the calling station, the identification signals as received by the called station are not identical, the called station sends "signal repetition" until two identical consecutive identification blocks are received after which the corresponding check-sum signal is transmitted, taking into account the time limit mentioned in § 3.6.18.

3.6.17 If during the identification cycle the called station receives the "end-of-communication block" (containing three "idle signals α"), it sends a "control signal 1" and reverts to the "stand-by" condition.

3.6.18 When reception of signals during the identification cycle is continuously mutilated, both stations revert to the "stand-by" condition after 32 cycles of continuous repetition.

3.6.19 Each station should retain the identity of the other station for the duration of the connection (see § 3.7.1) and this information should be accessible locally, e.g. by means of a display or on a separate output circuit for external use. However, this identity information should not appear on the output line to the network.

3.7 Traffic flow

3.7.1 At all times after the start of the traffic flow and until the station reverts to the "stand-by" condition, the station should retain the following information:

– whether it is in the master or slave condition;

– the identity of the other station (when applicable);

– whether it is in the ISS or IRS condition;

– whether the traffic flow is in the letter case or figure case condition.

3.7.2 The ISS transmits the traffic information in blocks, each block consisting of three signals. If necessary, "idle signals β" are used to complete or to fill information blocks when no traffic information is available.

3.7.3 The ISS retains the transmitted information block in memory until the appropriate control signal confirming correct reception by the IRS has been received.

3.7.4 For internal use, the IRS numbers the received information blocks alternately "information block 1" and "information block 2" dependent on the first transmitted control signal. The numbering is interrupted at the reception of, either:

– an information block in which one or more signals are mutilated; or

– an information block containing at least one "signal repetition".

3.7.5 The IRS sends "control signal 1" at the reception of, either:

– an unmutilated "information block 2"; or

– a mutilated "information block 1"; or

– an "information block 1" containing at least one "signal repetition".

3.7.6 The IRS sends "control signal 2" at the reception of, either:

– an unmutilated "information block 1"; or

– a mutilated "information block 2"; or

– an "information block 2" containing at least one "signal repetition".

3.7.7 For internal use, the ISS numbers successive information blocks alternately "information block 1" and "information block 2". The first block should be numbered "information block 1" or "information block 2" dependent on whether the received control signal is a "control signal 1" or a "control signal 2". The numbering is interrupted at the reception of, either:

– a request for repetition; or

– a mutilated control signal; or

– a "control signal 3".

3.7.8 On receipt of "control signal 1" the ISS sends "information block 1".

3.7.9 On receipt of "control signal 2" the ISS sends "information block 2".

3.7.10 On receipt of a mutilated control signal the ISS sends a block containing three "signal repetitions".

3.7.11 Change-over procedure

3.7.11.1 If the ISS is required to initiate a change in the direction of the traffic flow, the station sends the signal sequence ("↑" combination No. 30), "+" (combination No. 26), "?" (combination No. 2) followed, if necessary, by one or more "idle signals β" to complete the information block.

3.7.11.2 On receipt of the signal sequence ("+", "?" (combination No. 26 and combination No. 2)) with the traffic flow in the figure case condition, the IRS sends "control signal 3" until an information block containing the signals "idle signal β", "idle signal α", "idle signal β" has been received.

NOTE 1 – The presence of "idle signals β" between the signals "+" and "?" should not inhibit the response of the IRS.

3.7.11.3 If the IRS is required to initiate a change in the direction of the traffic flow, it sends "control signal 3".

3.7.11.4 On receipt of "control signal 3" the ISS sends an information block containing "idle signal β", "idle signal α" and "idle signal β" in the first, second and third character places respectively.

3.7.11.5 On receipt of the information block containing the service information signals "idle signal β", "idle signal α" and "idle signal β", the IRS changes to ISS and sends, either:

– an information block containing three "signal repetitions", if it is the slave station; or

– one "signal repetition", if it is the master station,

until either "control signal 1" or "control signal 2" is received, taking into account the time limit mentioned in § 3.7.12.1.

3.7.11.6 The ISS changes to IRS after the reception of, either:

– an information block containing three "signal repetitions" if it is the master station; or

– one "signal repetition" if it is the slave station,

and sends either "control signal 1" or "control signal 2" depending on whether the preceding control signal was "control signal 2" or "control signal 1", respectively, after which the traffic flow starts in the appropriate direction.

3.7.12 Time-out procedure

3.7.12.1 When reception of information blocks or of control signals is continuously mutilated, both stations revert to the "rephase" condition after 32 cycles of continuous repetition, in accordance with § 3.8.

3.7.13. Answer-back procedure

3.7.13.1 If the ISS is required to request terminal identification, the station sends the signals "↑" (combination No. 30) and "☒" (combination No. 4) followed, if necessary, by one or more "idle signals β" to complete the information block.

3.7.13.2 On receipt of an information block containing the traffic information signal "☒" (combination No. 4) with the traffic flow in the figure case condition, the IRS:

– changes the direction of the traffic flow in accordance with § 3.7.11;

– transmits the traffic information signals derived from the teleprinter answer-back code generator;

– transmits, after completion of the answer-back code, or in the absence of an answer-back code, two information blocks of three "idle signals β";

– changes the direction of the traffic flow in accordance with § 3.7.11, and reverts to IRS.

3.7.14 End-of-communication procedure

3.7.14.1 If the ISS is required to terminate the established circuit, it sends the "end-of-communication block" containing three "idle signals α", until the appropriate "control signal 1" or "control signal 2" has been received; however, the number of transmissions of the "end-of-communication block" is limited to four, after which the ISS reverts to the "stand-by" condition.

3.7.14.2 On receipt of the "end-of-communication block" the IRS sends the appropriate control signal indicating correct reception of this block, and reverts to the "stand-by" condition.

3.7.14.3 On receipt of the control signal that confirms the unmutilated reception of the "end-of-communication block", the ISS reverts to the "stand-by" condition.

3.7.14.4 If the IRS is required to terminate the established circuit, it has first to change over to the ISS condition, in accordance with § 3.7.11, before the termination can take place.

3.8 Rephasing procedure

3.8.1 If during the traffic flow, reception of information blocks or control signals is continuously mutilated, both stations change to the "rephase" condition after 32 cycles of continuous repetition. Rephasing is the automatic re-establishment of the previous circuit immediately following interruption of that circuit as a result of continuous repetition (see § 3.7.12).

NOTE 1 – Some coast stations do not provide for rephasing. Therefore, it should be possible to disable the rephasing procedure.

3.8.2 After changing to the "rephase" condition the master station immediately initiates the rephasing procedure. This procedure is the same as the phasing procedure; however, in the case of a 7-signal call identity, instead of "control signal 4" the rephasing slave station will transmit "control signal 5" after the reception of the appropriate "call signal" transmitted by the rephasing master station.

3.8.3 When "control signal 5" is received by the master station, automatic identification takes place along the same lines as laid down in § 3.6. However, on receipt of the "end-of-identification block", containing three "signal repetitions":

3.8.3.1 If, at the time of interruption, the slave station was in the IRS condition, it sends either:

– "control signal 1" if the last correctly received block before the interruption occurred as an "information block 2"; or

– "control signal 2" if the last correctly received block before the interruption occurred was an "information block 1".

3.8.3.2 If, at the time of interruption, the slave station was in the ISS condition, it sends "control signal 3", to initiate change-over to the IRS condition. When the change-over is completed, i.e. after correct reception of the block containing three "signal repetitions" by the master station, the master station sends either:

– "control signal 1" if the last correctly received block before the interruption occurred was an "information block 2"; or

– "control signal 2" if the last correctly received block before the interruption occurred was an "information block 1".

3.8.4 On receipt of "control signal 4", during the rephasing procedure the master station sends one "end-of-communication block" containing three "idle signals α" after which it continues with the rephasing attempt.

3.8.5 On receipt of each identification block, the slave station compares the received identification signals with the previously stored identity of the master station and:

– if the signals are identical, the slave station continues with the procedure by sending the appropriate check-sum signal;

– if the signals are not identical, the slave station initiates the "end-of-communication" procedure in accordance with § 3.7.14 and remains in the "rephase" condition.

3.8.6 On receipt of a block containing three "idle signals α", the slave station sends one "control signal 1" and remains in the "rephase" condition.

3.8.7 In the case of a 4-signal call identity, the rephasing master station:

– upon receipt of two consecutive signals "control signal 1" or "control signal 2" resumes directly with the transmission of traffic information if the slave station was in the IRS condition, or initiates the change-over procedure in accordance with § 3.7.11.1 if the slave station was in the ISS condition;

– upon receipt of two consecutive signals "control signal 3" proceeds directly with the change-over procedure in accordance with § 3.7.11.4 if the slave station was in the ISS condition.

3.8.8 In the case of a 4-signal call identity, the slave station on receipt of the appropriate "call signal" sends:

– if, at the time of interruption, the slave station was in the IRS condition, either:

  – "control signal 1" if it had correctly received "information block 2" before the interruption occurred; or

  – "control signal 2" if it had correctly received "information block 1" before the interruption occurred;

– if, at the time of interruption, the slave station was in the ISS condition, "control signal 3" to initiate change-over to the ISS condition.

3.8.9 If rephasing has not been accomplished within the time-out interval of 32 cycles, both stations revert to the "stand-by" condition and no further rephasing attempts are made.

3.9 Summary of service blocks and service information signals

3.9.1 Service blocks

X_1 - RQ - X_2 : "Call block 1" containing the 1st and 2nd identification signals.

X_3 - X_4 - RQ : "Call block 2" for a 4-signal call identity containing the 3rd and 4th identification signals.

RQ - X_3 - X_4 : "Call block 2" for a 7-signal call identity containing the 3rd and 4th identification signals.

X_5 - X_6 - X_7 : "Call block 3" for a 7-signal call identity containing the 5th, 6th and 7th identification signals.

Y_1 - α - Y_2 : "Identification block 1" containing self-identification signals 1 and 2 and request for the 1st check-sum signal.

α - Y_3 - Y_4 : "Identification block 2" containing self-identification signals 3 and 4 and request for the 2nd check-sum signal.

Y_5 - Y_6 - Y_7 : "Identification block 3" containing self-identification signals 5, 6 and 7 and request for the 3rd check-sum signal.

RQ - RQ - RQ : If occurring within the automatic identification procedure, indicates the end of that procedure and requests the appropriate control signal.

During the traffic flow, indicates request for repetition of the last control signal or in the change-over procedure response to β - α - β.

β - α - β : Block to change the direction of the traffic flow.

α - α - α : Block to initiate the end-of-communication procedure.

3.9.2 Service information signals

CS1 : Request for "information block 1" or "call signal" has been correctly received during phasing/rephasing (only in the case of a 4-signal call identity).

CS2 : Request for "information block 2".

CS3 : IRS requests change of traffic flow direction.

CS4 : "Call signal" has been correctly received during phasing.

CS5 : "Call signal" has been correctly received during rephasing.

RQ : Request for retransmission of the last identification or information block or in the change-over procedure, response to β - α - β.

4 Characteristics, mode B (FEC)

4.1 General

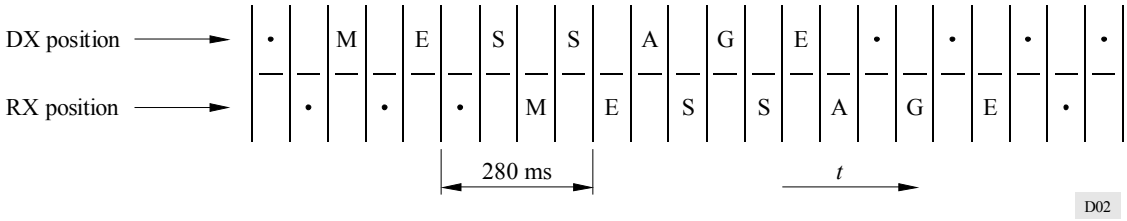
The system operates in a synchronous mode, transmitting an uninterrupted stream of signals from a station sending in the collective B-mode (CBSS) to a number of stations receiving in the collective B-mode (CBRS), or from a station sending in the selective B-mode (SBSS) to one or more selected stations receiving in the selective B-mode (SBRS).

4.2 The sending station (CBSS and SBSS)

The sending station, both in collective and in selective B-mode, sends each signal twice: the first transmission (DX) of a specific signal is followed by the transmission of four other signals, after which the retransmission (RX) of the first signal takes place, allowing for time-diversity reception at 280 ms (4 × 70 ms) time space (see Fig. 2).

FIGURE 2

Time-diversity transmission



4.3 The receiving station (CBRS and SBRS)

The receiving station, both in collective and selective B-mode, checks both signals (DX and RX), and uses the unmutilated one. When both signals appear as unmutilated but different, then both signals should be considered as mutilated.

4.4 Phasing procedure

4.4.1 When no circuit is established, both stations are in the "stand-by" condition and no sending or receiving condition is assigned to either of the stations.

4.4.2 The station required to transmit information becomes the sending station and sends alternately "phasing signal 2" and "phasing signal 1", whereby "phasing signal 2" is transmitted in the DX position and "phasing signal 1" in the RX position. At least sixteen of these signal pairs should be transmitted.

4.4.3 On receipt of the signal sequence "phasing signal 1"-"phasing signal 2", or of the signal sequence "phasing signal 2"-"phasing signal 1", in which "phasing signal 2" determines the DX position and "phasing signal 1" determines the RX position, and at least two further phasing signals in the appropriate position, the station changes to the CBRS condition and offers continuous stop-polarity to the line output terminal until either the traffic information signal "←" (combination No. 27) or "≡" (combination No. 28) is received.

4.5 Selecting calling procedure (selective B-mode)

4.5.1 After the transmission of the required number of phasing signals, the SBSS sends the "call signal", which consists of six transmissions of a sequence, each consisting of the identification signals of the station to be selected followed by an "idle signal β". This transmission takes place using time-diversity in accordance with § 4.2.

4.5.2 The SBSS sends the "call signal" and all further information signals in a 3B/4Y ratio, i.e. inverted with respect to the information signals in Tables 1 and 2 and the identification signals in Table 3a.

4.5.3 The "call signal" contains either four, or seven identification signals as applicable. The identification signals are listed in Table 3a. The composition of these "call signals" should be in accordance with Recommendation ITU-R M.491.

4.5.4 Following unmutilated reception of one complete signal sequence representing its inverted identification signals, the CBRS changes to the SBRS condition and continues offering stop-polarity to the line output terminal until either the traffic information signal; "←" (combination No. 27) or "≡" (combination No. 28) is received.

4.5.5 The station in the SBRS condition accepts the subsequent information signals received with the 3B/4Y ratio, all other stations reverting to the "stand-by" condition.

4.6 Traffic flow

4.6.1 Immediately prior to the transmission of the first traffic signals the sending station transmits the information signals "←" (combination No. 27) and "≡" (combination No. 28), and starts transmitting traffic.

4.6.2 A CBSS sends, during breaks in the information flow, "phasing signals 1" and "phasing signals 2" in the RX and DX positions respectively. At least one sequence of four consecutive phasing signal pairs should occur for every 100 signals sent in the DX position during traffic flow.

4.6.3 A SBSS sends, during breaks in the information flow, "idle signals β".

4.6.4 On receipt of either the traffic combination signal "←" (combination No. 27) or "≡" (combination No. 28), the receiving station starts printing the received traffic information signals.

NOTE 1 – The term "printing" is used in § 4.6.4 and 4.6.5 to denote the transfer of traffic signals to the output device.

4.6.5 The receiving station checks both signals received in the DX and RX position:

– printing an unmutilated DX or RX signal; or

– printing a "Δ" (combination No. 31), or alternatively an "error character" (to be user-defined) if both DX and RX signals are mutilated or appear unmutilated but are different.

4.6.6 A receiving station reverts to the "stand-by" condition if, during a predetermined time, the percentage of mutilated signals received has reached a predetermined value.

4.6.7 End-of-transmission

4.6.7.1 A station sending in the B-mode (CBSS or SBSS) should terminate the transmission by sending at least 2 s of consecutive "idle signals α", immediately after the last transmitted traffic information signals after which the station reverts to the "stand-by" condition.

4.6.7.2 The receiving station reverts to the "stand-by" condition not less than 210 ms after receipt of at least two consecutive "idle signals α" in the DX position.

FIGURE 3

Phasing procedure with automatic identification in the case of a 7-signal call identity (mode A)

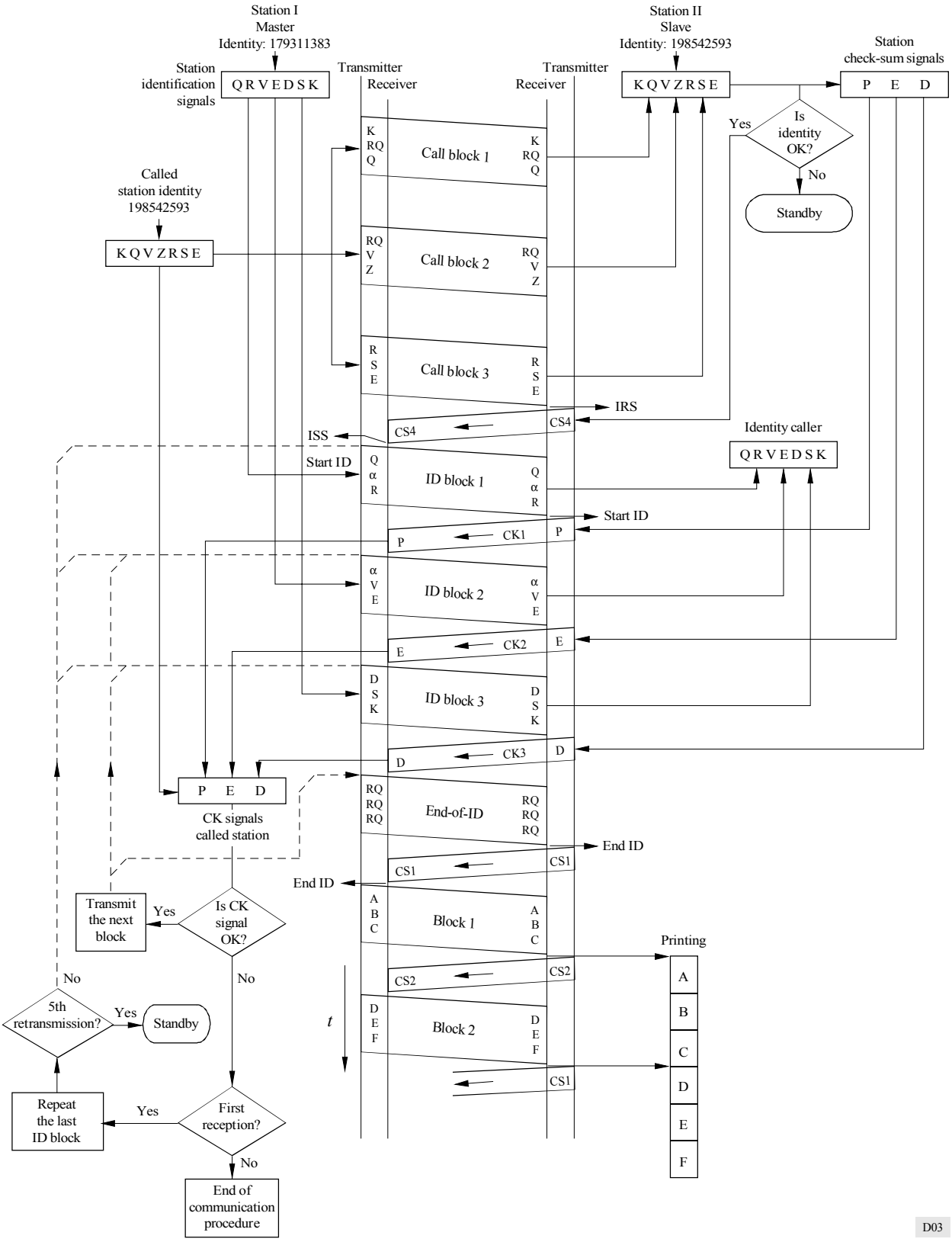


FIGURE 4

Rephasing procedure with automatic identification in the case of a 7-signal call identity (station II was ISS)

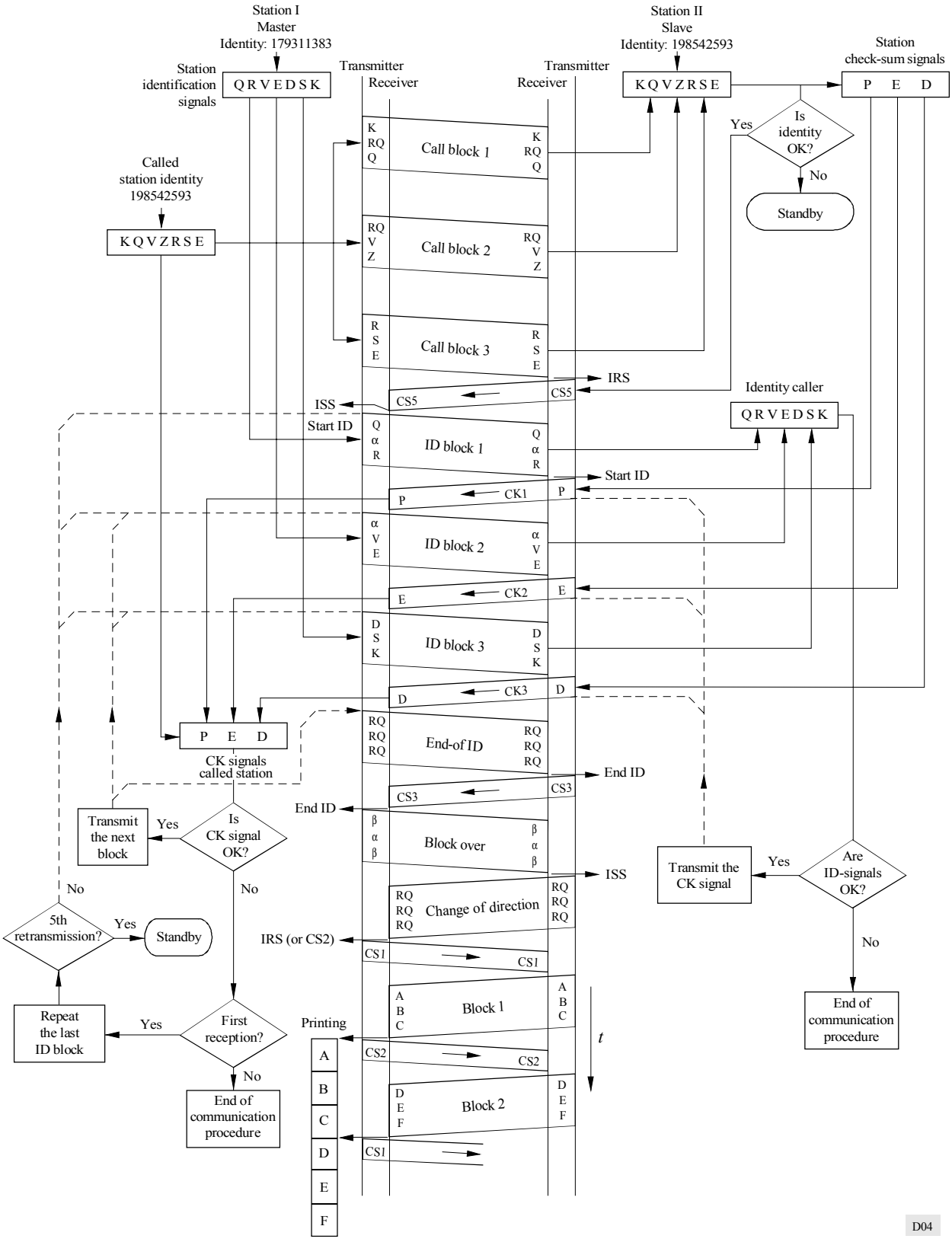


FIGURE 5

Traffic flow with change-over procedure and end-of-communication

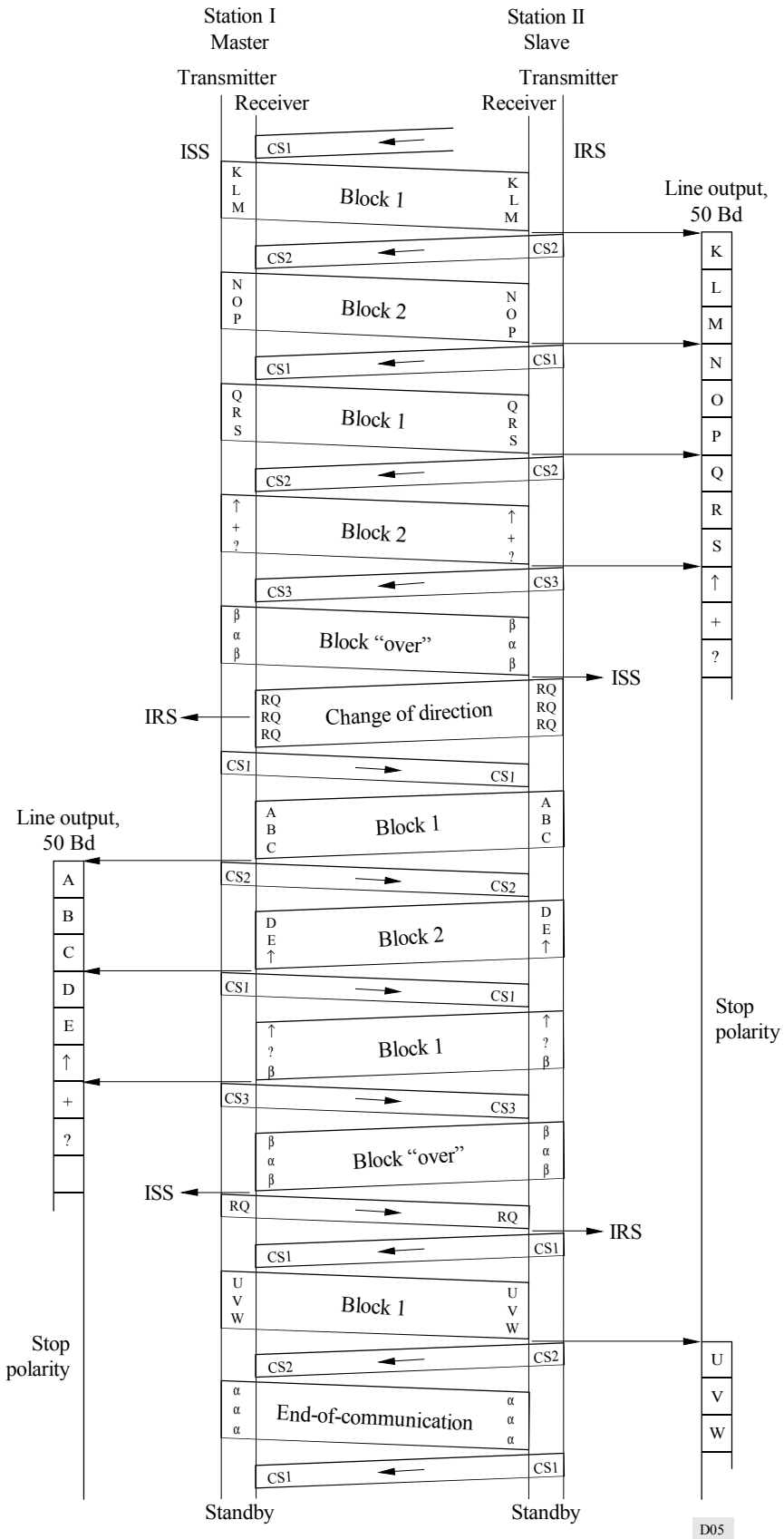


FIGURE 6

Phasing procedure with automatic identification in the condition of mutilated reception in the case of a 7-signal call identity

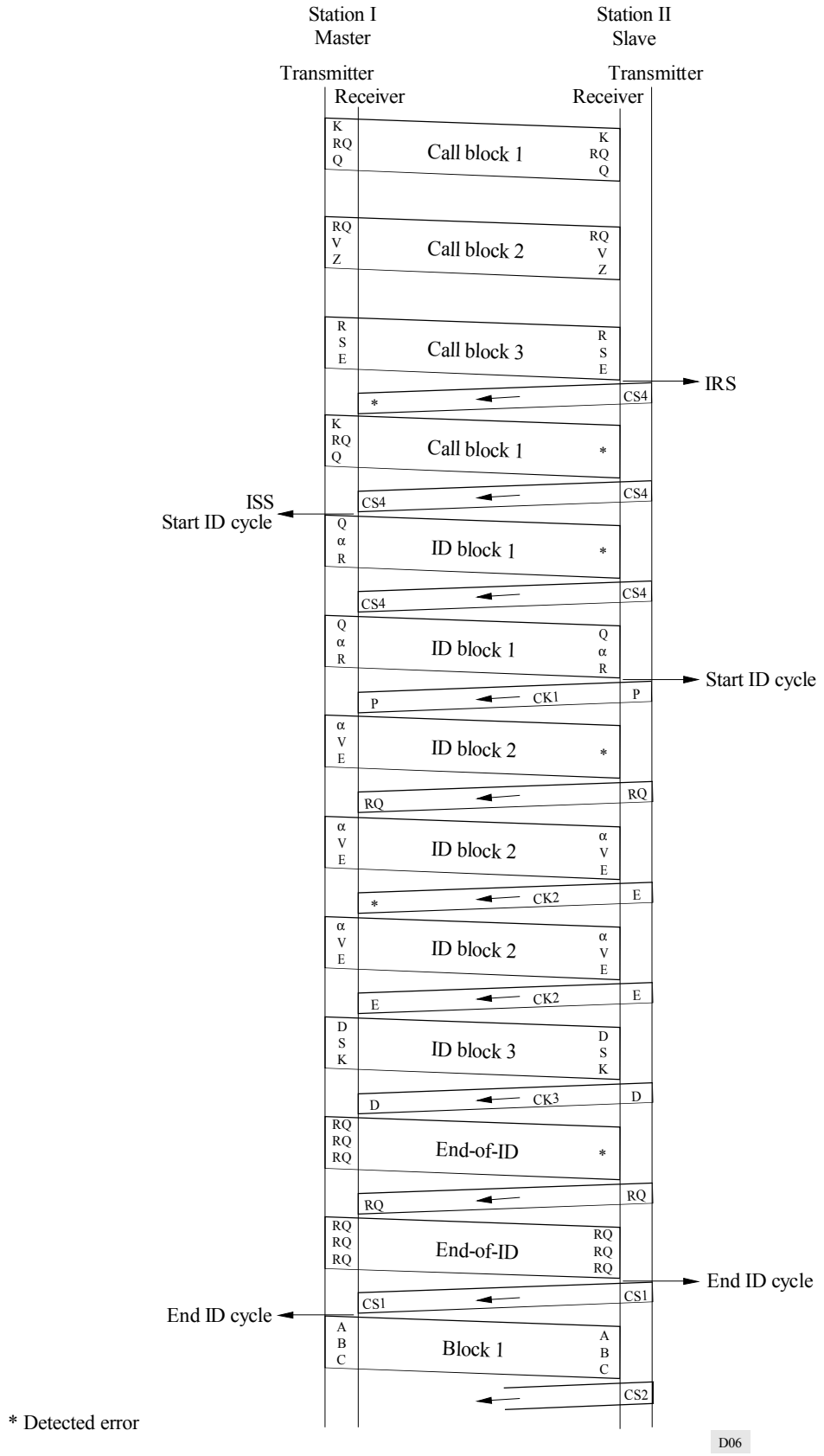
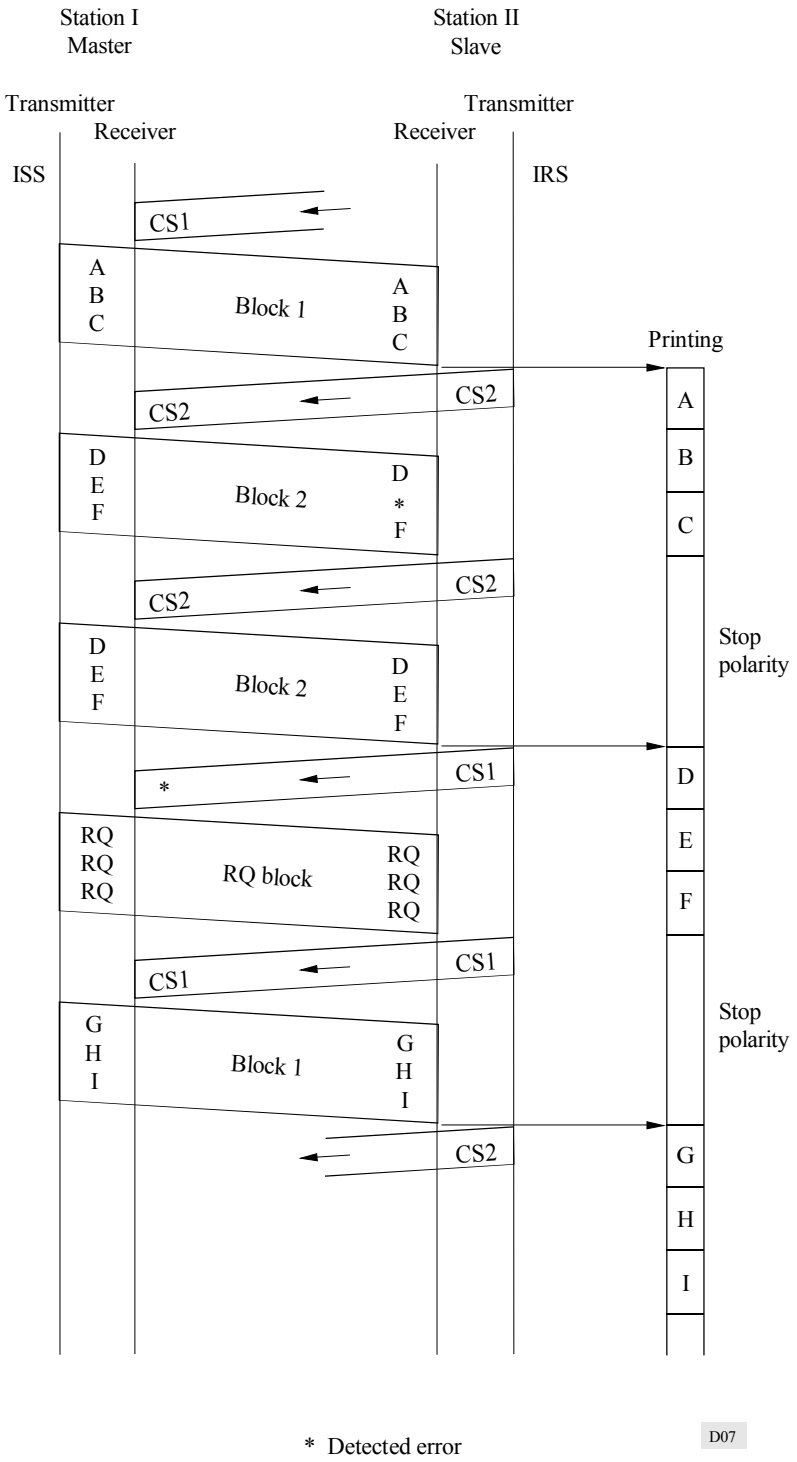


FIGURE 7

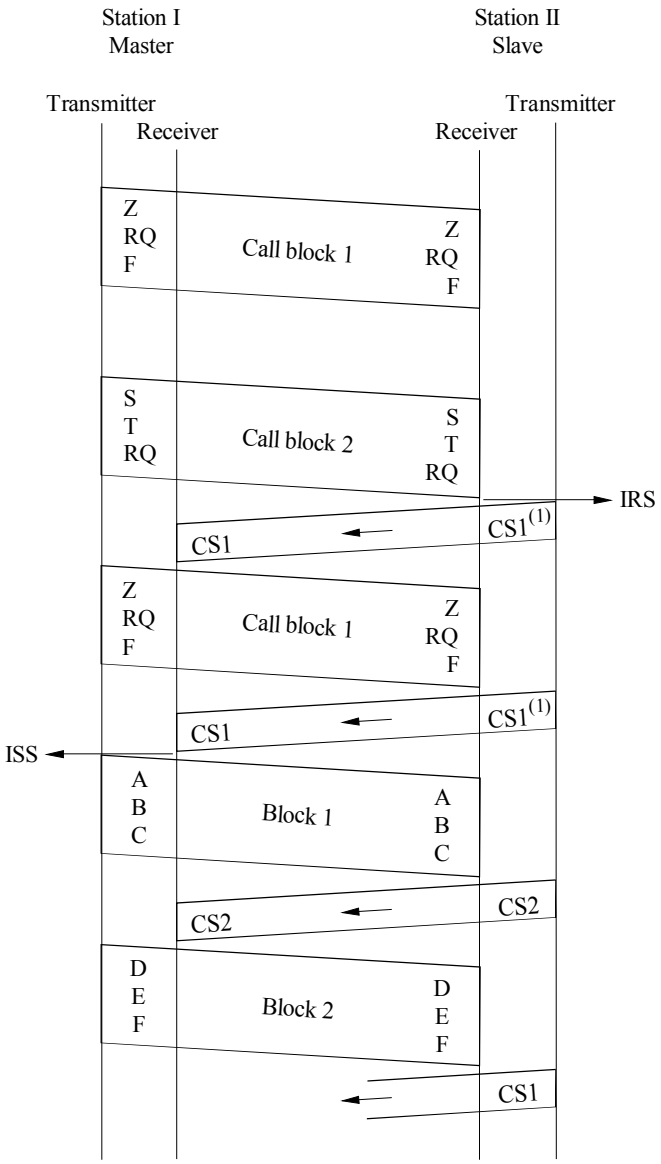
Traffic flow in the condition of mutilated reception



* Detected error

FIGURE 8

Phasing procedure in the case of a 4-signal call identity

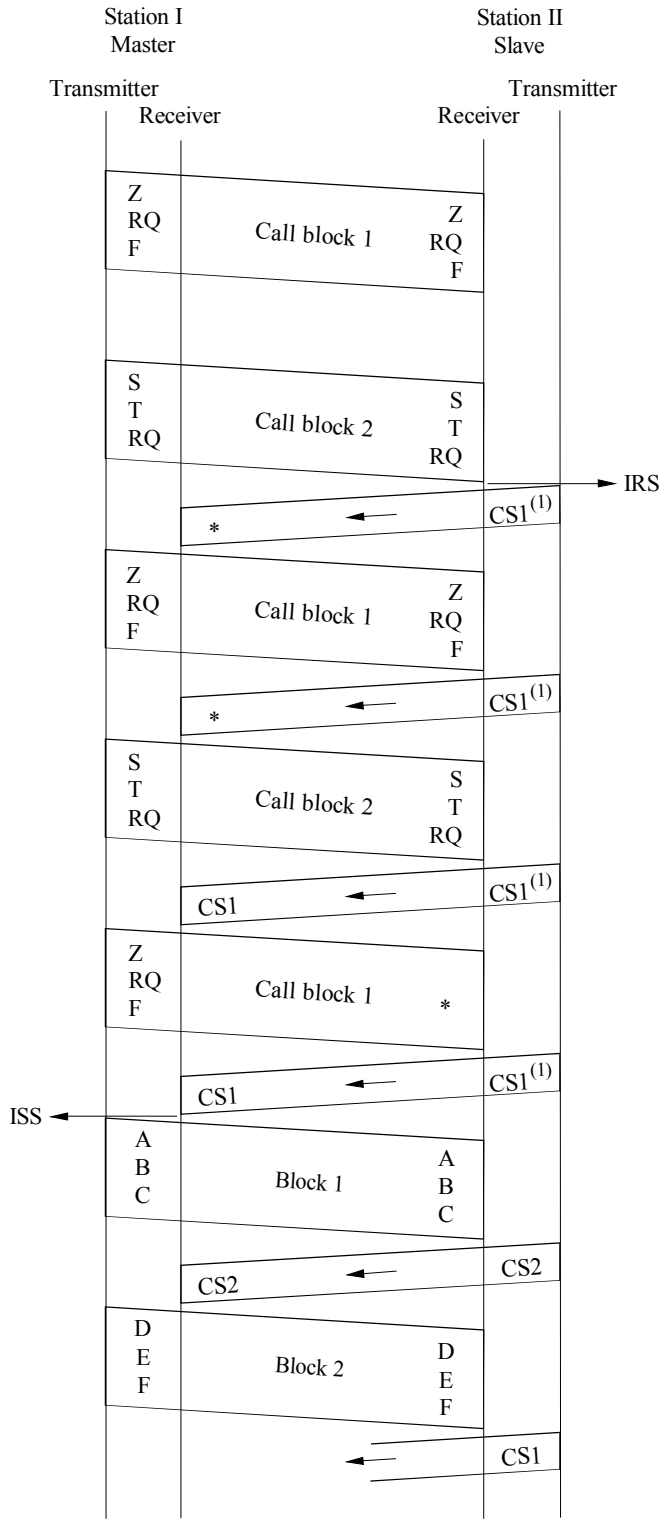


(1) With some equipment built in accordance with Recommendation ITU-R M.476 this could be CS2.

D08

FIGURE 9

Phasing procedure in the condition of mutilated reception in the case of a 4-signal call identity



* Detected error

(1) With some equipment built in accordance with Recommendation ITU-R M.476 this could be CS2.

D09

FIGURE 10

Collective B-mode operation

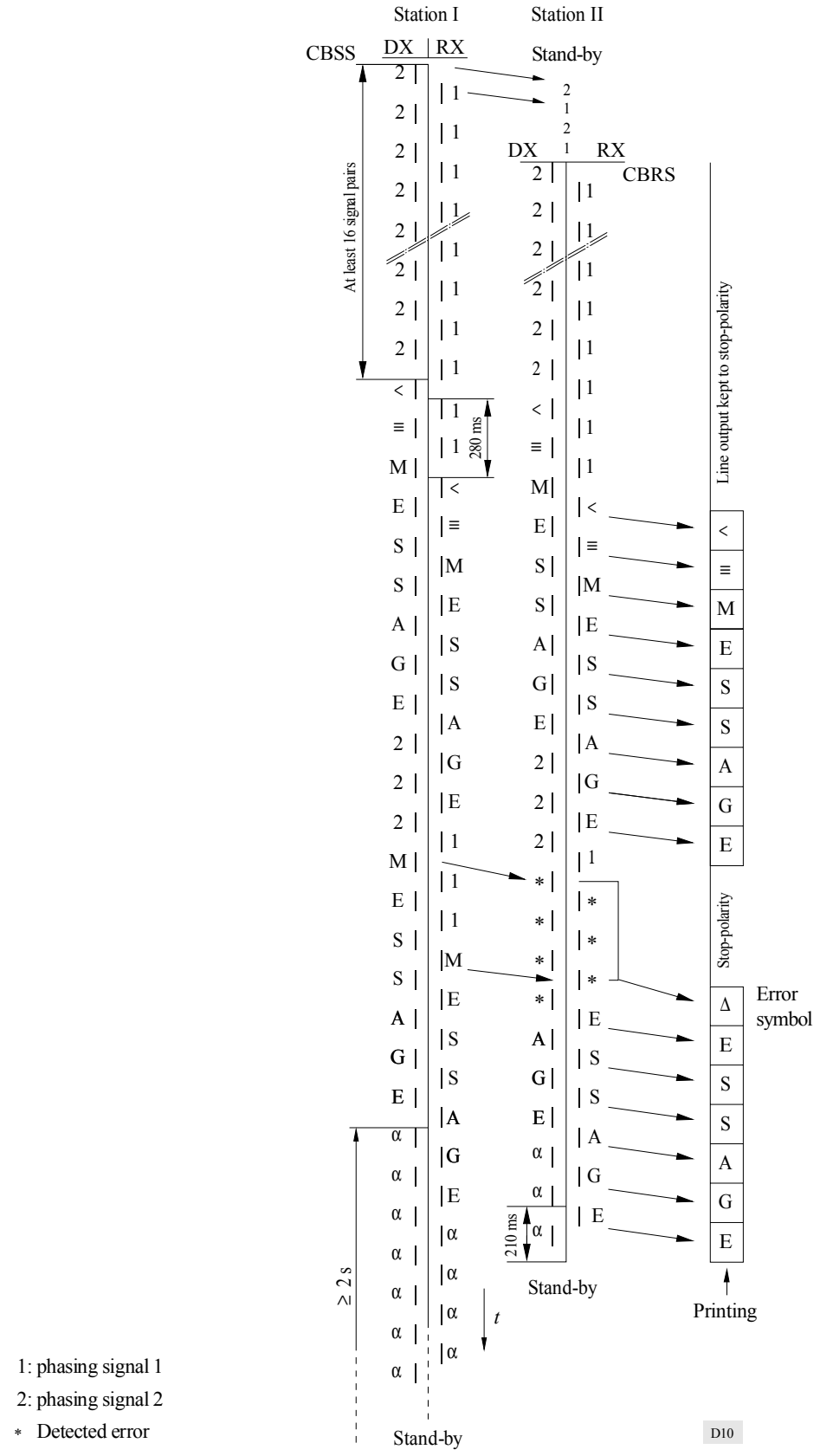


FIGURE 11

Selective B-mode operation in the case of a 4-signal call identity

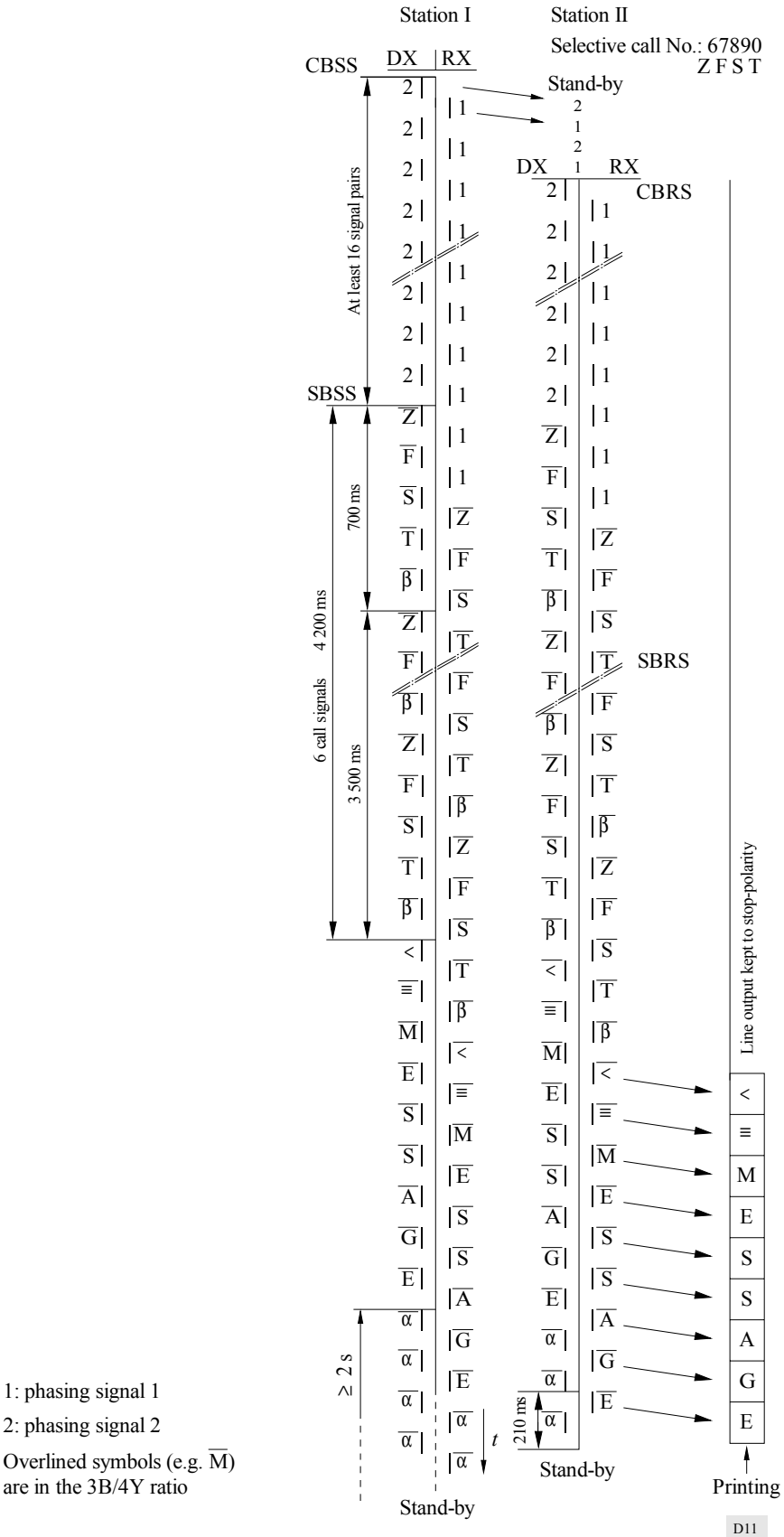
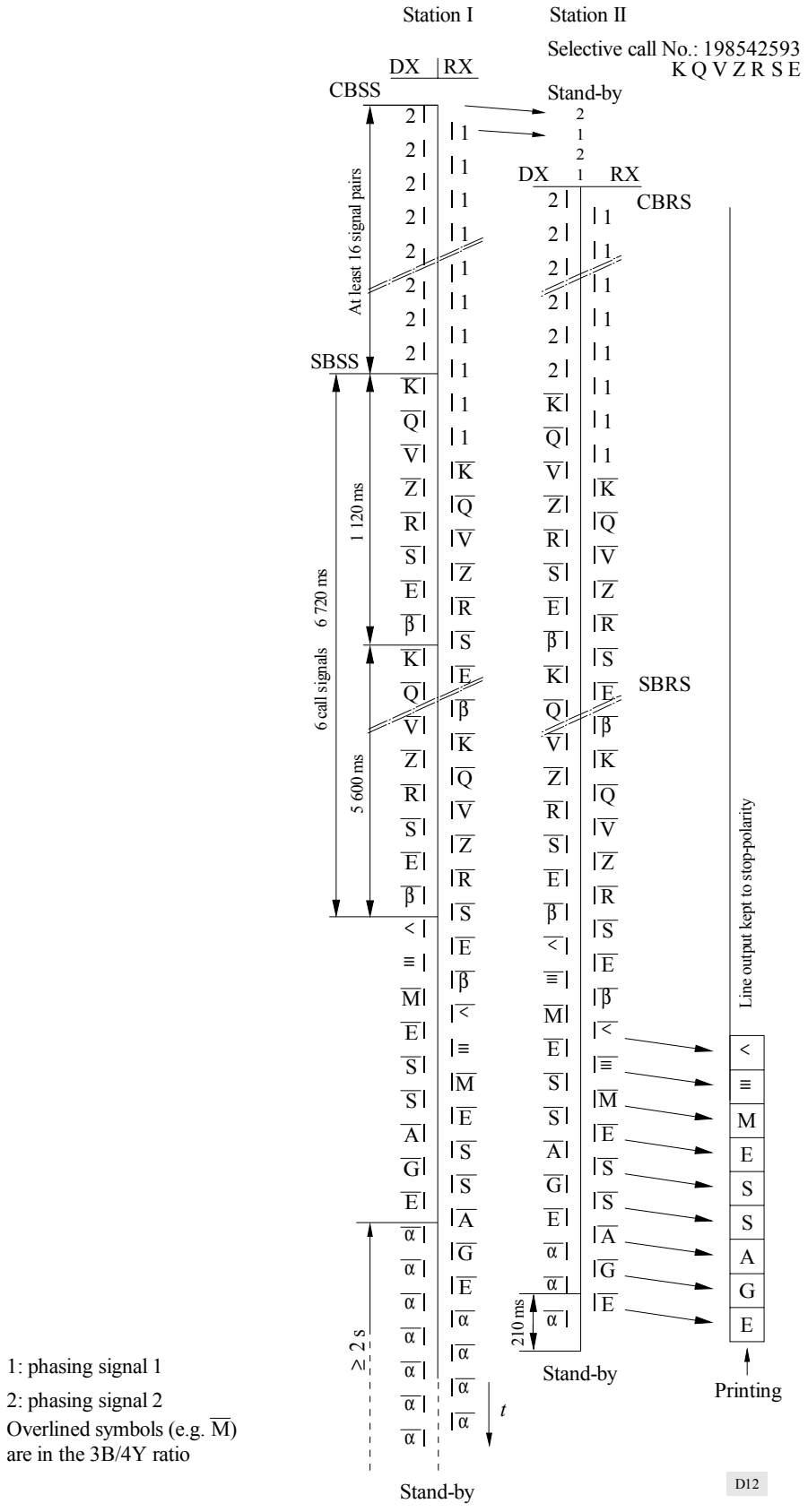


FIGURE 12

Selective B-mode operation in the case of a 7-signal call identity



APPENDICES TO ANNEX 1

APPENDIX 1

SDL diagrams (mode A)

1 General

The specification and description language (SDL) is described in ITU-T Recommendation Z.100.

The following graphical symbols have been used*:



State

D13

– A "state" is a condition in which the action of a process is suspended awaiting an input.



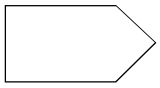
External input



Internal input

D14

– An "input" is an incoming signal which is recognized by a process.



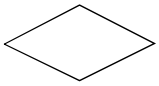
External output



Internal output

D15

– An "output" is an action which generates a signal which in turn acts as an input elsewhere.



Decision

D16

---

* *Note by the Secretariat:*

A "connector" is represented by the following graphical symbol:



where:

n : connector reference
x : number of the sheet
y : number of the Appendix (omitted when it occurs in the same Appendix).
z : number of occurrences.

– A “decision” is an action which asks a question to which the answer can be obtained at that instant and chooses one of several paths to continue the sequence.



– A “task” is any action which is neither a decision nor an output.

2 Phasing procedure with automatic identification in the case of a 7-signal call identity (calling station)

2.1 The SDL diagrams are given in Appendix 2.

2.2 The following supervisory counters are used in the diagrams:

Counter	Time-out	State	Sheet
n_0	128 cycles	02, 03, 04	1
n_1	128 cycles	00	1
n_2	32 cycles	05, 06, 07, 08	2, 3

3 Rephasing procedure with automatic identification in the case of a 4-signal call identity (calling station)

3.1 The SDL diagrams are given in Appendix 3.

3.2 The following supervisory counters are used in the diagrams:

Counter	Time-out	State	Sheet
n_5	32 cycles	00, 02, 03, 04	1
		05, 06, 07, 08	2, 3
n_1	128 cycles		1
n_2	32 cycles	05, 06, 07, 08	2, 3

4 Phasing procedure without automatic identification in the case of a 4-signal call identity (calling station)

4.1 The SDL diagrams are given in Appendix 4.

4.2 The following supervisory counters are used in the diagrams:

Counter	Time-out	State	Sheet
n_0	128 cycles	02, 03	1
n_1	128 cycles	00	1

5 Rephasing procedure without automatic identification in the case of a 4-signal call identity (calling station)

5.1 The SDL diagrams are given in Appendix 5.

5.2 The following supervisory counters are used in the diagrams:

Counter	Time-out	State	Sheet
n_5	32 cycles	00, 02, 03	1
n_1	128 cycles		1

6 Phasing procedure with automatic identification in the case of a 7-signal call identity (called station)

6.1 The SDL diagrams are given in Appendix 6.

6.2 The following supervisory counters are used in the diagrams:

Counter	Time-out	State	Sheet
n_2	32 cycles	05, 06, 07, 08	2, 3

7 Rephasing procedure with automatic identification in the case of a 7-signal call identity (called station)

7.1 The SDL diagrams are given in Appendix 7.

7.2 The following supervisory counters are used in the diagrams:

Counter	Time-out	State	Sheet
n_5	32 cycles	00, 01, 02, 03, 04	1
		05, 06, 07, 08	2, 3
n_2	32 cycles	05, 06, 07, 08	2, 3

8 Phasing procedure without automatic identification in the case of a 4-signal call identity (called station)

8.1 The SDL diagrams are given in Appendix 8.

9 Rephasing procedure without automatic identification in the case of a 4-signal call identity (called station)

9.1 The SDL diagrams are given in Appendix 9.

9.2 The following supervisory counters are used in the diagrams:

Counter	Time-out	State	Sheet
n_5	32 cycles	00, 01, 03	1

10 Traffic flow in the case of a 4-signal call identity and in the case of a 7-signal call identity (station is in the ISS position)

10.1 The SDL diagrams are given in Appendix 10.

10.2 The following supervisory counters are used in the diagrams:

Counter	Time-out	State	Sheet
n_3	32 cycles	09, 10, 13	1, 3
n_4	4 cycles	11, 12	2
n_1	128 cycles	12	2
n_5	32 cycles	11, 12, 13, 14	2, 3

11 Traffic flow in the case of a 4-signal call identity and in the case of a 7-signal call identity (station is in the IRS position)

11.1 The SDL diagrams are given in Appendix 11.

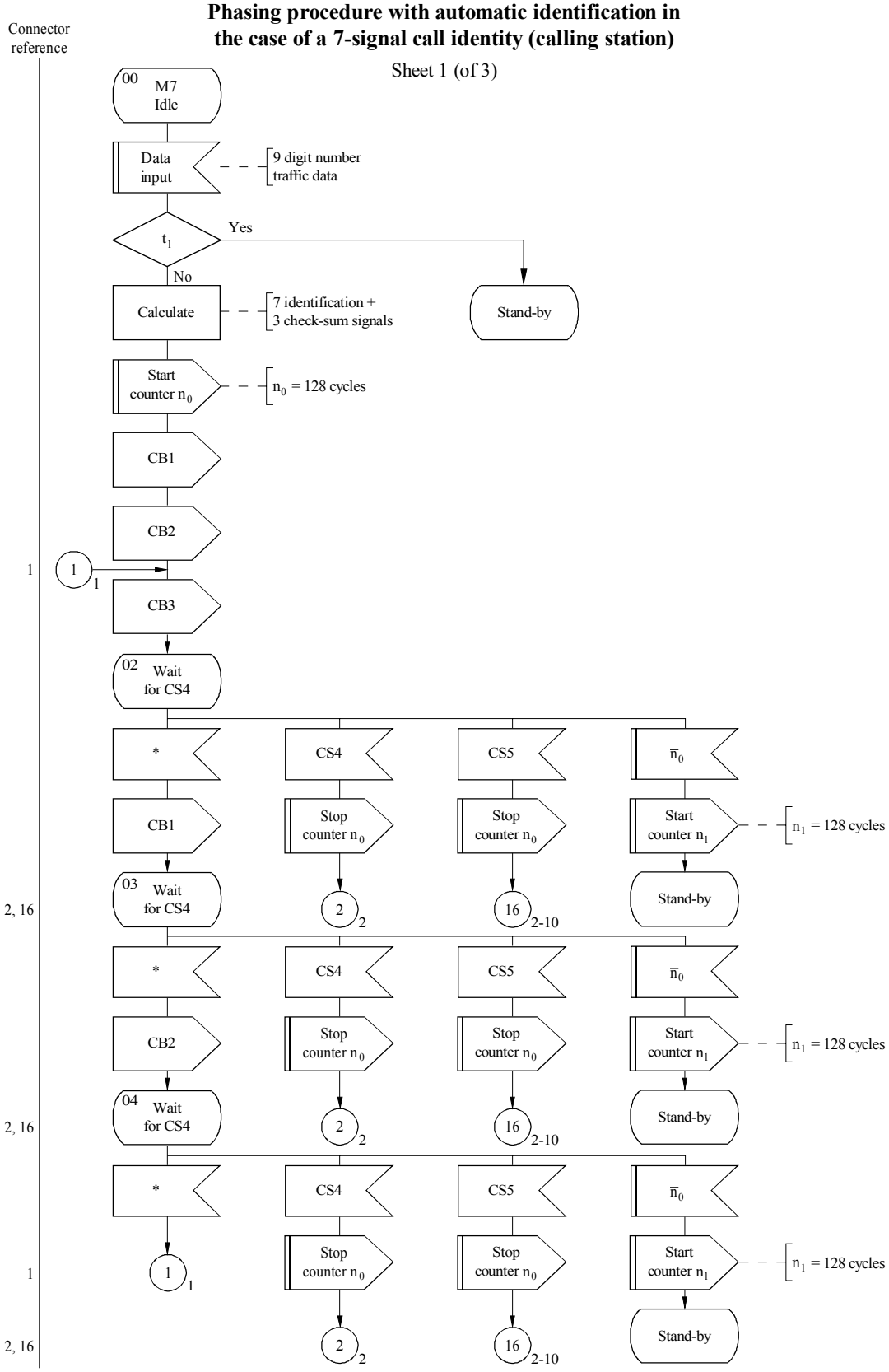
11.2 The following supervisory counters are used in the diagrams:

Counter	Time-out	State	Sheet
n_3	32 cycles	09, 10, 11	1, 2
n_5	32 cycles	09, 10, 11, 12	1, 2

APPENDIX 2

Phasing procedure with automatic identification in the case of a 7-signal call identity (calling station)

Sheet 1 (of 3)



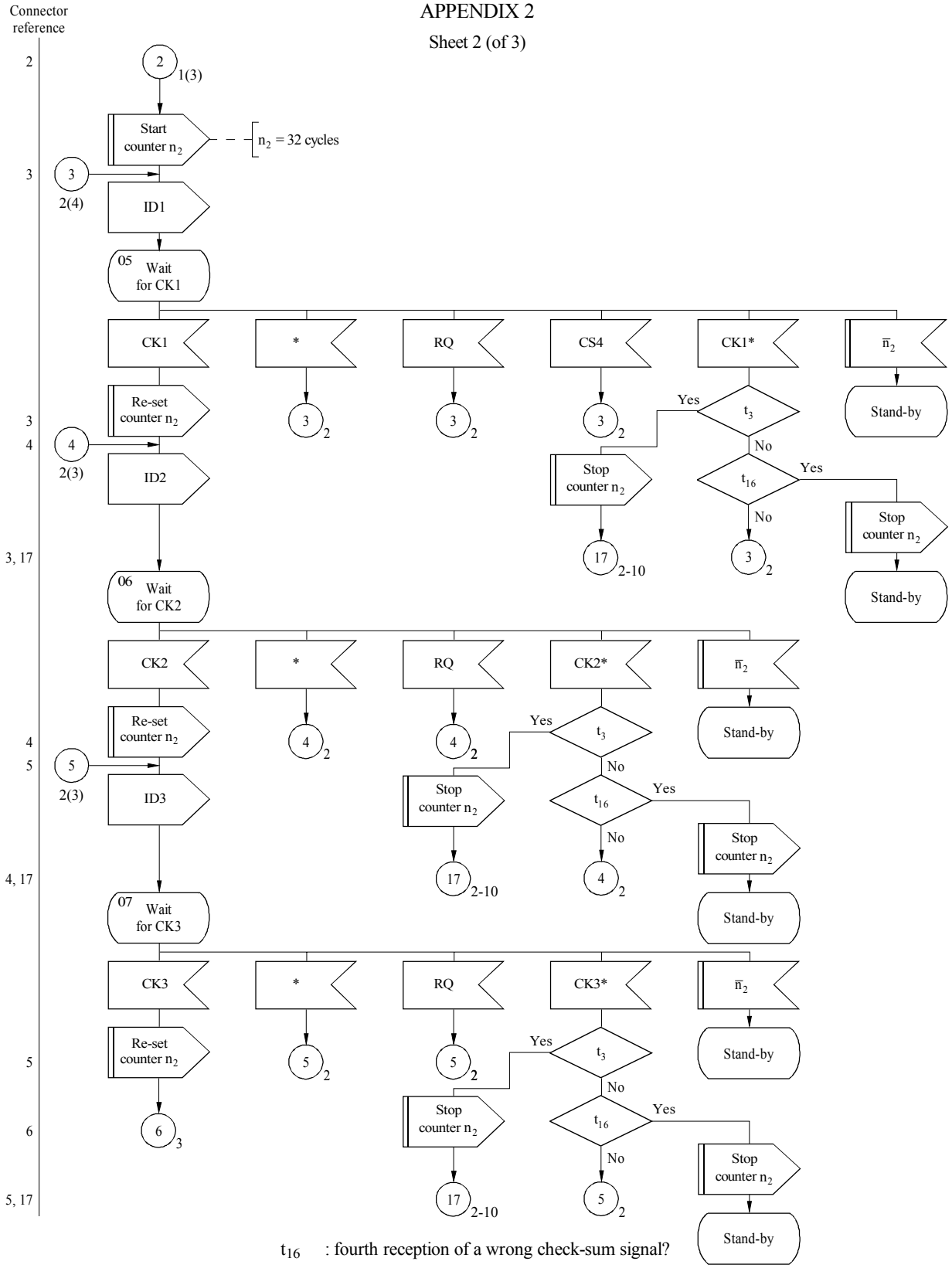
t_1: call identity the same as the one before and $n_1 > 0$?

* Detected error, invalid signal or no signal at all

D18

APPENDIX 2

Sheet 2 (of 3)



t_{16} : fourth reception of a wrong check-sum signal?

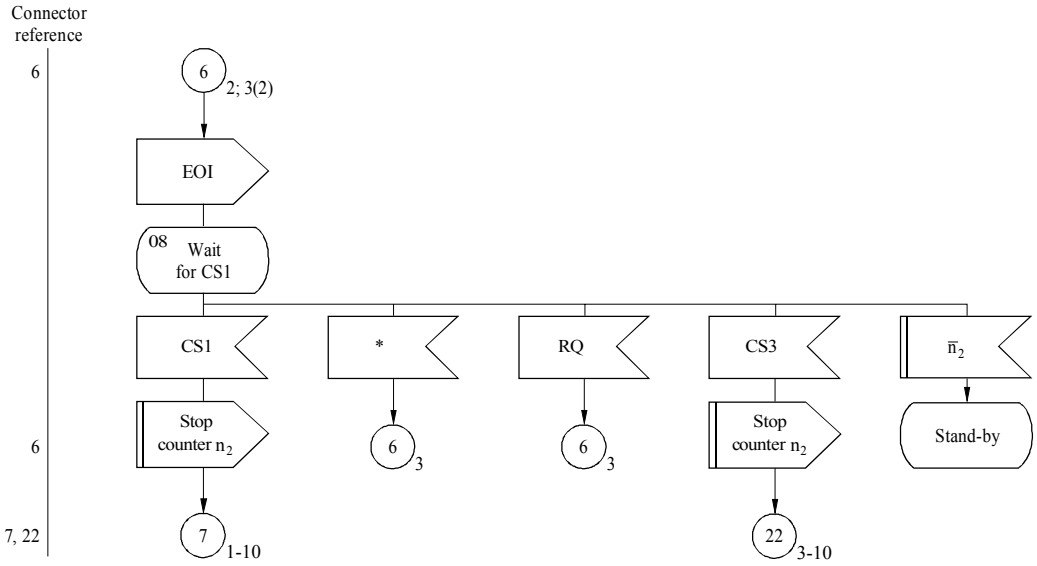
t_3 : same wrong check-sum signal one cycle before?

CKn*: wrong check-sum signal

* Detected error, invalid signal or no signal at all

APPENDIX 2

Sheet 3 (of 3)



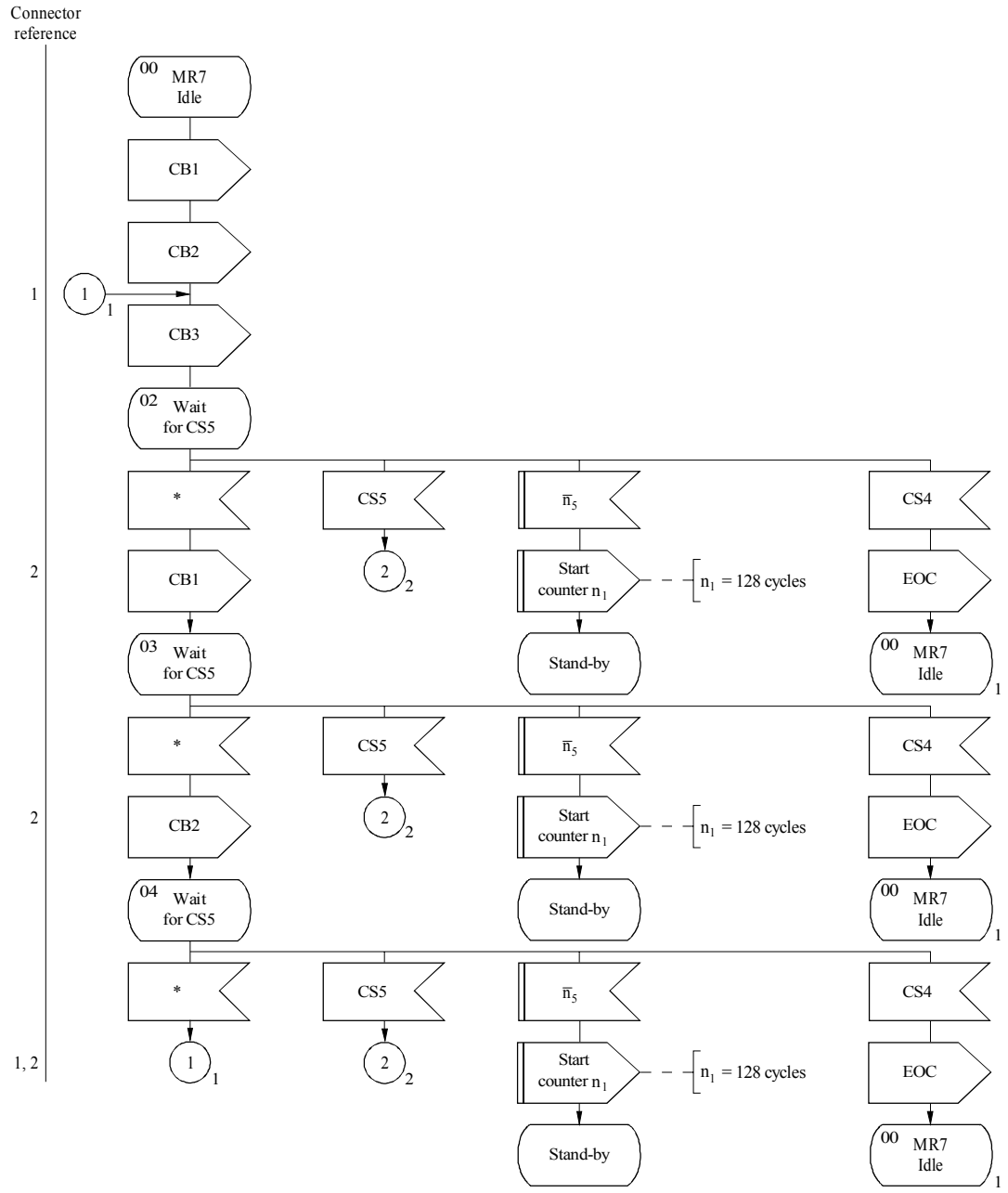
* Detected error, invalid signal or no signal at all

D20

APPENDIX 3

Rephasing procedure with automatic identification in the case of a 7-signal call identity (calling station)

Sheet 1 (of 3)

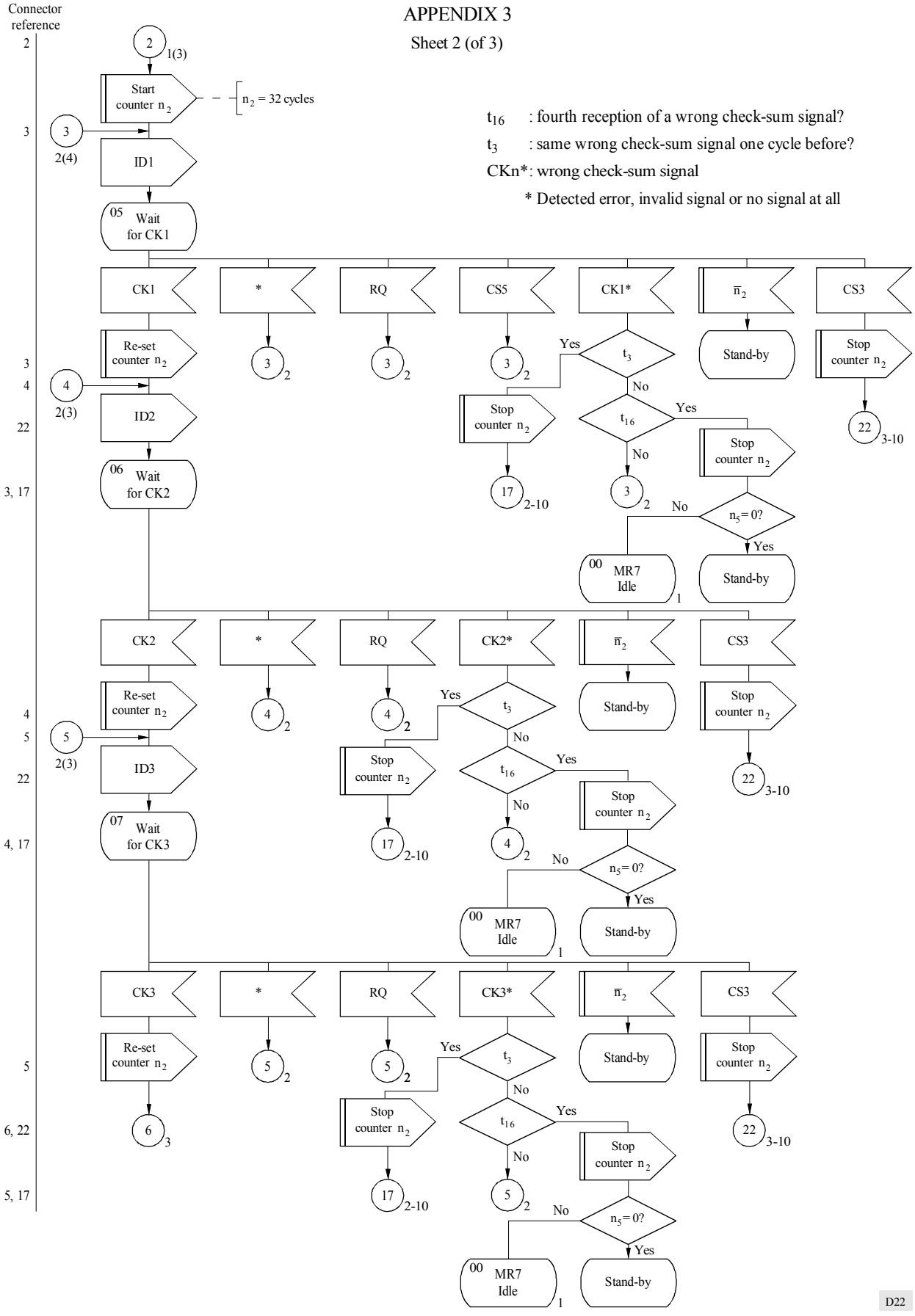


* Detected error, invalid signal or no signal at all

D21

APPENDIX 3

Sheet 2 (of 3)



t_{16} : fourth reception of a wrong check-sum signal?

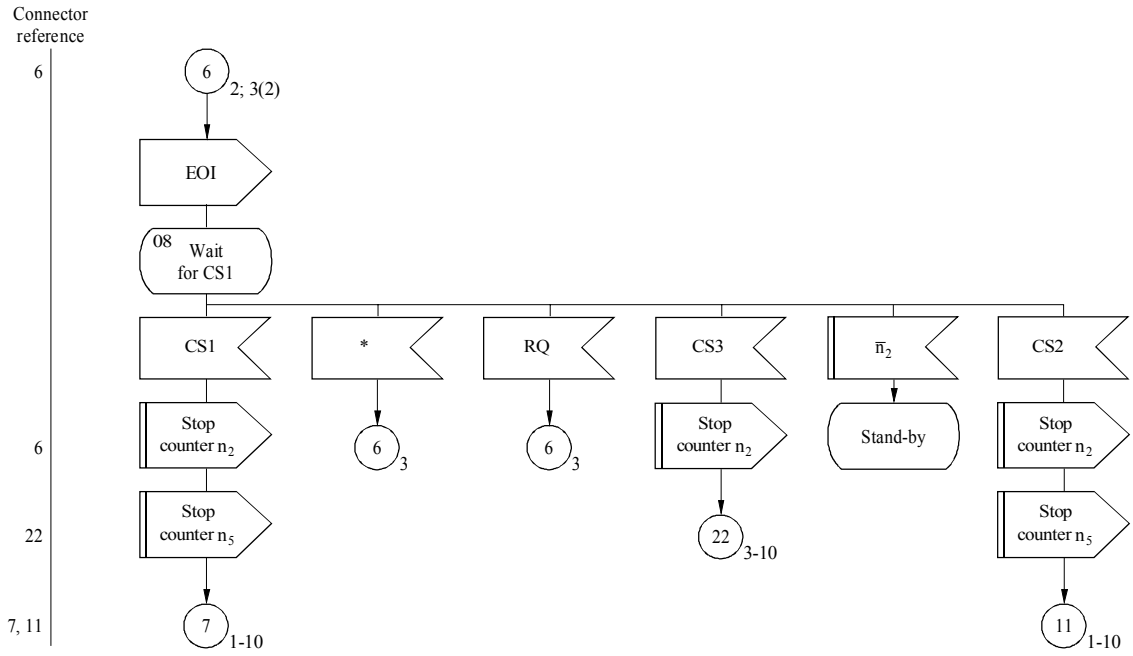
t_3 : same wrong check-sum signal one cycle before?

CKn*: wrong check-sum signal

* Detected error, invalid signal or no signal at all

APPENDIX 3

Sheet 3 (of 3)



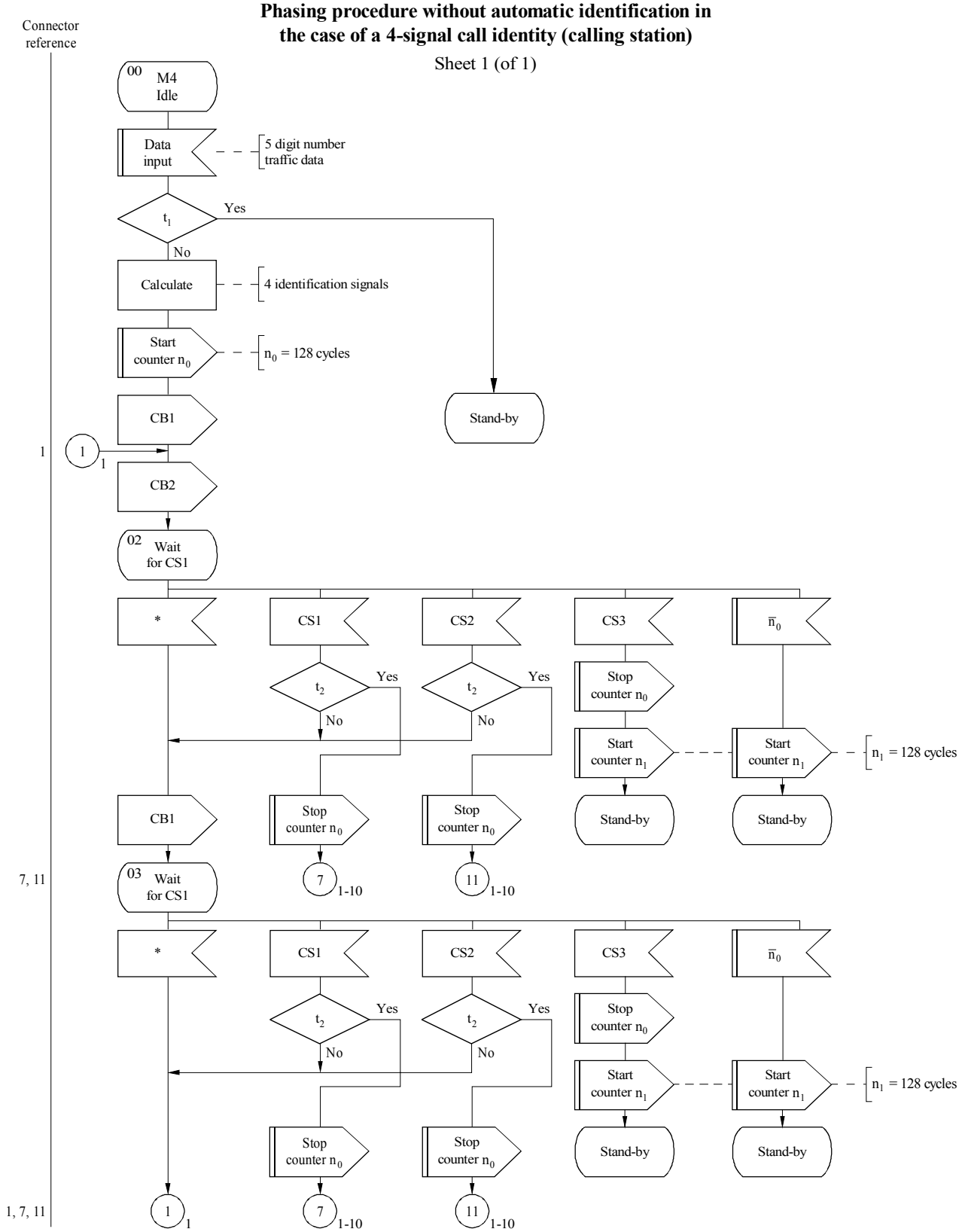
* Detected error, invalid signal or no signal at all

D23

APPENDIX 4

Phasing procedure without automatic identification in the case of a 4-signal call identity (calling station)

Sheet 1 (of 1)



t_1: call identity the same as the one before and $n_1 > 0$?

t_2: same control signal one cycle before?

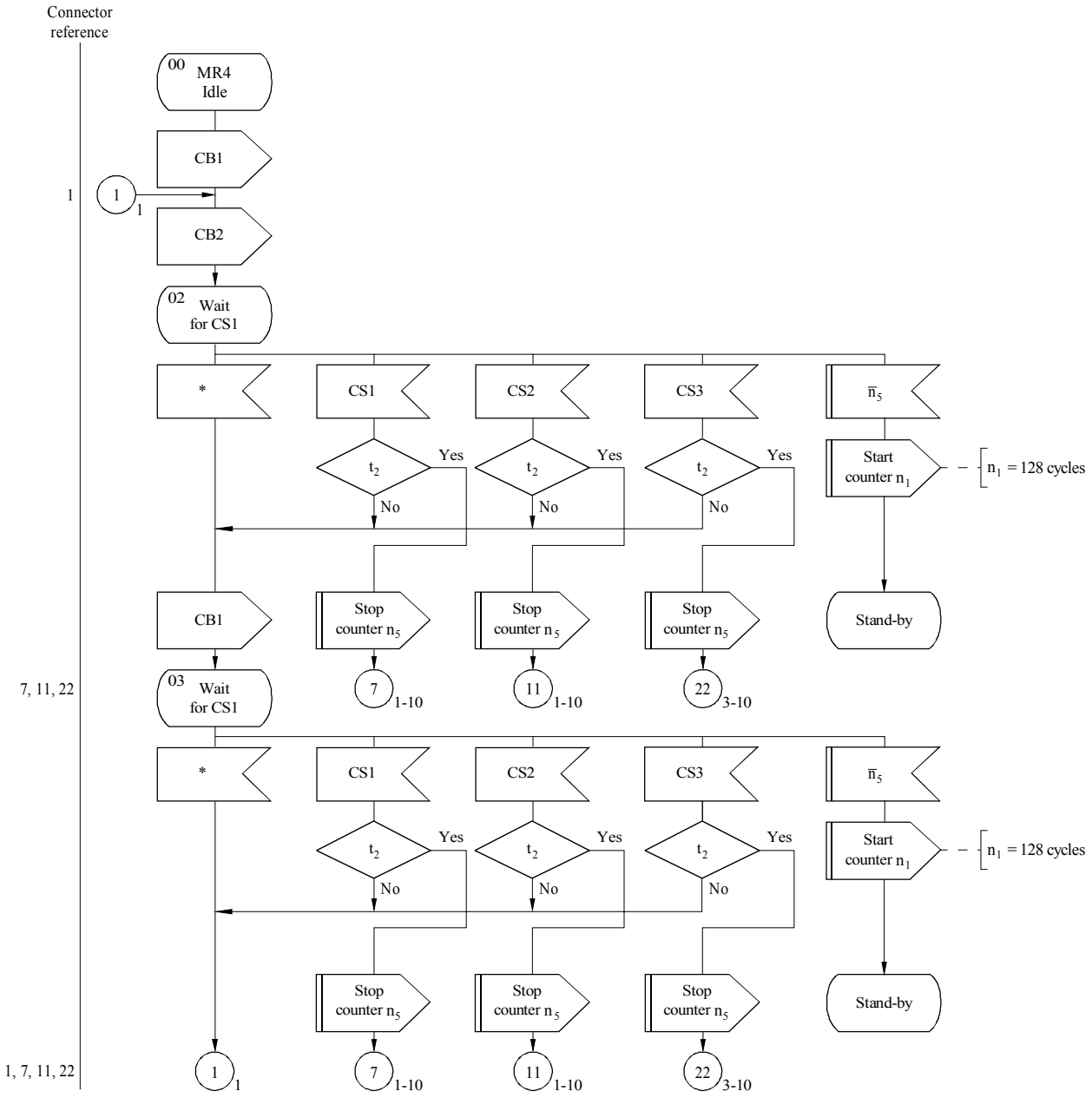
* Detected error, invalid signal or no signal at all

D24

APPENDIX 5

Rephasing procedure without automatic identification in the case of a 4-signal call identity (calling station)

Sheet 1 (of 1)



t_2: same control signal one cycle before?

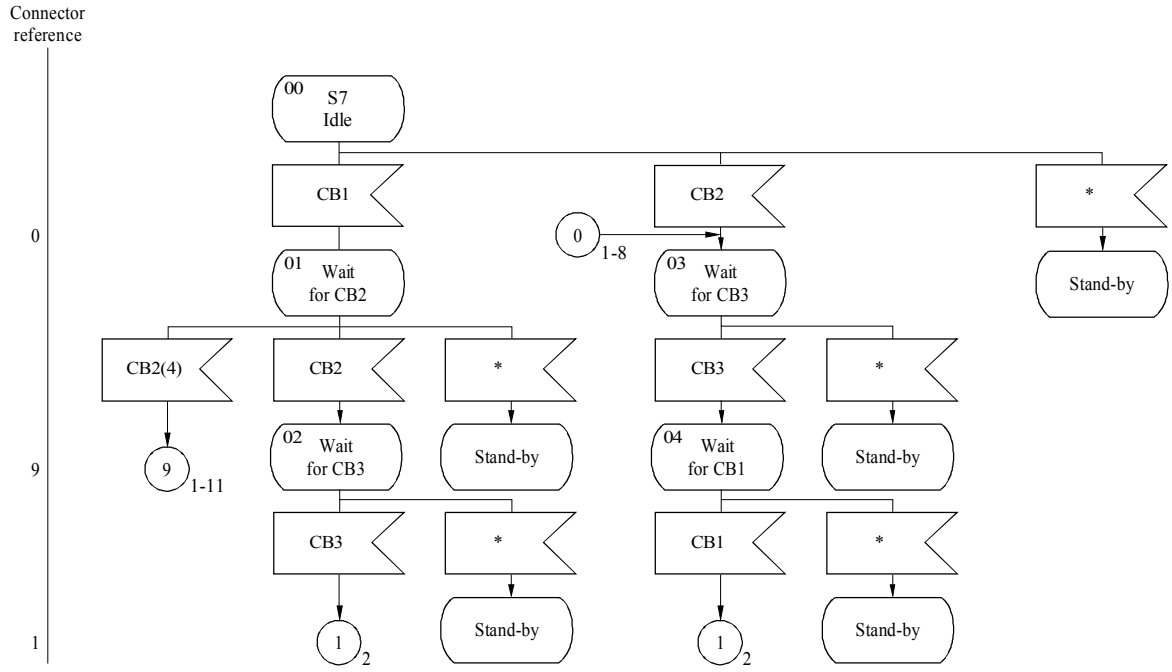
* Detected error, invalid signal or no signal at all

D25

APPENDIX 6

Phasing procedure with automatic identification in the case of a 7-signal call identity (called station)

Sheet 1 (of 3)

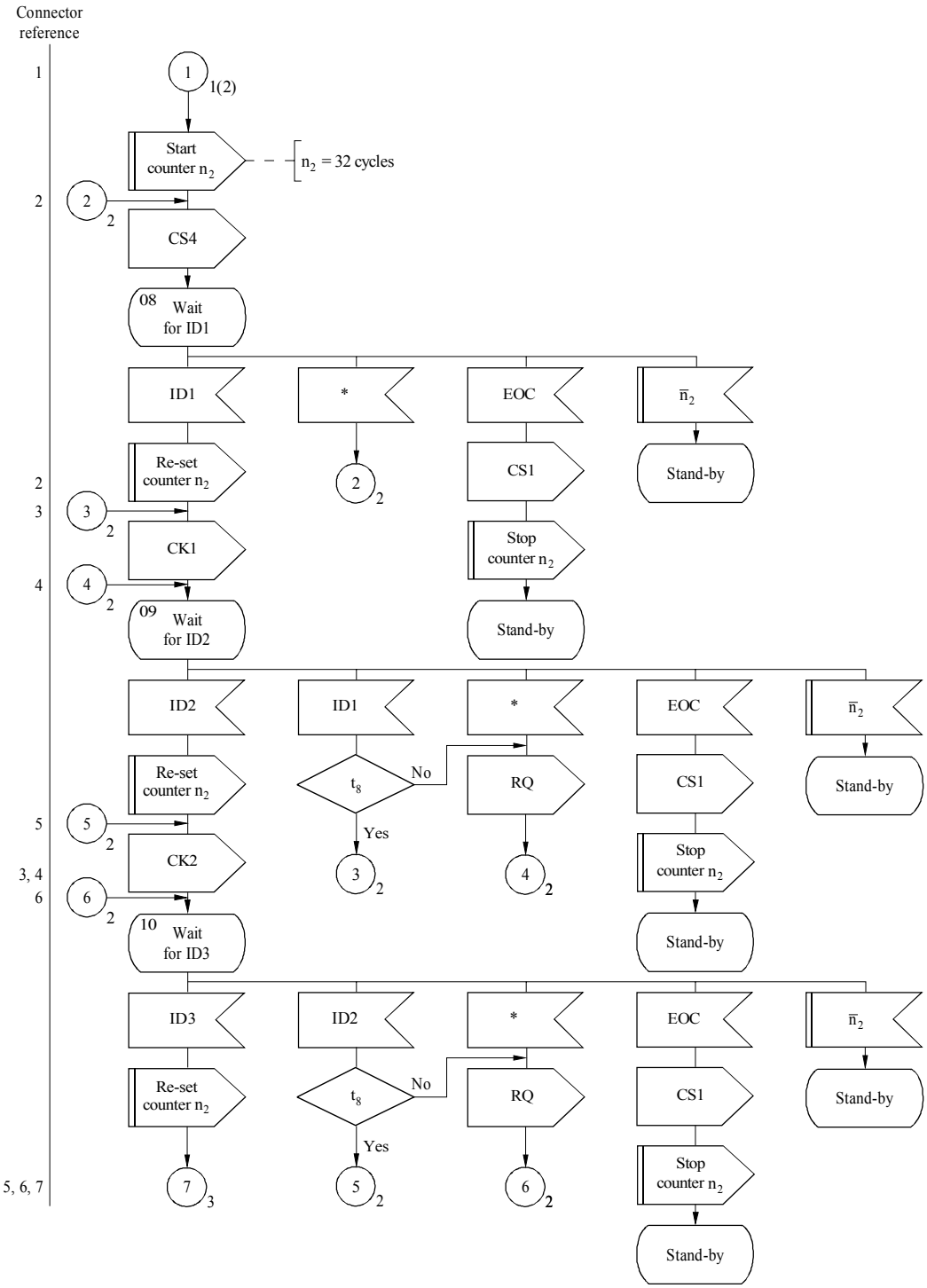


* Detected error, invalid signal or no signal at all

D26

APPENDIX 6

Sheet 2 (of 3)

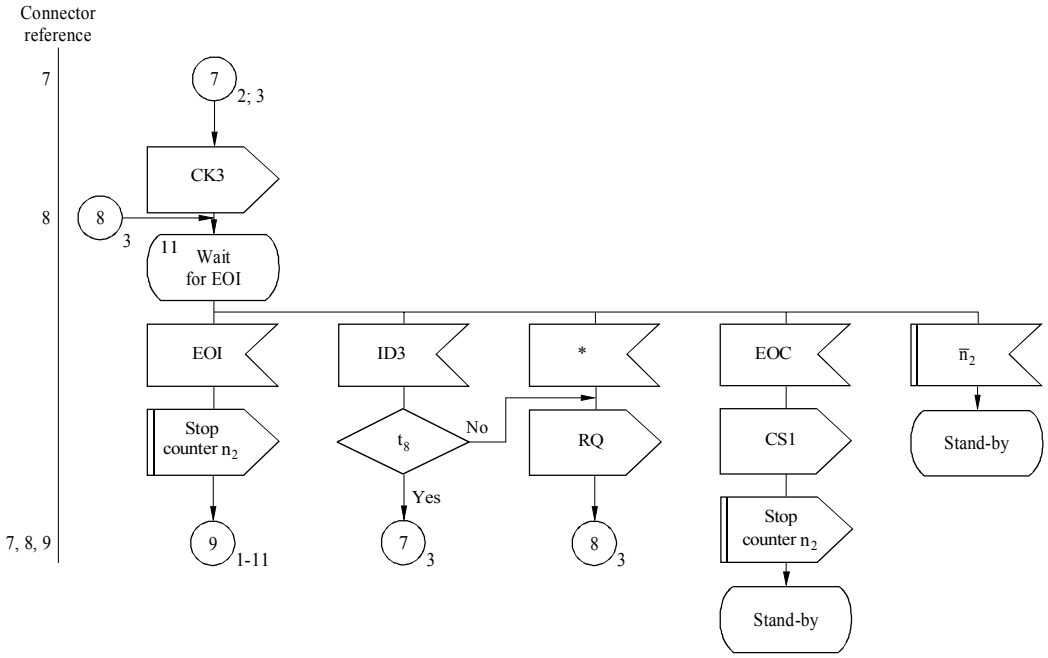


t_3: same ID-block one cycle before?

* Detected error, invalid signal or no signal at all

APPENDIX 6

Sheet 3 (of 3)



t_3: same ID-block one cycle before?

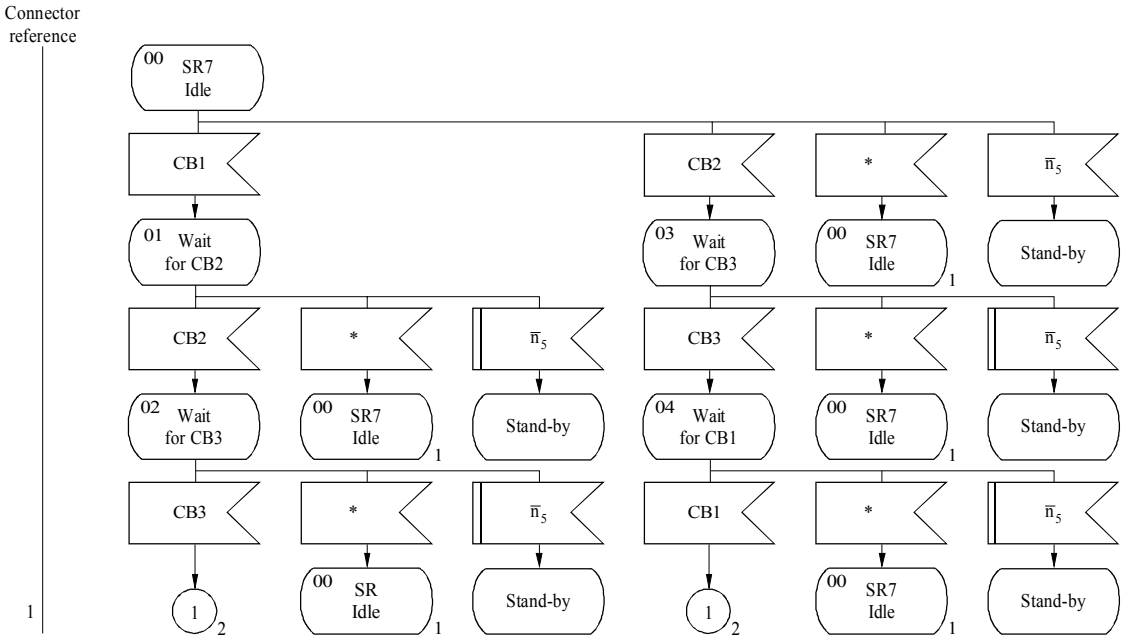
* Detected error, invalid signal or no signal at all

D28

APPENDIX 7

Rephasing procedure with automatic identification in the case of a 7-signal call identity (called station)

Sheet 1 (of 3)

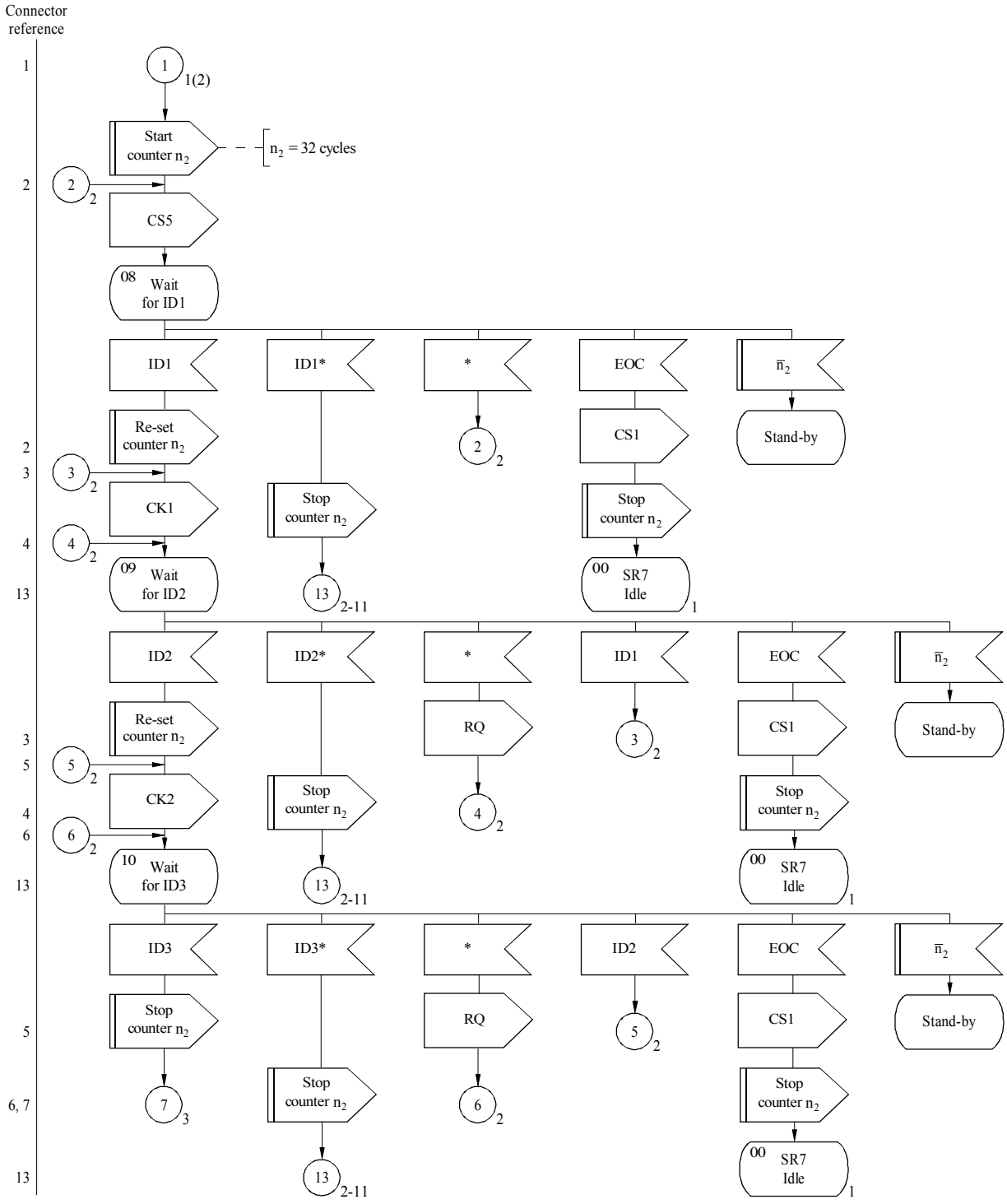


* Detected error, invalid signal or no signal at all

D29

APPENDIX 7

Sheet 2 (of 3)



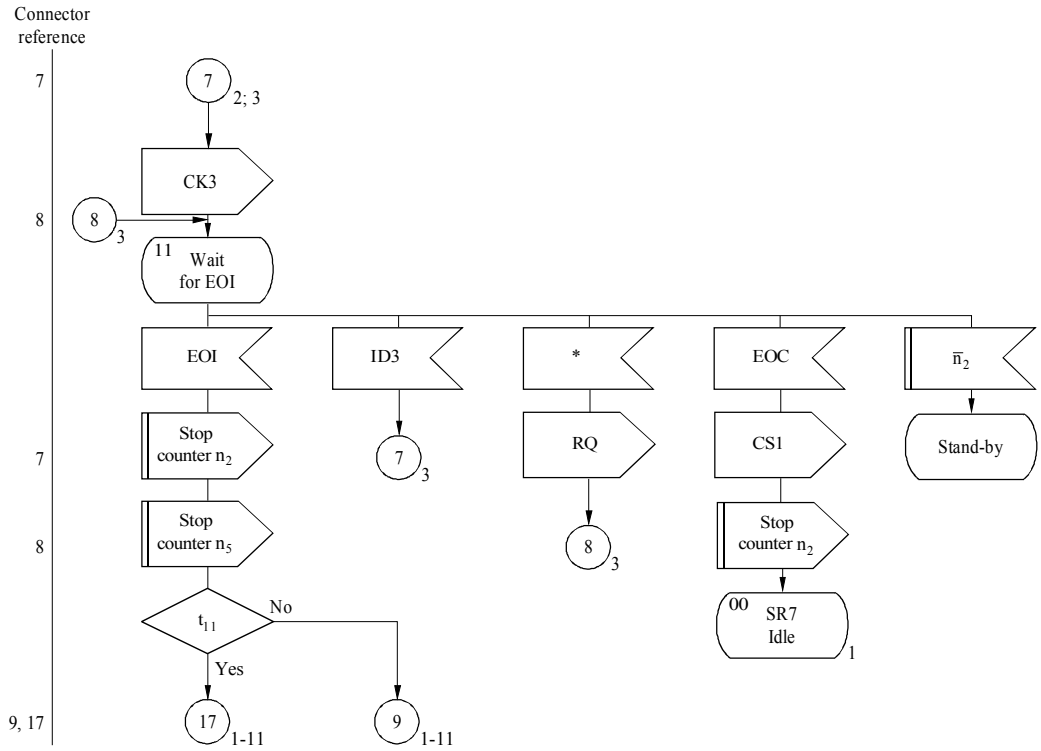
IDn* : wrong identification signal(s)

* Detected error, invalid signal or no signal at all

D30

APPENDIX 7

Sheet 3 (of 3)



t_{11}: block 2 was the last received block at the moment the interruption occurred?

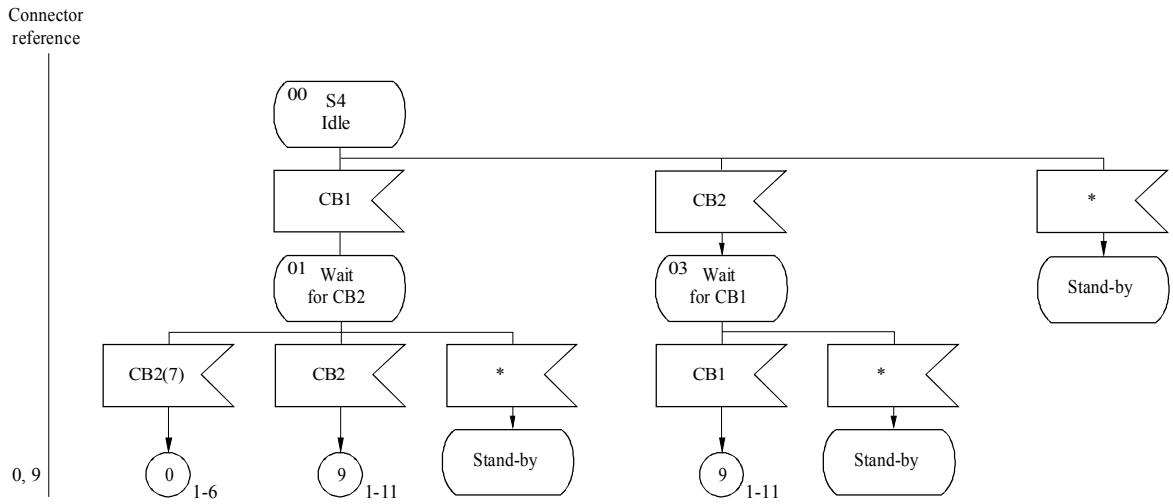
* Detected error, invalid signal or no signal at all

D31

APPENDIX 8

Phasing procedure without automatic identification in the case of a 4-signal call identity (called station)

Sheet 1 (of 1)



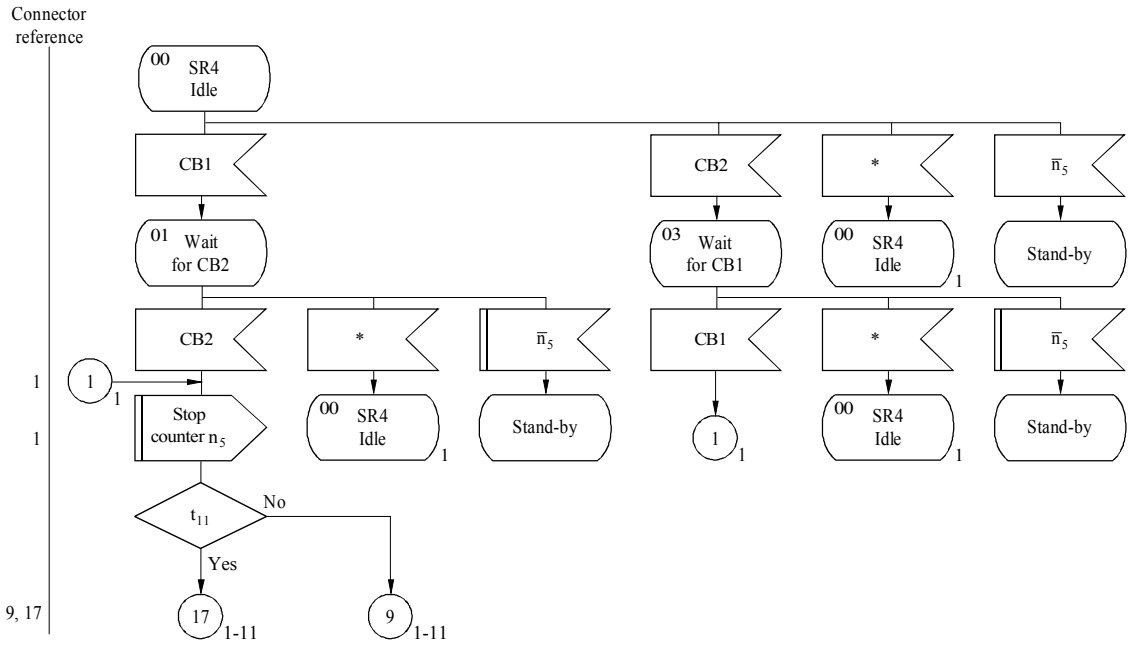
* Detected error, invalid signal or no signal at all

D32

APPENDIX 9

Rephasing procedure with automatic identification in the case of a 4-signal call identity (called station)

Sheet 1 (of 1)



t_{11}: block 2 was the last received block at the moment the interruption occurred?

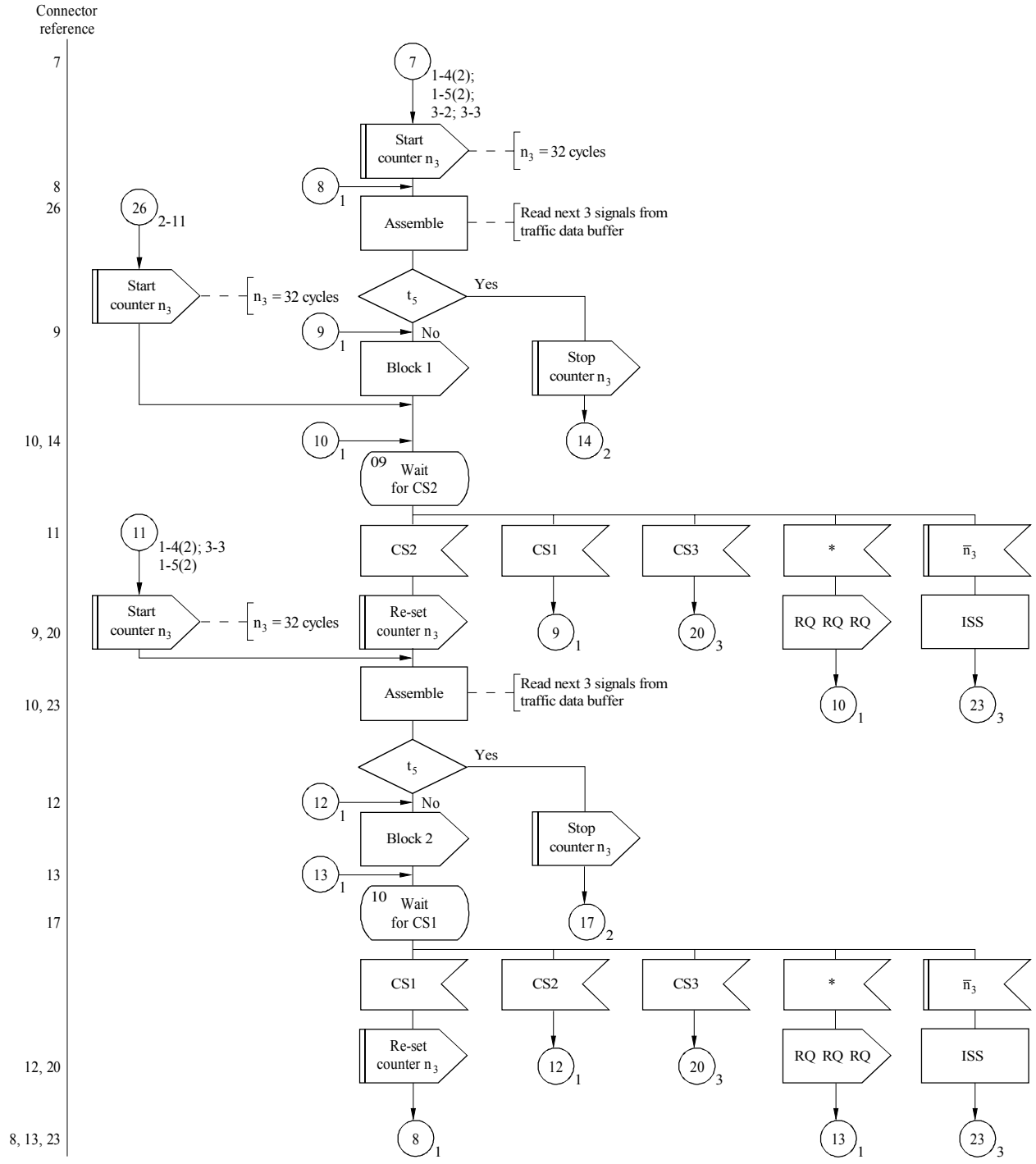
* Detected error, invalid signal or no signal at all

D33

APPENDIX 10

Traffic flow in the case of a 4-signal call identity and in the case of a 7-signal call identity (station is in the ISS position)

Sheet 1 (of 3)



t_5 : data block contains message "end-of-communication"?

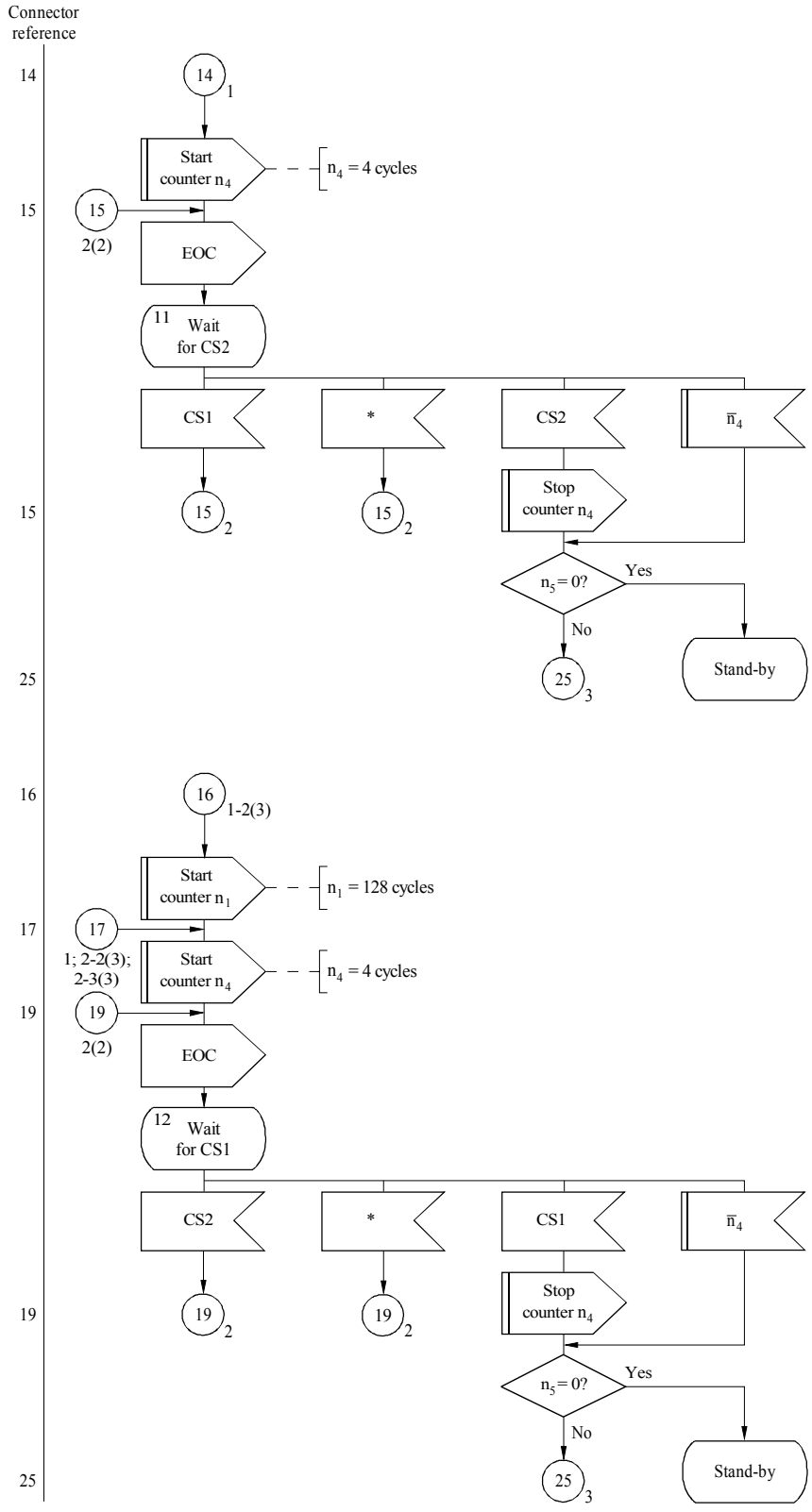
ISS: notice: station is ISS at the moment the interruption occurred

* Detected error, invalid signal or no signal at all

D34

APPENDIX 10

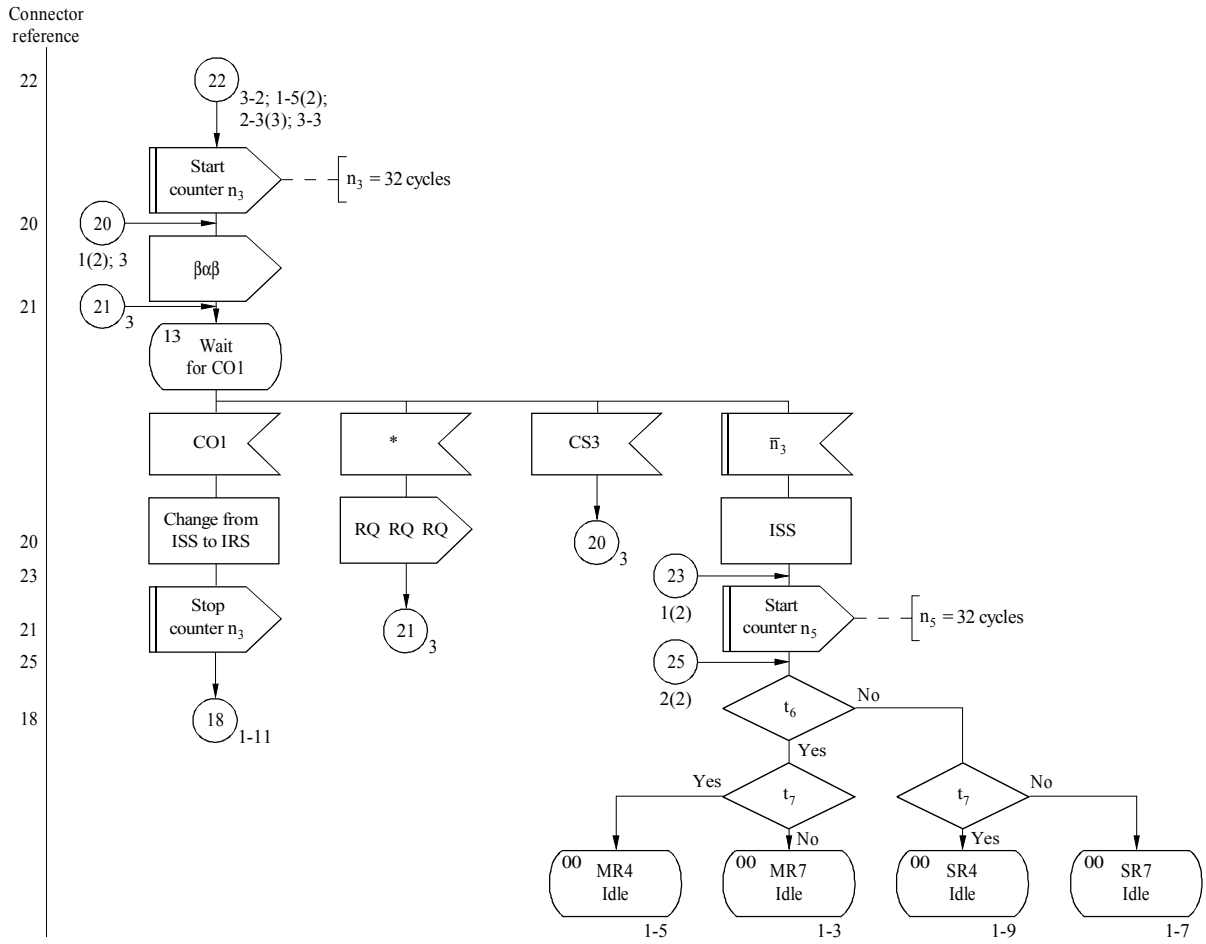
Sheet 2 (of 3)



* Detected error, invalid signal or no signal at all D35

APPENDIX 10

Sheet 3 (of 3)



t_6 : station is master station?

t_7 : station working in the case of a 4-position call identity?

ISS : notice: station is ISS at the moment the interruption occurred

CO1: if ISS is:
– master then “RQ RQ RQ”
– slave then “RQ”

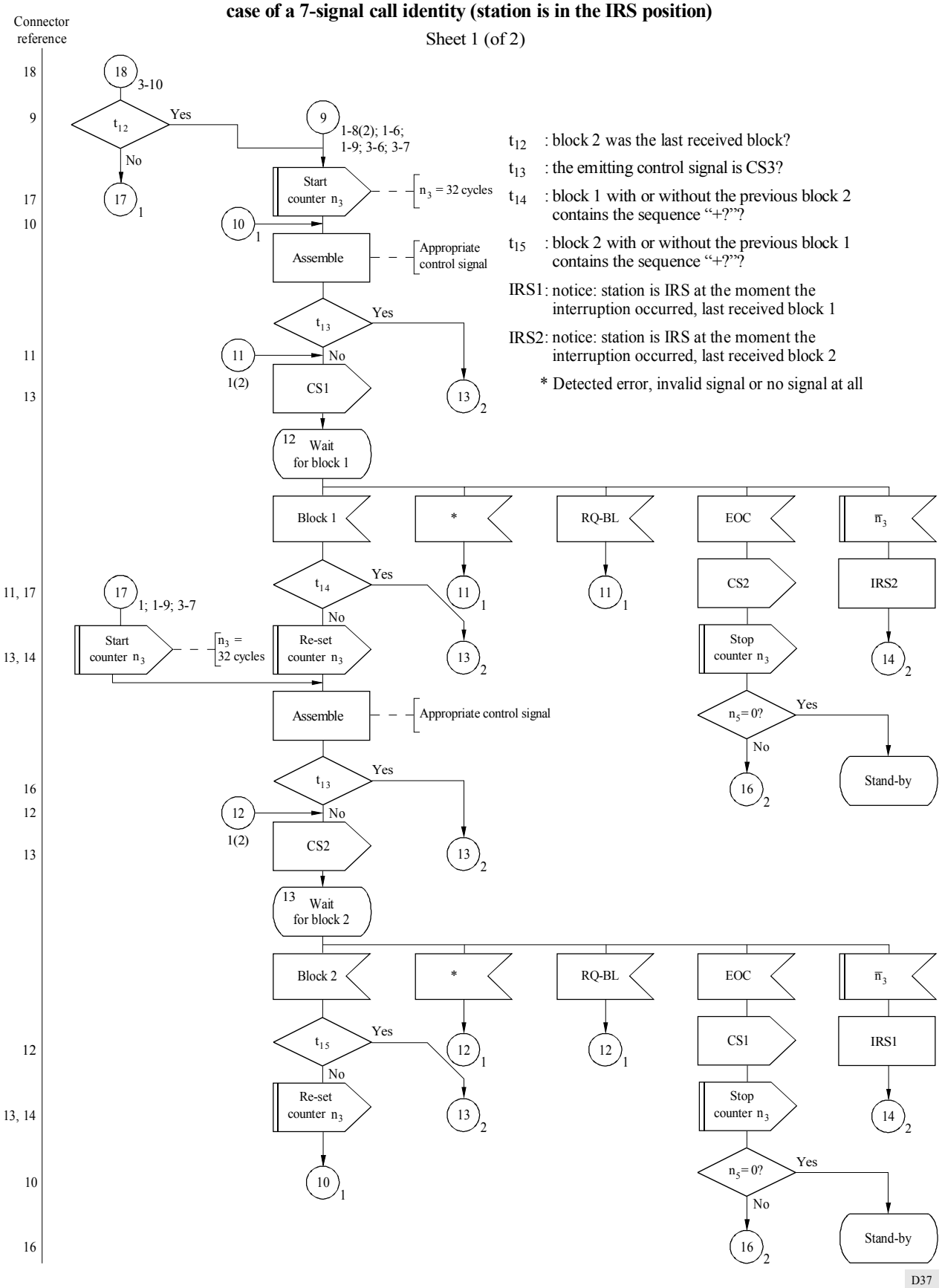
* Detected error, invalid signal or no signal at all

D36

APPENDIX 11

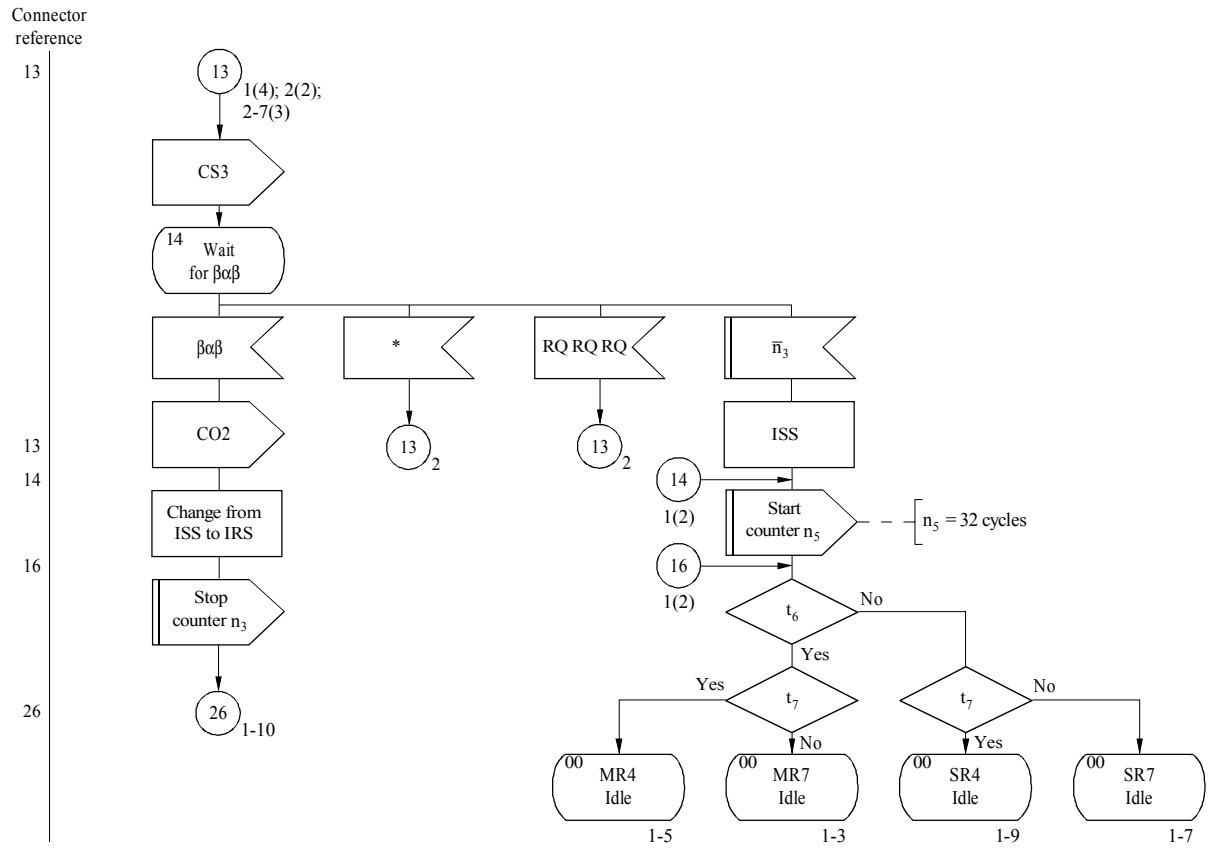
Traffic flow in the case of a 4-signal call identity and in the case of a 7-signal call identity (station is in the IRS position)

Sheet 1 (of 2)



APPENDIX 11

Sheet 2 (of 2)



t_6 : station is master station?

t_7 : station working in the case of a 4-signal call identity?

CO2: if IRS is:
– master then "RQ"
– slave then "RQ RQ RQ"

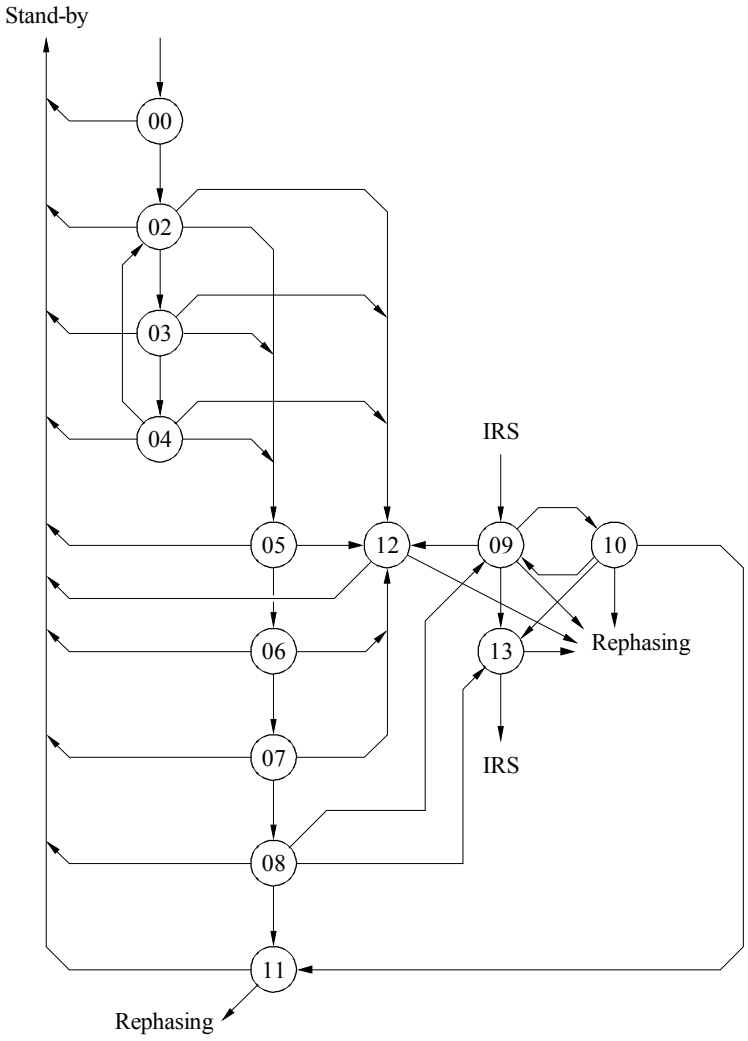
* Detected error, invalid signal or no signal at all

D38

APPENDIX 12

Phasing procedure with automatic identification in the case of a 7-signal call identity (calling station) and traffic flow if the station is in the ISS position (state overview diagram)

Sheet 1 (of 8)



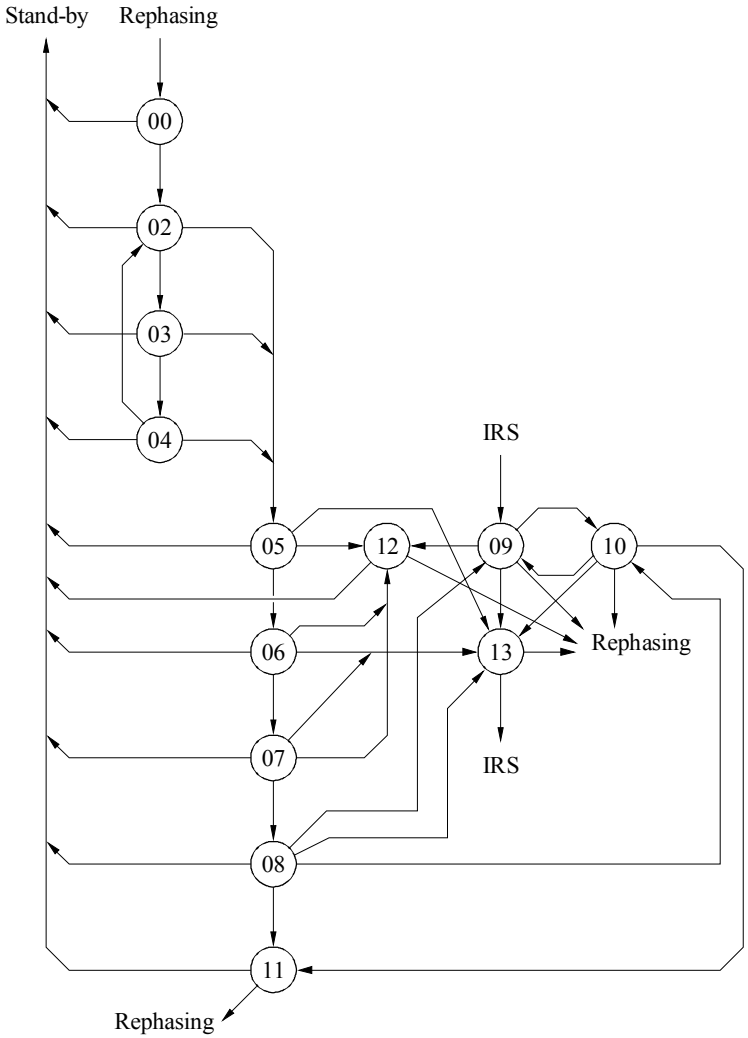
State number	State description	Sheet reference	Counters running	Supervisory counters
00	M7 idle	1-2	n_1	n_0 = 128 cycles
02	Wait for CS4	1-2	n_0	n_1 = 128 cycles
03	Wait for CS4	1-2	n_0	n_2 = 32 cycles
04	Wait for CS4	1-2	n_0	n_3 = 32 cycles
05	Wait for CK1	2-2	n_2	n_4 = 4 cycles
06	Wait for CK2	2-2	n_2	
07	Wait for CK3	2-2	n_2	
08	Wait for CS1	3-2	n_2	
09	Wait for CS2	1-10	n_3	
10	Wait for CS1	1-10	n_3	
11	Wait for CS2	2-10	n_4	
12	Wait for CS1	2-10	n_1, n_4	
13	Wait for change-over	3-10	n_3	

D39

APPENDIX 12

Rephasing procedure with automatic identification in the case of a 7-signal call identity (calling station) and traffic flow if the station is in the ISS position (state overview diagram)

Sheet 2 (of 8)



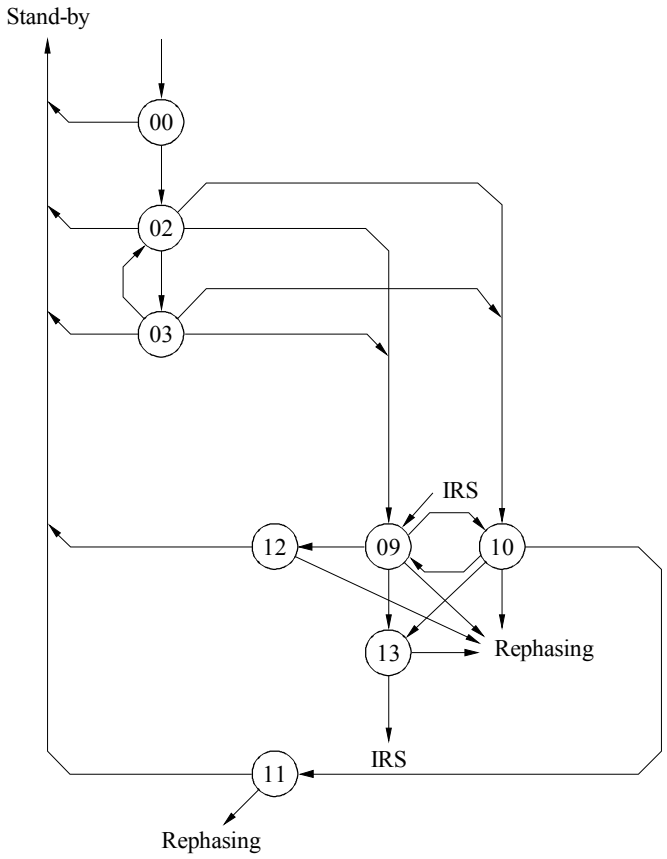
State number	State description	Sheet reference	Counters running	Supervisory counters
00	MR7 idle	1-3	n_5	n_1 = 128 cycles
02	Wait for CS5	1-3	n_5	n_2 = 32 cycles
03	Wait for CS5	1-3	n_5	n_3 = 32 cycles
04	Wait for CS5	1-3	n_5	n_4 = 4 cycles
05	Wait for CK1	2-3	n_2, n_5	n_5 = 32 cycles
06	Wait for CK2	2-3	n_2, n_5	
07	Wait for CK3	2-3	n_2, n_5	
08	Wait for CS1	3-3	n_2, n_5	
09	Wait for CS2	1-10	n_3, n_5	
10	Wait for CS1	1-10	n_3, n_5	
11	Wait for CS2	2-10	n_4, n_5	
12	Wait for CS1	2-10	n_1, n_4, n_5	
13	Wait for change-over	3-10	n_3, n_5	

D40

APPENDIX 12

Phasing procedure without automatic identification in the case of a 4-signal call identity (calling station) and traffic flow if the station is in the ISS position (state overview diagram)

Sheet 3 (of 8)



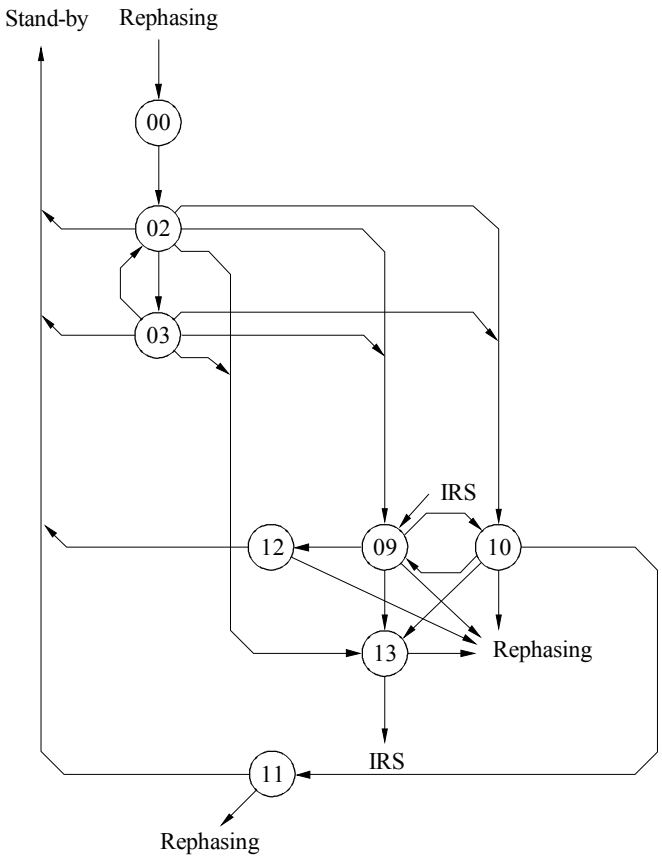
State number	State description	Sheet reference	Counters running	Supervisory counters
00	M4 idle	1- 4	n_1	n_0 = 128 cycles
02	Wait for CS1	1- 4	n_0	n_1 = 128 cycles
03	Wait for CS1	1- 4	n_0	n_3 = 32 cycles
09	Wait for CS2	1-10	n_3	n_4 = 4 cycles
10	Wait for CS1	1-10	n_3	
11	Wait for CS2	2-10	n_4	
12	Wait for CS1	2-10	n_1, n_4	
13	Wait for change-over	3-10	n_3	

D41

APPENDIX 12

Rephasing procedure without automatic identification in the case of a 4-signal call identity (calling station) and traffic flow if the station is in the ISS position (state overview diagram)

Sheet 4 (of 8)



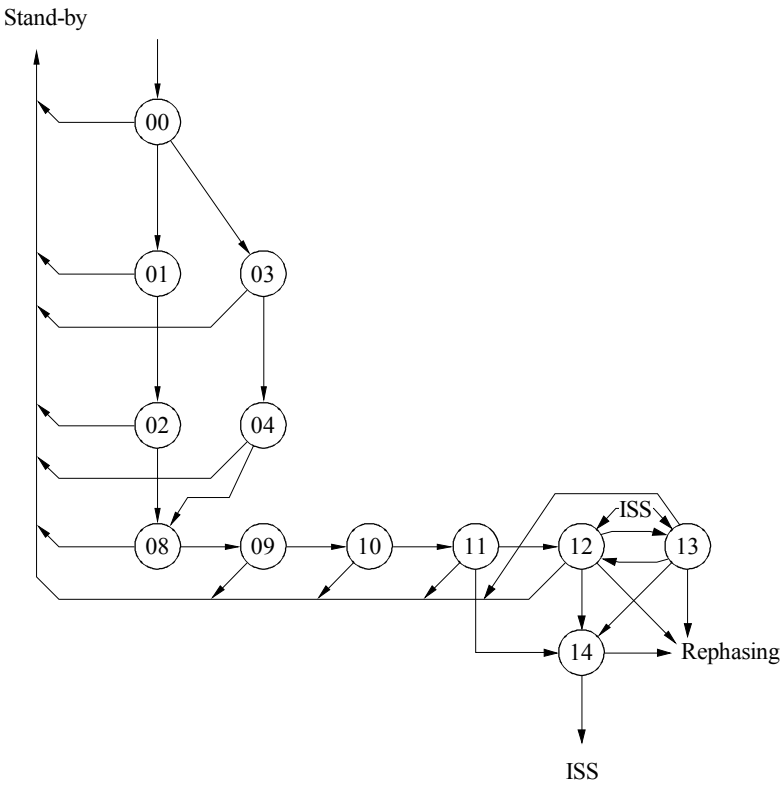
State number	State description	Sheet reference	Counters running	Supervisory counters
00	M4 idle	1-5	n_5	n_1 = 128 cycles
02	Wait for CS1	1-5	n_5	n_3 = 32 cycles
03	Wait for CS1	1-5	n_5	n_4 = 4 cycles
09	Wait for CS2	1-10	n_3	n_5 = 32 cycles
10	Wait for CS1	1-10	n_3	
11	Wait for CS2	2-10	n_4	
12	Wait for CS1	2-10	n_1, n_4	
13	Wait for change-over	3-10	n_3	

D42

APPENDIX 12

Phasing procedure with automatic identification in the case of a 7-signal call identity (called station) and traffic flow if the station is in the IRS position (state overview diagram)

Sheet 5 (of 8)



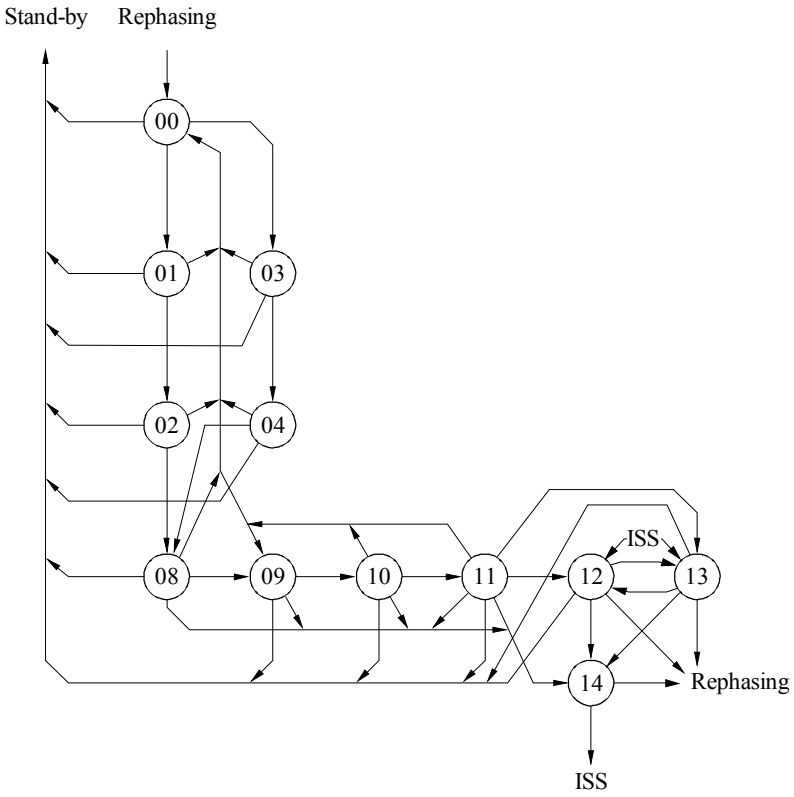
State number	State description	Sheet reference	Counters running	Supervisory counters
00	S7 idle	1-6		n_2 = 32 cycles
01	Wait for CB2	1-6		n_3 = 32 cycles
02	Wait for CB3	1-6		
03	Wait for CB3	1-6		
04	Wait for CB1	1-6		
08	Wait for ID1	2-6	n_2	
09	Wait for ID2	2-6	n_2	
10	Wait for ID3	2-6	n_2	
11	Wait for EOI	3-6	n_2	
12	Wait for block 1	1-11	n_3	
13	Wait for block 2	1-11	n_3	
14	Wait for βαβ	2-11	n_3	

D43

APPENDIX 12

Rephasing procedure with automatic identification in the case of a 7-signal call identity (called station) and traffic flow if the station is in the IRS position (state overview diagram)

Sheet 6 (of 8)



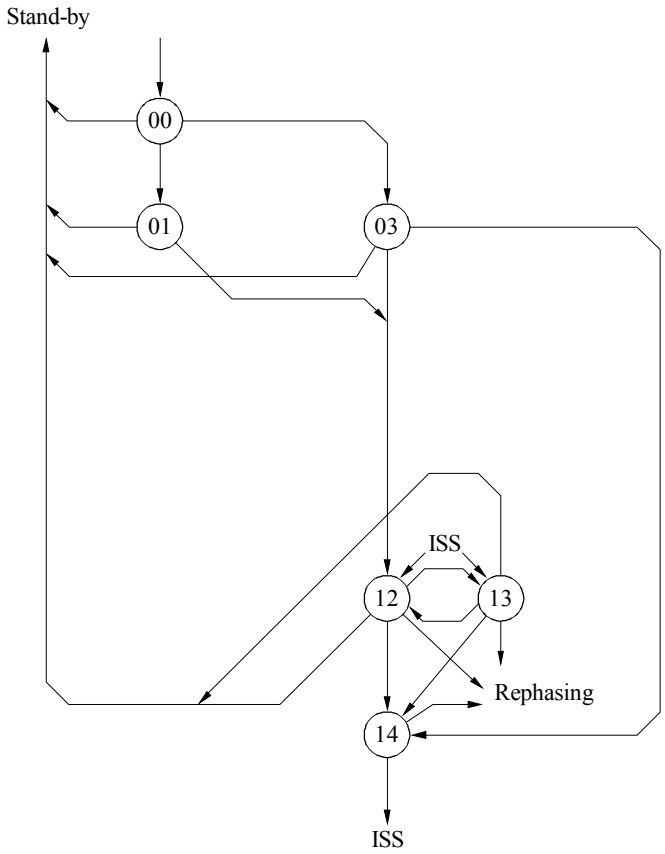
State number	State description	Sheet reference	Counters running	Supervisory counters
00	SR7 idle	1-7	n_5	n_2 = 32 cycles
01	Wait for CB2	1-7	n_5	n_3 = 32 cycles
02	Wait for CB3	1-7	n_5	n_5 = 32 cycles
03	Wait for CB3	1-7	n_5	
04	Wait for CB1	1-7	n_5	
08	Wait for ID1	2-7	n_2, n_5	
09	Wait for ID2	2-7	n_2, n_5	
10	Wait for ID3	2-7	n_2, n_5	
11	Wait for EOI	3-7	n_2, n_5	
12	Wait for block 1	1-11	n_3, n_5	
13	Wait for block 2	1-11	n_3, n_5	
14	Wait for βαβ	2-11	n_3, n_5	

D44

APPENDIX 12

Phasing procedure without automatic identification in the case of a 4-signal call identity (called station) and traffic flow if the station is in the IRS position (state overview diagram)

Sheet 7 (of 8)

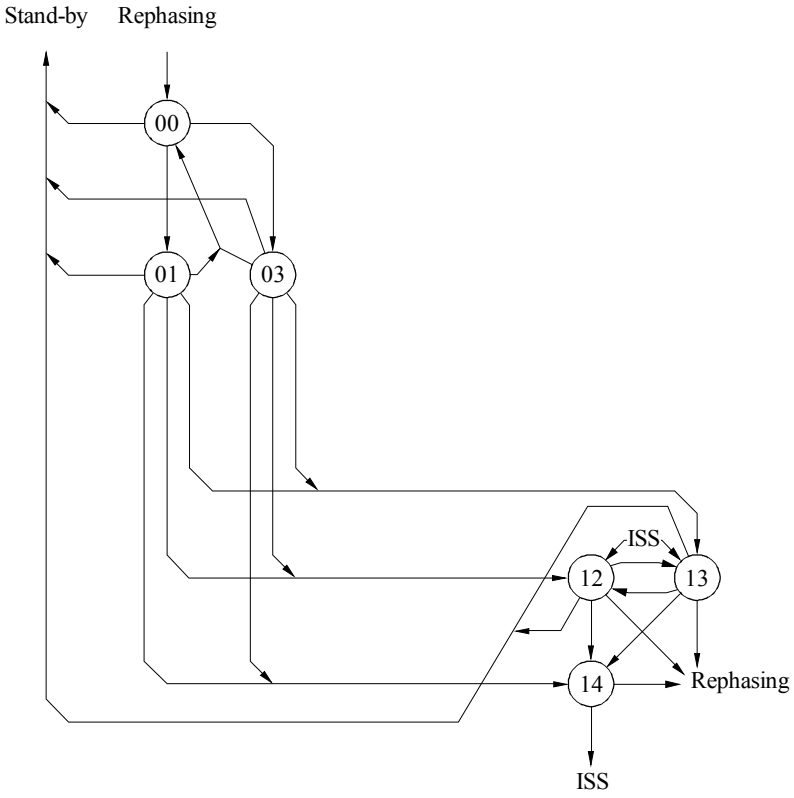


State number	State description	Sheet reference	Counters running	Supervisory counters
00	S4 idle	1-8		n_3 = 32 cycles
01	Wait for CB2	1-8		
03	Wait for CB1	1-8		
12	Wait for block 1	1-11	n_3	
13	Wait for block 2	1-11	n_3	
14	Wait for βαβ	2-11	n_3	D45

APPENDIX 12

Rephasing procedure without automatic identification in the case of a 4-signal call identity (called station) and traffic flow if the station is in the IRS position (state overview diagram)

Sheet 8 (of 8)



State number	State description	Sheet reference	Counters running	Supervisory counters
00	SR4 idle	1-9	n_5	n_2 = 32 cycles
01	Wait for CB2	1-9	n_5	n_3 = 32 cycles
03	Wait for CB1	1-9	n_5	n_5 = 32 cycles
12	Wait for block 1	1-11	n_3, n_5	
13	Wait for block 2	1-11	n_3, n_5	
14	Wait for βαβ	2-11	n_3, n_5	

D46

Annex 3-2-14

RECOMMENDATION 820

USE OF 9-DIGIT IDENTITIES FOR NARROW-BAND DIRECT-PRINTING TELEGRAPHY IN THE MARITIME MOBILE SERVICE

(Question 5/8)

(1992)

The CCIR,

considering

a) that CCIR Recommendations 476 and 625 provide for the use of narrow-band direct-printing equipment;

b) that Recommendation 625 provides for the use of maritime mobile service identities (MMSI) in accordance with the provisions of Appendix 43 of the Radio Regulations (RR);

c) that only the use of 9-digit MMSI offers the improved procedures of Recommendation 625 for the establishment and re-establishment of radio circuits which will also reduce the possibility of a message being received at a wrong station;

d) that in order to maintain compatibility with older equipment built in conformance with Recommendation 476, the new equipment built in accordance with Recommendation 625 still needs a 5-digit identity in addition to the 9-digit MMSI (see also Recommendation 585),

recommends

1. that the use of 5-digit identities as specified in Appendix 44 to the RR be restricted to those situations where one or both stations use equipment conforming to Recommendation 476-4 (Düsseldorf, 1990);

2. that administrations, in accordance with Appendix 43 to the RR, assign 9-digit identities in addition to 5-digit identities, to all stations under their jurisdiction which are, or will be, fitted with equipment conforming to Recommendation 625;

3. that coast stations are fitted with, or converted to, ARQ equipment in conformity with Recommendation 625 as soon as possible.

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Annex 3-3-1
Resolution A.810(19)

(Adopted on 23 November 1995)

PERFORMANCE STANDARDS FOR FLOAT-FREE SATELLITE EMERGENCY POSITION-INDICATING RADIO BEACONS (EPIRBs) OPERATING ON 406 MHz

THE ASSEMBLY,

RECALLING Article 15(j) of the Convention on the International Maritime Organization concerning the functions of the Assembly in relation to regulations and guidelines concerning maritime safety,

RECALLING ALSO regulations IV/7.1.6 and 14.1 of the 1988 amendments to the International Convention for the Safety of Life at Sea (SOLAS), 1974, concerning radiocommunications for the global maritime distress and safety system (GMDSS), which require, respectively, that ships be provided with a satellite emergency position-indicating radio beacon (EPIRB) and that such EPIRBs shall conform to appropriate performance standards not inferior to those adopted by the Organization,

RECOGNIZING the need to prepare performance standards for float-free satellite EPIRBs operating through a polar-orbiting satellite system on 406 MHz to be used in the GMDSS in order to ensure the operational reliability of such equipment and to avoid, as far as practicable, adverse interaction between such equipment and other communication and navigation equipment on board ship,

HAVING CONSIDERED the recommendation made by the Maritime Safety Committee at its sixty-fifth session,

1. ADOPTS the Recommendation on Performance Standards for Float-Free Satellite Emergency Position-Indicating Radio Beacons (EPIRBs) Operating on 406 MHz set out in the annex to the present resolution;

2. RECOMMENDS Governments to ensure that float-free satellite EPIRBs operating on the frequency 406 MHz, which form part of the GMDSS:

(a) if installed on or after 23 November 1996, conform to performance standards not inferior to those specified in the annex to the present resolution;

(b) if installed before 23 November 1996, conform to performance standards not inferior to those specified in the annex to resolution A.763(18);

(c) if installed before 4 November 1994, conform to performance standards not inferior to those specified in the annex to resolution A.763(18), except that they need not be provided with the 121.5 MHz homing beacon required by 2.3.14 of part A thereof;

3. INVITES the COSPAS–SARSAT partners to ensure that any amendments to the specification for COSPAS–SARSAT 406 MHz distress beacons are agreed with the Organization prior to their adoption;

4. REQUESTS the Maritime Safety Committee to ensure that any proposed amendments to this resolution are agreed with the COSPAS–SARSAT partners prior to their adoption;

5. REQUESTS ALSO the Maritime Safety Committee to review the code assignment method recommended in 4 of part B of the annex to this resolution prior to 1 February 1997;

6. REQUESTS FURTHER the Maritime Safety Committee to keep these Performance Standards under review and to adopt amendments thereto, as necessary.

Annex

RECOMMENDATION ON PERFORMANCE STANDARDS FOR FLOAT-FREE SATELLITE EMERGENCY POSITION-INDICATING RADIO BEACONS (EPIRBs) OPERATING ON 406 MHz

Part A

General

1 INTRODUCTION

The satellite emergency position-indicating radio beacon (EPIRB) should, in addition to meeting the requirements of the Radio Regulations, the relevant ITU-R Recommendations and the general requirements set out in resolution A.694(17), comply with the following performance standards.

2 GENERAL

2.1 The satellite EPIRB should be capable of transmitting a distress alert to a polar-orbiting satellite.

2.2 The EPIRB should be of an automatic float-free type. The equipment, mounting and releasing arrangements should be reliable, and should operate satisfactorily under the most extreme conditions likely to be met with at sea.

2.3 The satellite EPIRB should:

.1 be fitted with adequate means to prevent inadvertent activation;

.2 be so designed that the electrical portions are watertight at a depth of 10 m for at least 5 min. Consideration should be given to a temperature variation of 45°C during transitions from the mounted position to immersion. The harmful effects of a marine environment, condensation and water leakage should not affect the performance of the beacon;

.3 be automatically activated after floating free;

.4 be capable of manual activation and manual deactivation;

.5 be provided with means to indicate that signals are being emitted;

.6 be capable of floating upright in calm water and have positive stability and sufficient buoyancy in all sea conditions;

.7 be capable of being dropped into the water without damage from a height of 20 m;

.8 be capable of being tested, without using the satellite system, to determine that the EPIRB is capable of operating properly;

.9 be of highly visible yellow/orange colour and be fitted with retro-reflecting material;

.10 be equipped with a buoyant lanyard suitable for use as a tether, which should be so arranged as to prevent its being trapped in the ship's structure when floating free;

.11 be provided with a low-duty-cycle light (0.75 cd), active during darkness, to indicate its position to nearby survivors and to rescue units;

.12 not be unduly affected by seawater or oil or both;

.13 be resistant to deterioration in prolonged exposure to sunlight; and

.14 be provided with a 121.5 MHz beacon primarily for homing by aircraft.

2.4 The battery should have sufficient capacity to operate the satellite EPIRB for a period of at least 48 h.

2.5 The satellite EPIRB should be so designed as to operate under any of the following environmental conditions:

.1 ambient temperatures of –20°C to +55°C;

.2 icing;

.3 relative wind speeds up to 100 knots; and

.4 after stowage, at temperatures between –30°C and +70°C.

2.6 The installed satellite EPIRB should:

.1 have local manual activation; remote activation may also be provided from the navigating bridge, while the device is installed in the float-free mounting;

.2 be capable, while mounted on board, of operating properly over the ranges of shock and vibration and other environmental conditions normally encountered above deck on seagoing ships; and

.3 be designed to release itself and float free before reaching a depth of 4 m at a list or trim of any angle.

3 DISTRESS FUNCTION

3.1 When the satellite EPIRB is manually operated, a distress alert should be initiated only by means of a dedicated distress alert activator.

3.2 The dedicated activator should:

.1 be clearly identified; and

.2 be protected against inadvertent operation.

3.3 Manual distress alert initiation should require at least two independent actions.

3.4 The satellite EPIRB should not be automatically activated after being manually removed from the release mechanism.

4 LABELLING

In addition to the items specified in resolution A.694(17) on general requirements, the following should be clearly indicated on the exterior of the equipment:

.1 brief operating instructions;

.2 expiry date for the primary battery used; and

.3 the identity code programmed into the transmitter.

Part B

Satellite signals

1 The satellite EPIRB distress alerting signal should be transmitted on the frequency of 406.025 MHz using G1B class of emission.

2 The technical characteristics of the transmitted signal and the message format should be in accordance with Recommendation ITU-R M.633.

3 Provisions should be included for storing the fixed portion of the distress message in the satellite EPIRB using non-volatile memory.

4 A unique beacon identification code should be made part of all messages.

Until 1 February 1999, this identification code should include a three-digit code for the country in which the beacon is registered, followed by either:

.1 the trailing six digits of the ship station identity in accordance with appendix 43 of ITU Radio Regulations; or

.2 a unique serial number; or

.3 a radio call sign.

Preference is given to method .1.

After 1 February 1999, all new beacon installations should be in accordance with method .1.*

5 The 121.5 MHz homing signal should:

.1 have a continuous duty cycle, except that it may be interrupted for up to a maximum of 2 s during the transmission of the 406 MHz signal; and

.2 with the exception of the sweep direction, meet the technical characteristics of appendix 37A of the Radio Regulations. The sweep may be either upward or downward.

* The code assignment method is to be reviewed prior to 1 February 1997.

Annex 3-3-2
Resolution MSC.56(66)

(Adopted on 3 June 1996)

ADOPTION OF AMENDMENTS TO THE RECOMMENDATION ON PERFORMANCE STANDARDS FOR FLOAT-FREE SATELLITE EMERGENCY POSITION-INDICATING RADIO BEACONS (EPIRBs) OPERATING ON 406 MHz (Resolution A.810(19))

THE MARITIME SAFETY COMMITTEE,

RECALLING resolution A.825(19), by which the Assembly resolved that the functions of adopting performance standards for radio and navigational equipment, as well as amendments thereto, shall be performed by the Maritime Safety Committee on behalf of the Organization,

HAVING CONSIDERED resolution A.810(19) on Performance Standards for Float-Free Satellite Emergency Position-Indicating Radio Beacons (EPIRBs) Operating on 406 MHz and reviewed the code assignment method recommended in paragraph 4, part B of the annex to resolution A.810(19),

ADOPTS the Amendments to the Recommendation on Performance Standards for Float-Free Satellite Emergency Position-Indicating Radio Beacons (EPIRBs) Operating on 406 MHz, annexed to resolution A.810(19), set out in the annex to the present resolution.

Annex

AMENDMENTS TO THE RECOMMENDATION ON PERFORMANCE STANDARDS FOR FLOAT-FREE SATELLITE EMERGENCY POSITION-INDICATING RADIO BEACONS (EPIRBs) OPERATING ON 406 MHz (Resolution A.810(19))

ANNEX TO RESOLUTION A.810(19)

1 *In paragraph 4 of part B of the annex:*

.1 *the expression* "Until 1 February 1999"*, in the second sentence, is deleted; and*

.2 *the fourth sentence* "After 1 February 1999, all new beacon installations should be in accordance with method .1*" *is deleted.*

2 *Footnote * is deleted.*

Annex 3-3-3
Resolution A.805(19)

(Adopted on 23 November 1995)

PERFORMANCE STANDARDS FOR FLOAT-FREE VHF EMERGENCY POSITION-INDICATING RADIO BEACONS

THE ASSEMBLY,

RECALLING Article 15(j) of the Convention on the International Maritime Organization concerning the functions of the Assembly in relation to regulations and guidelines concerning maritime safety,

RECALLING ALSO regulations IV/8.3 and 14.1 of the 1988 amendments to the International Convention for the Safety of Life at Sea (SOLAS), 1974, concerning radiocommunications for the global maritime distress and safety system (GMDSS), which, respectively, permit ships engaged on voyages exclusively in sea area A1 to be provided with a float-free VHF emergency position-indicating radio beacon (EPIRB) and that such EPIRBs shall conform to appropriate performance standards not inferior to those adopted by the Organization,

RECOGNIZING the need to prepare performance standards for float-free VHF EPIRBs to be used in the GMDSS in order to ensure the operational reliability of such equipment and to avoid, as far as practicable, adverse interaction between such equipment and other communication and navigation equipment on board ship,

HAVING CONSIDERED the recommendation made by the Maritime Safety Committee at its sixty-fifth session,

1. ADOPTS the Recommendation on Performance Standards for Float-Free VHF Emergency Position-Indicating Radio Beacons set out in the annex to the present resolution;

2. RECOMMENDS Governments to ensure that VHF EPIRBs which will form part of the GMDSS:

(a) if installed on or after 23 November 1996, conform to performance standards not inferior to those specified in the annex to the present resolution;

(b) if installed before 23 November 1996, conform to performance standards not inferior to those specified in the annex to resolution A.612(15);

3. REQUESTS the Maritime Safety Committee to keep these Performance Standards under review and to adopt amendments thereto, as necessary.

Annex

RECOMMENDATION ON PERFORMANCE STANDARDS FOR FLOAT-FREE VHF EMERGENCY POSITION-INDICATING RADIO BEACONS

Part A
General

1 INTRODUCTION

The VHF emergency position-indicating radio beacon (EPIRB), in addition to meeting the requirements of the Radio Regulations, the relevant ITU-R Recommendations and the general requirements set out in resolution A.694(17), should comply with the following performance standards.

2 GENERAL

2.1 The EPIRB should be capable of transmitting a VHF distress alert and of providing a locating signal by means of a 9 GHz radar transponder. These two functions may be provided in an integral unit. The radar transponder (SART) should comply with the Recommendation on Performance Standards for Survival Craft

Radar Transponders for Use in Search and Rescue Operations (resolution A.802(19)) and should be capable of indicating the location of a unit in distress on the assisting units' radars by means of a series of equally spaced dots as specified in resolution A.530(13).

2.2 The EPIRB should be of an automatic float-free type. The equipment and the mounting and releasing arrangements should be reliable even under extreme conditions.

2.3 The VHF EPIRB should:

.1 be capable of being easily activated by unskilled personnel;

.2 be fitted with adequate means to prevent inadvertent activation;

.3 be so designed that the electrical portions are watertight at a depth of 10 m for at least 5 min. Consideration should be given to a temperature variation of 45°C during transitions from the mounted position to immersion. The harmful effects of a marine environment, condensation and water leakage should not affect the performance of the beacon;

.4 be automatically activated after floating free;

.5 be capable of manual activation and manual deactivation;

.6 be provided with means to indicate that signals are being emitted;

.7 be capable of floating upright in calm water, and have positive stability and sufficient buoyancy (preferably more than 20 N) in all sea conditions;

.8 be capable of being dropped into the water without damage from a height of 20 m;

.9 be capable of being tested on board, without radiating an alerting signal, to determine that it is capable of operating properly;

.10 be of highly visible yellow/orange colour and be fitted with retro-reflecting material;

.11 be equipped with a buoyant captive lanyard, suitable for use as a tether, which should be so arranged as to prevent its being trapped in the ship's structure when floating free;

.12 be provided with a low-duty-cycle light (0.75 cd), activated during darkness, to indicate the beacon's position for the survivors nearby and rescue units;

.13 not be unduly affected by seawater or oil; and

.14 be resistant to deterioration by prolonged exposure to sunlight.

2.4 The battery should have sufficient capacity to operate the VHF EPIRB for a period of at least 48 h.

2.5 The VHF EPIRB should be so designed as to operate under any of the following environmental conditions:

.1 ambient temperatures of –20°C to +55°C;

.2 icing;

.3 relative wind speeds up to 100 knots; and

.4 after stowage, at temperatures between –30°C and +65°C.

2.6 The installed VHF EPIRB should:

.1 have local manual activation; remote activation may also be provided from the navigating bridge while the device is installed in the float-free mounting;

.2 be capable, while mounted on board, of operating properly over the ranges of shock and vibrations and other environmental conditions normally encountered above deck on seagoing vessels; and

.3 be designed to release and float free before reaching a depth of 4 m at a list or trim of any angle.

3 LABELLING

In addition to the items specified in resolution A.694(17) on general requirements, the following should be clearly indicated on the exterior of the equipment:

.1 brief operating instructions; and

.2 expiry date of the primary battery used.

Part B

DSC alerting signal

1 The VHF EPIRB DSC distress alerting signal should be transmitted on the frequency of 156.525 MHz using G2B class of emission.

2 The frequency tolerance should not exceed 10 parts per million.

3 The necessary bandwidth should be less than 16 kHz.

4 The output power should be at least 100 mW.

5 The emission should be vertically polarized at the source.

6 MODULATION

6.1 Frequency modulation with a pre-emphasis characteristic of 6 dB/octave (phase modulation) with the modulating sub-carrier, should be used.

6.2 A sub-carrier of 1,700 Hz with frequency shift between 1,300 Hz and 2,100 Hz should be used.

6.3 The frequency tolerance of 1,300 Hz and 2,100 Hz tones should be within ± 10 Hz.

6.4 The modulation rate should be 1,200 bauds.

6.5 The index of modulation should be 2.0 $\pm 10\%$.

7 DSC MESSAGE FORMAT AND TRANSMISSION SEQUENCE

7.1 The technical characteristics for the DSC message should be in accordance with the sequence for the "distress call" specified in Recommendation ITU-R M.493.

7.2 The "nature of distress" indication should be "EPIRB emission".

7.3 The "distress co-ordinates" and "time" information need not be included. In this case the digit 9 repeated 10 times and the digit 8 repeated four times should be included as specified in Recommendation ITU-R M.493.

7.4 The "type of subsequent communication" indication should be "no information" (symbol # 126) which indicates that no subsequent communications will follow.

7.5 The alerting signals should be transmitted in bursts. The (N+1) burst of transmission which consists of five successive DSC sequences should be made with an interval of T_n after the Nth burst as given in figure 1.

Where: $T_n = (240 + 10N)$ s $\pm$ 5% and $N = 1, 2, 3, ...$

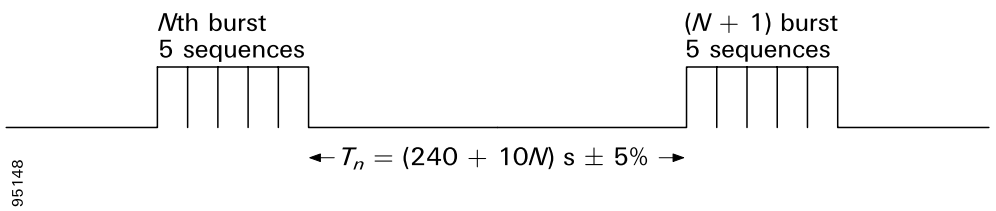


Figure 1

Annex 3-3-4
Resolution A.812(19)

(Adopted on 23 November 1995)

PERFORMANCE STANDARDS FOR FLOAT-FREE SATELLITE EMERGENCY POSITION-INDICATING RADIO BEACONS OPERATING THROUGH THE GEOSTATIONARY INMARSAT SATELLITE SYSTEM ON 1.6 GHz

THE ASSEMBLY,

RECALLING Article 15(j) of the Convention on the International Maritime Organization concerning the functions of the Assembly in relation to regulations and guidelines concerning maritime safety,

RECALLING ALSO regulations IV/7.1.6 and 14.1 of the 1988 amendments to the International Convention for the Safety of Life at Sea (SOLAS), 1974, concerning radiocommunications for the global maritime distress and safety system (GMDSS), which require respectively that ships be provided with a satellite emergency position-indicating radio beacon (EPIRB) and that such EPIRBs shall conform to appropriate performance standards not inferior to those adopted by the Organization,

RECOGNIZING the need to prepare performance standards for float-free satellite EPIRBs operating through the geostationary Inmarsat satellite system on 1.6 GHz to be used in the GMDSS in order to ensure the operational reliability of such equipment and to avoid, as far as practicable, adverse interaction between such equipment and other communication and navigation equipment on board ship,

HAVING CONSIDERED the recommendation made by the Maritime Safety Committee at its sixty-fifth session,

1. ADOPTS the Recommendation on Performance Standards for Float-Free Satellite EPIRBs Operating through the Geostationary Inmarsat Satellite System on 1.6 GHz set out in the annex to the present resolution;

2. RECOMMENDS Governments to ensure that float-free satellite EPIRBs operating through the geostationary Inmarsat satellite system on 1.6 GHz, which form part of the GMDSS;

(a) if installed on or after 23 November 1996, conform to performance standards not inferior to those specified in the annex to the present resolution;

(b) if installed before 23 November 1996, conform to performance standards not inferior to those specified in the annex to resolution A.661(16);

3. INVITES Inmarsat to ensure that any amendments in the specification for Inmarsat 1.6 GHz distress beacons are agreed with the Organization prior to their adoption;

4. REQUESTS the Maritime Safety Committee to ensure that any proposed amendments to this resolution are agreed with Inmarsat prior to their adoption;

5. REQUESTS ALSO the Maritime Safety Committee to keep these Performance Standards under review and to adopt amendments thereto, as necessary.

Annex

RECOMMENDATION ON PERFORMANCE STANDARDS FOR FLOAT-FREE SATELLITE EPIRBs OPERATING THROUGH THE GEOSTATIONARY INMARSAT SATELLITE SYSTEM ON 1.6 GHz

Part A
General

1 INTRODUCTION

The satellite emergency position-indicating radio beacon (EPIRB) should, in addition to meeting the requirements of the Radio Regulations, the relevant ITU-R Recommendations, the relevant Inmarsat technical requirements, and the general requirements set out in resolution A.694(17), comply with the following performance standards.

2 GENERAL

2.1 The satellite EPIRB should be capable of transmitting a distress alert to a geostationary satellite.

2.2 The satellite EPIRB should be of an automatic float-free type. The equipment should be reliable even under extreme conditions.

2.3 The performance of the float-free arrangements should be in accordance with the requirements of the performance standards for float-free release and activation arrangements for emergency radio equipment set out in resolution A.662(16).

2.4 The satellite EPIRB should:

.1 be fitted with adequate means to prevent inadvertent activation;

.2 be so designed that the electrical portions are watertight at a depth of 10 m for at least 5 min. Consideration should be given to a temperature variation of 45°C during transitions from the mounted position to immersion. The harmful effects of a marine environment, condensation and water leakage should not affect the performance of the beacon;

.3 be automatically activated after floating free;

.4 be continuously provided with the ship's position data for automatic inclusion in the distress message when activated;

.5 be equipped with a search and rescue radar transponder unless integral facilities are included for automatic position updating after activation;

.6 be capable of manual activation and manual deactivation;

.7 be provided with means to indicate that signals are being emitted;

.8 be capable of floating upright in calm water and have positive stability and sufficient buoyancy in all sea conditions;

.9 be capable of being dropped into the water without damage from a height of 20 m;

.10 be capable of being tested without using the satellite system to determine that the EPIRB is capable of operating properly;

.11 be of highly visible yellow/orange colour and be fitted with retro-reflective material;

.12 be equipped with a buoyant captive lanyard suitable for use as a tether, which should be so arranged as to prevent its being trapped in the ship's structure when floating free;

.13 be provided with a low-duty-cycle light (0.75 cd), active during darkness, to indicate its position to nearby survivors and to rescue units;

.14 not be unduly affected by seawater, or oil, or both; and

.15 be resistant to deterioration by prolonged exposure to sunlight.

2.5 The battery should have sufficient capacity to operate:

.1 the distress alerting transmitter for 4 h in accordance with Recommendation ITU-R M.632 or for at least 48 h if integral facilities are included for automatic position updating; and

.2 any other facilities (e.g. SART and flashing light) for at least 48 h.

2.6 The satellite EPIRB should be so designed as to operate under any of the following environmental conditions:

.1 ambient temperature of –20°C to +55°C;

.2 icing;

.3 relative wind speeds up to 100 knots; and

.4 after stowage at temperatures between –30°C and +70°C.

2.7 The installed satellite EPIRB should:

.1 have local manual activation; remote activation may also be provided from the navigating bridge, while the device is installed in the float-free mounting;

.2 be capable, while mounted on board, of operating properly over the range of shock and vibrations and other environmental conditions normally encountered above deck on seagoing vessels; and

.3 be designed to release itself and float free before reaching a depth of 4 m at a list or trim of any angle.

2.8 Any connection to the EPIRB, e.g. for the purpose of supply of data or power, should be corrosion-resistant and protected against accidental disconnection.

3 DISTRESS FUNCTION

3.1 When the satellite EPIRB is manually operated, a distress alert should be initiated only by means of a dedicated distress alert activator.

3.2 The dedicated activator should:

.1 be clearly identified; and

.2 be protected against inadvertent operation.

3.3 Manual distress alert initiation should require at least two independent actions.

3.4 The satellite EPIRB should not be automatically activated after being manually removed from the release mechanism.

4 LABELLING

In addition to the general requirements specified in resolution A.694(17), the following should be clearly indicated on the exterior of the equipment:

.1 brief operating instructions; and

.2 expiry date for the primary batteries used.

Part B

Satellite signal

1 The satellite EPIRB should include facilities to transmit in the 1,644.3 to 1,644.5 MHz frequency band and, after full implementation of the second-generation Inmarsat space segment, in the frequency band 1,645.5 to 1,646.5 MHz only. Alternatively, the satellite EPIRB distress alert could be transmitted sequentially in the 1,644.3 to 1,644.5 MHz frequency band and the frequency band 1,645.5 to 1,646.5 MHz. After full implementation of the second-generation Inmarsat space segment, the emission should be limited to the frequency band 1,645.5 to 1,646.5 MHz only.

2 The technical characteristics of the transmitted signal and the message format should be in accordance with Recommendation ITU-R M.632.* The binary system codes on the satellite radiopath and its decimal representations are used for in-system control, commissioning and registration. The system code is fixed into the Inmarsat-E EPIRB and protected through its entire life against any unauthorized change.

3 The system code should be made part of all messages. The Inmarsat-E registration database, which is maintained by Inmarsat, matches the applicant identity and any alphanumeric form of national identity to the unique system code.

* Substitution of the term *ship station identity* by *system code* in Recommendation ITU-R M.632 is being considered by the ITU. This note should be disregarded after the above amendment to Recommendation ITU-R M.632 has received formal approval by ITU.

Annex 3-3-5

RECOMMENDATION ITU-R M.632-3*

TRANSMISSION CHARACTERISTICS OF A SATELLITE EMERGENCY POSITION-INDICATING RADIO BEACON (SATELLITE EPIRB) SYSTEM OPERATING THROUGH GEOSTATIONARY SATELLITES IN THE 1.6 GHz BAND

(Question ITU-R 90/8)

(1986-1990-1994-1997)

Summary

This Recommendation contains the transmission characteristics of a satellite EPIRB system operating through geostationary satellites in the 1.6 GHz band. This Recommendation is intended to facilitate the popularization of satellite EPIRB systems practically without sacrificing the system performance.

The ITU Radiocommunication Assembly,

considering

a) that satellite EPIRBs are one of the prime alerting means in the Global Maritime Distress and Safety System (GMDSS) adopted by the International Maritime Organization (IMO);

b) that the satellite EPIRB system operating through geostationary satellites in the 1.6 GHz band is one of two satellite-based distress alerting systems developed for use in the GMDSS;

c) that all ships to which Chapter IV of the International Convention for the Safety of Life at Sea (SOLAS) 1974, as amended in 1988, applies are required by Regulation IV/7.1.6 to carry a satellite EPIRB from 1 August 1993;

d) that SOLAS Regulation IV/7.1.6 permits the carriage of a satellite EPIRB operating through the Inmarsat geostationary-satellite system, subject to the availability of appropriate receiving and processing ground facilities for each ocean region covered by Inmarsat;

e) that pre-operational demonstrations have been satisfactorily completed;

f) that the IMO has adopted Resolution A.661(16) – Performance standards for float-free satellite EPIRBs operating through the geostationary Inmarsat satellite system on 1.6 GHz;

g) that ships to which the 1974 SOLAS Convention does not apply will use elements of the GMDSS, including satellite EPIRBs, some of which may not meet all of the requirements established by the IMO in Resolution A.661(16);

h) the necessity to make available satellite EPIRB production units, and to gain operational experience within the remaining time-frame;

j) that the frequency band for satellite EPIRBs available through the first generation Inmarsat space segment is 1 644.3-1 644.5 MHz;

k) that the second generation Inmarsat space segment, which is planned to commence operation from 1990 onwards, will cover both the band 1 644.3-1 644.5 MHz and the band 1 645.5-1 646.5 MHz;

l) that the number of potential users, including non-Convention ships, cannot yet be estimated;

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* This Recommendation should be brought to the attention of the International Maritime Organization (IMO), the International Civil Aviation Organization (ICAO), and the International Mobile Satellite Organization (Inmarsat).

Note by the Secretariat: The current version of this Recommendation has been incorporated by reference in the Radio Regulations (RR) as revised by the World Radiocommunication Conference, 1995 (WRC-95). According to *resolves 1* of Resolution 28 (WRC-95), the next Radiocommunication Assembly shall communicate to the WRC-97 the list of the ITU-R Recommendations incorporated by reference in the RR which have been revised and approved.

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m) that the amount of spectrum for the 1.6 GHz satellite EPIRB system necessary to meet the presently foreseen operational capacity requirements is probably not greater than 200 kHz,

recommend3s

1 that the transmission characteristics of all types of satellite EPIRBs operating through geostationary satellites at 1.6 GHz should be in accordance with Annex 1;

2 that the transmission frequencies of satellite EPIRBs be distributed uniformly across the frequency band appropriate to the space segment in use;

3 that the operational implementation of the 1.6 GHz satellite EPIRB system as it applies to the second and subsequent generations of the Inmarsat space segment be initiated in the spectrum between 1 645.6 and 1 645.8 MHz;

4 that until all satellites of the Inmarsat first generation space segment (spare and operational) are completely replaced, all types of satellite EPIRBs in the 1.6 GHz band will transmit sequentially on both 1 645.6-1 645.8 MHz and 1 644.3-1 644.5 MHz.

ANNEX 1

Transmission characteristics of a satellite emergency position-indicating radio beacon (satellite EPIRB) system operating through geostationary satellites in the 1.6 GHz band

Modulation:	non-coherent binary frequency shift keying (FSK)
Transmit frequency:*	within the bands 1 644.3-1 644.5 MHz (Inmarsat first generation space segment) and 1 645.5-1 646.5 MHz (Inmarsat second generation space segment)
Deviation:	−120 Hz (0) + 120 Hz (1) tolerance ± 1%
Accuracy of clock frequency:	$\pm 2 \times 10^{-6}$/year (This requires a clock accuracy of $\pm 2 \times 10^{-7}$/year in the receiver processor)
Transmit frequency:	
– long-term accuracy (for 1 year):	better than $\pm 3 \times 10^{-6}$
– short-term stability:	2×10^{-8} for 1 min
FSK switching time:	80% transmit power within 1.5 ms
Transmit power (e.i.r.p.):	0 dBW with tolerance + 2 to −3 dB
Antenna:	Hemispherical in pattern
Antenna axial ratio:	≤ 5 dB for ± 90° from zenith
Polarization:	right-hand circular
Frame length:	
– data:	100 bits (see Appendix 1)
– synchronization:	20 bits (see Appendix 1)
– parity bits:	40 bits (see Appendix 2)

* Until all satellites of the Inmarsat first generation space segment (spare and operational) are completely replaced, all types of satellite EPIRBs will transmit sequentially on both frequency bands of the Inmarsat first and subsequent generation space segments.

Code: NRZ-L

Modulation rate: 32 Bd

Total transmission duration: 40 min (150 min) (see § 7 of Appendix 3)

Number of transmissions: 4 (see Appendix 3)

NOTE 1 – The total transmission duration will be reduced to 20 min (75 min) (see § 7 of Appendix 3) (see also § 5 of Appendix 3) when all first generation satellites have been replaced.

APPENDIX 1

TO ANNEX 1

1 The following items, listed in the preferred priority order for entry and read-out, should be included in distress messages to the extent practicable and necessary:

TABLE 1

Content of distress message

Item	Content of distress message	Number of bits
1	Ship station identity	30
2	Position coordinates and information in the following order:	
2.1	Latitude in degrees and minutes(1)	14
2.2	Longitude in degrees and minutes(1)	15
2.3	Time of position up-date(2)	11
3	Nature of distress	4
4	Course	9
5	Speed	6
6	Time of activation(3)	11
7	Assistance desired and any other information which might facilitate the rescue(4)	

(1) For implementation reasons the order in which items 2.1 and 2.2 are transmitted on the radio path is given in Tables 2 and 4 and Fig. 1.

(2) The time of receipt of an alert is added by the digital receiver processor.

(3) Where a GPS receiver is built in as an integral part of the EPIRB, this field may be omitted. The 11 bits thereby released may be used to enhance the accuracy of reported position as given in Table 4.

(4) Item 7 may be included with the data sent in item 3, if necessary.

2 The format of the transmitted message and string is shown in Table 2 and Fig. 1.

TABLE 2

Format of the transmitted message (see (1) Table 1)

Synchronization bits	20 bits	Hex EDE20
Distress message	30 bits	Ship station identity range: 0-999.999.999
	1 bit	Longitude hemispherical symbol 0: East; 1: West
	1 bit	Latitude hemispherical symbol 0: North; 1: South
	8 bits	Degrees of longitude range: 0-180
	6 bits	Minutes of longitude range: 0-60
	7 bits	Degrees of latitude range: 0-90
	6 bits	Minutes of latitude range: 0-60
	9 bits	Course: degrees (true) range: 0-360
	5 bits	Time of position update: h (UTC) range: 0-24
	6 bits	Time of position update: min range: 0-60
	5 bits	Time of activation: h (UTC) range: 0-24
	6 bits	Time of activation: min range: 0-60
	6 bits	Speed: knots range: 0-63
	4 bits	Nature of distress (see Table 3)
Parity bits	40 bits	See Appendix 2 for composition

In those systems where it is desirable to provide, on activation, a specific indication of the nature of distress, the indications of Table 3 should be used.

TABLE 3

Nature of distress indications

IMO indicator	Binary code	Nature of distress
1	0001	Fire/explosion
2	0010	Flooding
3	0011	Collision
4	0100	Grounding
5	0101	Listing, in danger of capsizing
6	0110	Sinking
7	0111	Disabled and adrift
8	0000	Undesignated (unspecified distress)
9	1000	Abandoning ship
10	1111	Test(1)

(1) Use of this indicator should be restricted to those applications where transmission of the distress alert (or call) is required to ascertain that the system is operating properly. Provisions may be required to confirm that the complete system is functioning.

Additional capacity should be provided if practical.

TABLE 4

Format of the transmitted message for "high resolution" mode*

Synchronization bits	20 bits	Hex EDE20
Distress message	30 bits	System code range: 0-999.999.999
	1 bit	Longitude hemispherical symbol 0: East; 1: West
	1 bit	Latitude hemispherical symbol 0: North; 1: South
	8 bits	Degrees of longitude range: 0-180
	6 bits	Minutes of longitude range: 0-60
	7 bits	Degrees of latitude range: 0-90
	6 bits	Minutes of latitude range: 0-60
	9 bits	Course: degrees (true) range: 0-360
	5 bits	Time of position update: h (UTC) range: 0-24
	6 bits	Time of position update: min range: 0-60
	3 bits	Mode selection (normal mode/high resolution) (see NOTE 1)
	4 bits	Latitude position enhancement (see Table 5)
	4 bits	Longitude position enhancement (see Table 5)
	6 bits	Speed: knots range: 0-63
	4 bits	Nature of distress (see Table 3)
Parity bits	40 bits	See Appendix 2 for composition

* For EPIRBs having an integral GPS receiver if a valid position fix has been provided, these 3 bits will be set to all ones to enable the digital receiver processor to recognize this and switch to "high resolution" mode.

TABLE 5

Use of additional 4 bits to enhance latitude and longitude accuracy

The additional 4 bits enable increased accuracy by subdividing the minutes information into 15 equal steps, i.e. intervals of 3.75 s or 0.0625 min. The binary representation of steps 1 to 15 is shown in Table 5.

Step	Binary number	Equivalent s	Decimal min
1	0001	3.75	0.0625
2	0010	7.5	0.125
3	0011	11.25	0.1875
4	0100	15.00	0.25
5	0101	18.75	0.3125
6	0110	22.50	0.375
7	0111	26.25	0.4375
8	1000	30.00	0.5
9	1001	33.75	0.5625
10	1010	37.50	0.625
11	1011	41.25	0.6875
12	1100	45.00	0.75
13	1101	48.75	0.8125
14	1110	52.5	0.875
15	1111	56.25	0.9375

APPENDIX 2

TO ANNEX 1

Forward error-correction code

40 parity bits for error-correcting purposes. A (140, 100, 5) BCH code is used resulting in a minimum code distance of 11.

The input message

$$\underbrace{C_1, C_2, \cdots, C_{100},}_{\text{Distress message}} \qquad \underbrace{C_{101}, \cdots, C_{140}}_{= 0}$$

C_1: MSB*

is divided modulo 2 by the following generator polynomial:

$$\begin{aligned} g(x) = {} & x^{40} + x^{37} + x^{36} + x^{33} + x^{32} \\ & + x^{30} + x^{29} + x^{28} + x^{27} + x^{26} + x^{24} + x^{23} + x^{22} + \\ & + x^{20} + x^{17} + x^{16} + x^{15} + x^{13} + x^{11} \\ & + x^{10} + x^{8} + x^{4} + \\ & + 1 \end{aligned}$$

The remainder of this division represents the parity bits C_{101}, …, C_{140}.

The output message is generated by inserting the parity bits in the output message.

Resultant output message:

$$\underbrace{C_1, C_2, \cdots, C_{100},}_{\text{Distress message}} \qquad \underbrace{C_{101}, \cdots, C_{140}}_{\text{Parity bits}}$$

C_1: MSB

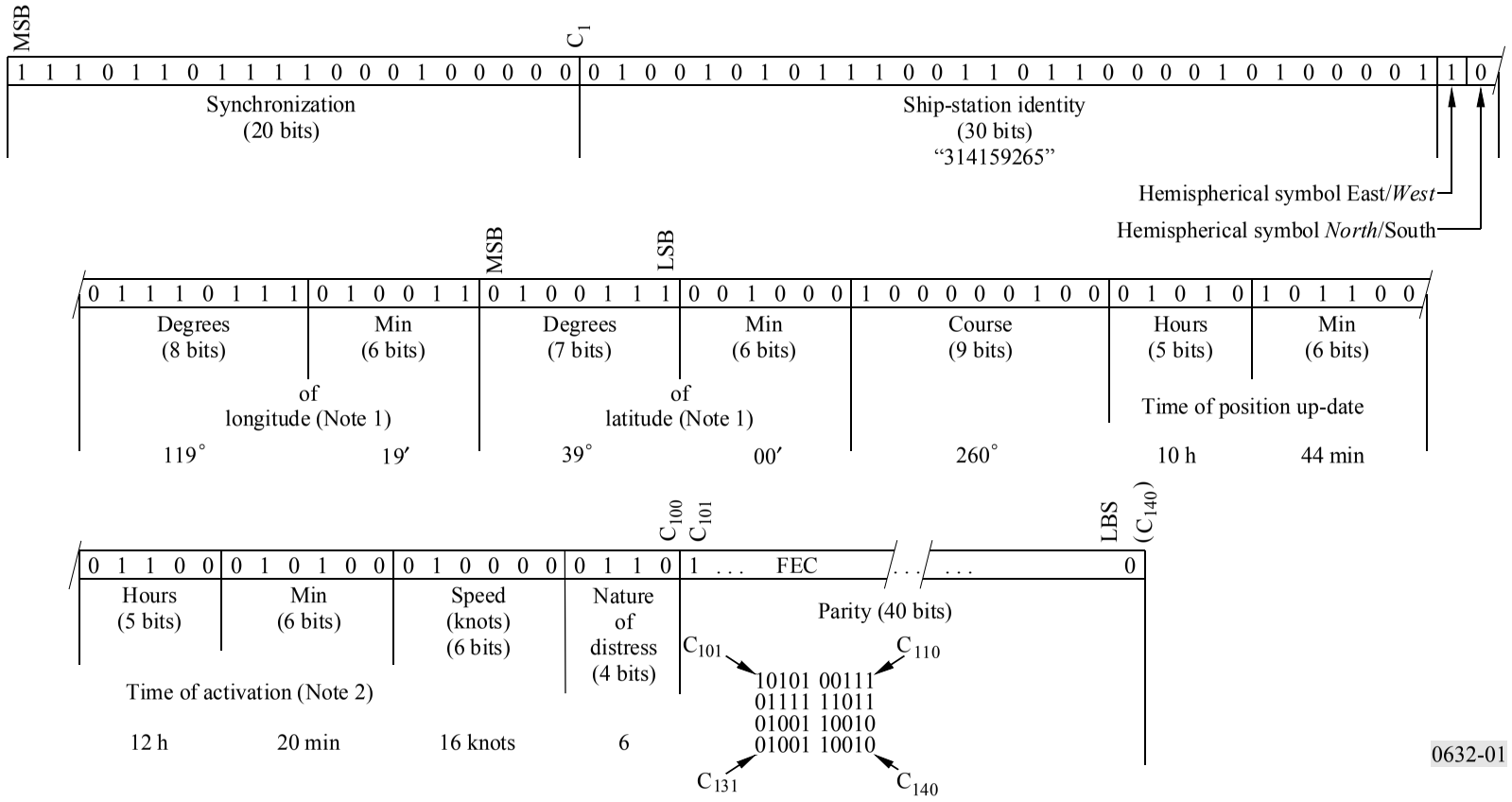
C_{140}: LSB**

* MSB: most significant bit.

** LSB: least significant bit.

FIGURE 1

Transmitted message string (example)
(See (1), Table 1)



MSB: most significant bit
LSB: least significant bit
FEC: forward error-correction code

– The data frame is periodically repeated during the whole operating time.
– The HSD of the data frame is transmitted first.

Note 1 – Where an integral GPS receiver is included in the EPIRB 4 additional bits will be available to provide increased accuracy as shown in Table 5.
Note 2 – As described in Note 1 to Table 4, 3 bits from this field will be used to indicate "high resolution" mode where a valid position fix from the integral GPS receiver is available.

APPENDIX 3

TO ANNEX 1

Duty cycle

1 The duration of each transmission period should initially be 10 min. However, when all satellites of the Inmarsat first generation (spare and operational) have been completely replaced, the minimum overall transmission duration for each burst can be reduced to 5 min in the distress and safety band 1 645.5-1 646.5 MHz.

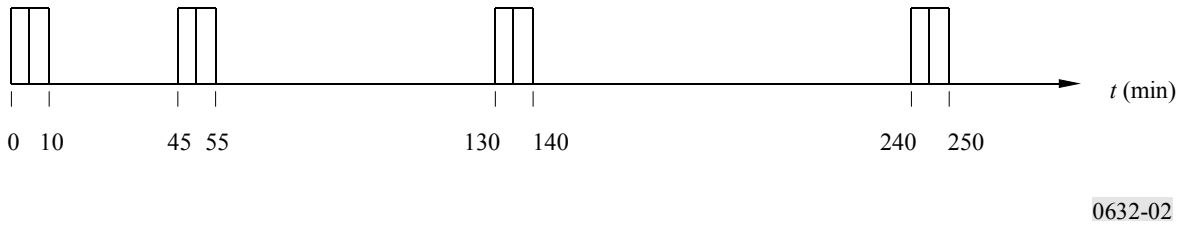
2 Once all first generation satellites have been retired, EPIRBs will only be required to transmit in the distress and safety band (1 645.5-1 646.5 MHz). Until that time satellite EPIRBs shall transmit sequentially for 5 min on each of the frequency bands 1 645.5-1 646.5 MHz and 1 644.3-1 644.5 MHz in that order.

3 The first transmission should be initiated when the distress occurs either by manual activation from on-board the ship or when the satellite EPIRB floats free.

4 The second transmission should begin 45 min after the start of the first to overcome possible interruptions caused by shadowing due to the superstructure of the abandoned ship.

5 To further increase the probability of a successful transfer of the distress alert, two additional transmissions should follow the first two, the third 130 min, and the fourth 240 min, after the start of the first transmission.

6 The transmission repetition rate is illustrated as follows:



Note that each transmission burst initially comprises 2 × 5 min duration. As noted under § 1 above, the duration will eventually be reduced to 5 min per burst.

7 Where an EPIRB contains integral facilities for position updating the total transmission duration may be extended to 150 (75) min by means of a further ten 10 (5) min transmission every four hours resulting in a total operational period of 48 h and 10 (5) min; the first of these additional bursts commencing 480 min after the commencement of transmissions from the EPIRB.

Annex 3-3-6

RECOMMENDATION ITU-R M.633-2*

TRANSMISSION CHARACTERISTICS OF A SATELLITE EMERGENCY POSITION-INDICATING RADIO BEACON (SATELLITE EPIRB) SYSTEM OPERATING THROUGH A LOW POLAR-ORBITING SATELLITE SYSTEM IN THE 406 MHz BAND

(Question ITU-R 90/8)

(1986-1990-2000)

The ITU Radiocommunication Assembly,

considering

a) that satellite EPIRBs can be used for distress alerting in the maritime, land and aeronautical environments;

b) that satellite EPIRBs with common characteristics may be employed in diverse operating environments;

c) that satellite EPIRBs are one of the prime alerting means in the Global Maritime Distress and Safety System (GMDSS) of the International Maritime Organization (IMO);

d) that all ships to which Chapter IV of the International Convention for the Safety of Life at Sea (SOLAS), 1974, as amended in 1988, applies are required by Regulation IV/7.1.6 to carry a satellite EPIRB from 1 August 1993;

e) that SOLAS Regulation IV/7.1.6 provides for the carriage of a satellite EPIRB operating in the 406 MHz band;

f) the assured availability of four operational Cospas-Sarsat type satellites in orbit until the year 2003 and the planned availability thereafter;

g) the current and projected availability of the Cospas-Sarsat ground system;

h) the test results presented in Report ITU-R M.919,

recommends

1 that the transmission characteristics and data formats for a satellite EPIRB operating through a low polar-orbiting satellite system in the 406 MHz band should be in accordance with Cospas-Sarsat Document C/S T.001 (Issue 3, Revision 2 October 1998 titled Specification for Cospas-Sarsat Distress Beacons).

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* This Recommendation should be brought to the attention of the International Maritime Organization (IMO), the International Civil Aviation Organization (ICAO) and the International Mobile Satellite Organization (IMSO).

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Annex 3-3-7

RECOMMENDATION 693*

TECHNICAL CHARACTERISTICS OF VHF EMERGENCY POSITION-INDICATING RADIO BEACONS USING DIGITAL SELECTIVE CALLING (DSC VHF EPIRB)

(1990)

The CCIR,

CONSIDERING

(a) that the alerting and locating functions are parts of the basic requirements of the GMDSS;

(b) that chapter IV of the 1988 Amendments to the International Convention for the Safety of Life at Sea (SOLAS), 1974, permits the carriage of a DSC VHF EPIRB in sea area A1** in lieu of a satellite EPIRB;

(c) that the characteristics of the digital selective calling system are given in Recommendation 493;

(d) that the characteristics of a search and rescue radar transponder (SART) for locating purposes are given in Recommendation 628,

UNANIMOUSLY RECOMMENDS

that the technical characteristics of DSC VHF EPIRBs should be in accordance with Annex I to this Recommendation and with Recommendation 493.

ANNEX I

MINIMUM TECHNICAL CHARACTERISTICS OF DSC VHF EPIRBs

1. General

– DSC VHF EPIRBs should be capable of transmitting distress alerts by digital selective calling and of providing a locating or homing facility. To meet the locating requirements of the GMDSS, Regulation IV/8.3.1 of the 1974 SOLAS Convention requires that a SART (see Recommendation 628) be used for this function.

– The EPIRB should be provided with a battery of sufficient capacity to enable it to operate for a period of at least 48 hours.

– The EPIRB should be designed to operate under the following environmental conditions:
  – ambient temperatures of –20 °C to + 55 °C,
  – icing,
  – relative wind speeds up to 100 knots,
  – after stowage at temperatures between –30 °C and + 65 °C.

2. Alerting transmissions

– The alerting signals should be transmitted on the frequency 156.525 MHz using G2B class of emission.

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* The Director of the CCIR is requested to bring this Recommendation to the attention of the International Maritime Organization (IMO).

** "Sea area A1" means an area within the radiotelephone coverage of at least one VHF coast station in which continuous DSC alerting is available, as may be defined by a contracting government to the 1974 SOLAS Convention.

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– The frequency tolerance should not exceed 10 parts per million.

– The necessary bandwidth should be less than 16 kHz.

– The emission should be vertically polarized. The antenna should be omnidirectional in the azimuthal plane and sufficiently high to ensure reception of the transmission at the maximum range of the A1 sea area.

– The output power should be at least 100 mW***.

3. DSC message format and transmission sequence

– The technical characteristics for the DSC message should be in accordance with the sequence for the "distress call" specified in Recommendation 493.

– The "nature of distress" indication should be "EPIRB emission" (symbol No. 112).

– The "distress coordinates" and "time" information need not be included. In this case the digit 9 repeated 10 times and the digit 8 repeated four times should be included, respectively, as specified in Recommendation 493.

– The "type of subsequent communication" indication should be "no information" (symbol No. 126) which indicates that no subsequent communications will follow.

– The alerting signals should be transmitted in bursts. Each burst should consist of five successive DSC sequences with the $(N + 1)$th burst of transmission being made with an interval T_n after the (N)th burst as given in Fig. 1, where:

$$T_n = (240 + 10\,N) \text{ s } (\pm 5\%) \text{ and}$$

$$N = 0, 1, 2, 3, \ldots, \text{etc.}$$

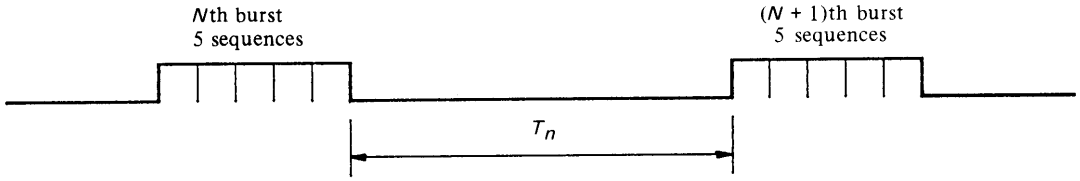


FIGURE 1 D01-sc

*** The output power required to carry a ship-to-shore alert at the maximum range of the A1 sea area should be at least 6 W with an appropriate antenna height above sea level.

Annex 3-4-1
Resolution A.808(19)

(Adopted on 23 November 1995)

PERFORMANCE STANDARDS FOR SHIP EARTH STATIONS CAPABLE OF TWO-WAY COMMUNICATIONS

THE ASSEMBLY,

RECALLING Article 15(j) of the Convention on the International Maritime Organization concerning the functions of the Assembly in relation to regulations and guidelines concerning maritime safety,

RECALLING ALSO regulations IV/10.1 and 14.1 of the 1988 amendments to the International Convention for the Safety of Life at Sea (SOLAS), 1974, concerning radiocommunications for the global maritime distress and safety system (GMDSS), which require, respectively, that ships remaining in sea area A3 be provided with an Inmarsat ship earth station and that such ship earth stations shall conform to appropriate performance standards not inferior to those adopted by the Organization,

RECOGNIZING the need to prepare performance standards for satellite communication equipment in order to ensure the operational reliability of such equipment and to avoid, as far as practicable, adverse interaction between satellite communication equipment and other communication and navigation equipment aboard the ship,

RECOGNIZING ALSO that Inmarsat discontinued type approval of Inmarsat-A ship earth stations in 1991,

HAVING CONSIDERED the recommendation made by the Maritime Safety Committee at its sixty-fifth session,

1. ADOPTS the Recommendation on Performance Standards for Ship Earth Stations Capable of Two-Way Communications set out in the annex to the present resolution;

2. NOTES that part A of the Inmarsat design and installation guidelines is similar to the performance standards for ship earth stations capable of two-way communications and to the general requirements for shipborne radio equipment set out in resolution A.694(17);

3. RECOMMENDS Governments to ensure that every ship earth station which forms part of the GMDSS:

(a) if installed on or after 23 November 1996, conforms to performance standards not inferior to those specified in the annex to the present resolution;

(b) if installed before 23 November 1996, conforms to performance standards not inferior to those specified in the annex to resolution A.698(17),

which are in accordance with part A of the Inmarsat ship earth station design and installation guidelines;

4. INVITES Inmarsat to ensure that any amendments to part A of the ship earth station design and installation guidelines are agreed with the Organization prior to their adoption;

5. REQUESTS the Maritime Safety Committee to ensure that any proposed amendments to this resolution are agreed with Inmarsat prior to their adoption;

6. REQUESTS ALSO the Maritime Safety Committee to keep these Performance Standards under review and to adopt amendments thereto, as necessary

Annex

RECOMMENDATION ON PERFORMANCE STANDARDS FOR SHIP EARTH STATIONS CAPABLE OF TWO-WAY COMMUNICATIONS

1 INTRODUCTION

The ship earth station installation capable of telephony and direct printing should comply with the general requirements set out in resolution A.694(17) and with the following minimum requirements.

2 TECHNICAL REQUIREMENTS

The equipment should be type approved by Inmarsat and should comply with the environmental conditions specified in its technical requirements for Inmarsat ship earth stations capable of two-way communications.

3 OPERATION

3.1 No control external to the equipment should be available for alteration of the ship station identity.

3.2 It should be possible to initiate and make distress calls by telephony or direct printing from the position at which the ship is normally navigated and from any other position designated for distress alerting. In addition, where a room is provided for radiocommunications, means to initiate distress calls should also be fitted in that room.

3.3 Where no other means of receiving distress, urgency and safety broadcasts or an addressed distress alert relay are provided and existing levels of aural signals produced by the telephone or teletype are considered to be inadequate, the ship earth station equipment should be configured to actuate an aural/visual alarm of appropriate level.

3.4 It should be possible to interrupt or initiate distress calls at any time.

3.5 A distress call should be activated only by means of a dedicated distress button. This button should not be any key of an ITU-T digital input panel or an ISO keyboard provided on the equipment.

3.6 The dedicated distress button should:

.1 be clearly identified; and

.2 be protected against inadvertent operation.

3.7 The distress call initiation should require at least two independent actions.

3.8 Paragraphs 3.5, 3.6 and 3.7 do not apply to Inmarsat-A ship earth stations.

4 RADIO FREQUENCY HAZARDS

In order to permit warning of potential radiation hazards to be displayed in appropriate places, a label should be attached to the radome indicating the distance at which radiation levels of 100 W/m^2, 25 W/m^2 and 10 W/m^2 exist.

5 POWER SUPPLY

5.1 The ship earth station should normally be powered from the ship's main source of electrical energy. In addition, it should be possible to operate the ship earth station and all equipment necessary for its normal functioning, including the antenna tracking system, from an alternative source of energy.

5.2 Changing from one source of supply to another or any interruption up to 60 s of the supply of electrical energy should not render the equipment inoperative or require the equipment to be re-initialized.

6 ANTENNA SITING

6.1 It is desirable that the antenna be sited in such a position that no obstacles likely significantly to degrade the performance of the equipment appear in any azimuth down to an angle of elevation of –5°.

6.2 The siting of the antenna needs careful consideration, taking into account the adverse effect of high levels of vibration which might be introduced by the use of a tall mast and the need to minimize shadow sectors. Objects, especially those within 10 m of the radome which cause a shadow sector of greater than 6°, are likely significantly to degrade the performance of the equipment.

6.3 The above-deck equipment should be separated, as far as is practicable, from the antennae of other communication and navigation equipment.

Annex 3-4-2
Resolution A.807(19)

(Adopted on 23 November 1995)

PERFORMANCE STANDARDS FOR INMARSAT-C SHIP EARTH STATIONS CAPABLE OF TRANSMITTING AND RECEIVING DIRECT-PRINTING COMMUNICATIONS

THE ASSEMBLY,

RECALLING Article 15(j) of the Convention on the International Maritime Organization concerning the functions of the Assembly in relation to regulations and guidelines concerning maritime safety,

RECALLING ALSO regulations IV/8.1.5.1, IV/9.3.2, IV/10.1.1 and IV/14.1 of the 1988 amendments to the International Convention for the Safety of Life at Sea (SOLAS), 1974, concerning radiocommunications for the global maritime distress and safety system (GMDSS), which require, respectively, that ships be provided with an Inmarsat-C ship earth station capable of transmitting and receiving direct-printing communications and that such ship earth stations shall conform to appropriate performance standards not inferior to those adopted by the Organization,

RECOGNIZING the need to prepare performance standards for Inmarsat-C ship earth stations operating through the geostationary Inmarsat satellite system to be used in the GMDSS in order to ensure the operational reliability of such equipment and to avoid, as far as practicable, adverse interaction between such equipment and other communication and navigation equipment on board ship,

HAVING CONSIDERED the recommendation made by the Maritime Safety Committee at its sixty-fifth session,

1. ADOPTS the Recommendation on Performance Standards for Inmarsat-C Ship Earth Stations Capable of Transmitting and Receiving Direct-Printing Communications set out in the annex to the present resolution;

2. NOTES that part A of the Inmarsat-C design and installation guidelines is similar to the present performance standards for Inmarsat-C ship earth stations and to the general requirements for shipborne radio equipment set out in resolution A.694(17);

3. RECOMMENDS Governments to ensure that every Inmarsat-C ship earth station which forms part of the GMDSS:

(a) if installed on or after 23 November 1996, conforms to performance standards not inferior to those specified in the annex to the present resolution;

(b) if installed before 23 November 1996, conforms to performance standards not inferior to those specified in the annex to resolution A.663(16),

which are in accordance with part A of the Inmarsat design and installation guidelines;

4. INVITES Inmarsat to ensure that any amendments to part A of the Inmarsat-C design and installation guidelines are agreed with the Organization prior to their adoption;

5. REQUESTS the Maritime Safety Committee to ensure that any proposed amendments to this resolution are agreed with Inmarsat prior to their adoption;

6. REQUESTS ALSO the Maritime Safety Committee to keep these Performance Standards under review and to adopt amendments thereto, as necessary.

Annex

RECOMMENDATION ON PERFORMANCE STANDARDS FOR INMARSAT-C SHIP EARTH STATIONS CAPABLE OF TRANSMITTING AND RECEIVING DIRECT-PRINTING COMMUNICATIONS

1 INTRODUCTION

1.1 The Inmarsat-C ship earth station installation capable of transmitting and receiving direct-printing communications should comply with the general requirements set out in resolution A.694(17) and with the following minimum performance requirements.

1.2 The performance of any enhanced group call facility provided by the ship earth station should be in accordance with the performance standards for enhanced group call equipment set out in resolution A.664(16).

2 TECHNICAL REQUIREMENTS

The ship earth station should be type-approved by Inmarsat and should comply with the environmental conditions specified in its technical requirements for Inmarsat-C ship earth stations.

3 OPERATION

3.1 No control external to the equipment should be available for alteration of the ship station identity.

3.2 It should be possible to initiate and make distress calls from the position from which the ship is normally navigated and from at least one other position designated for distress alerting.

3.3 A distress alert should be activated only by means of a dedicated distress button. This button should not be any key of an ITU-T digital input panel or an ISO keyboard provided on the equipment.

3.4 The dedicated distress button should:

.1 be clearly identified; and

.2 be protected against inadvertent operation.

3.5 The distress alert initiation should require at least two independent actions.

3.6 The equipment should indicate the status of the distress alert transmission.

3.7 It should be possible to interrupt and initiate distress messages at any time.

3.8 Provisions should be made for:

.1 automatic and manual entry of the position information; and

.2 automatic and manual entry of the time at which the position was determined.

4 RADIO FREQUENCY HAZARDS

In order to permit a warning of potential radiation hazards to be displayed in appropriate locations, a label should be attached to the radome indicating the distances external to the radome at which radiation levels of 100 W/m^2, 25 W/m^2 and 10 W/m^2 exist. However, the distances which are within a radome need not be indicated.

5 POWER SUPPLY

5.1 The ship earth station should normally be powered from the ship's main source of electrical energy. In addition, it should be possible to operate the ship earth station and all equipment necessary for its normal functioning, including the antenna tracking system, where provided, from an alternative source of energy.

5.2 Changing from one source of supply to another or any interruption of up to 60 s duration of the supply of electrical energy should not require the equipment to be manually re-initialized and should not result in loss of received messages stored in the memory.

6 ANTENNA SITING

6.1 Where an omnidirectional antenna is used it should, if practicable, be sited in such a position that no obstacle likely to degrade significantly the performance of the equipment appears in the fore and aft directions down to –5° and in the port and starboard directions down to –15°. For omnidirectional antennas, objects, especially those within 1 m of the antenna, which cause a shadow sector of greater than 2° are likely to degrade significantly the performance of the equipment.

6.2 Where a stabilized directive antenna is used it should, if practicable, be sited in such a position that no obstacle likely to degrade significantly the performance of the equipment appears in any azimuth down to –5°. For directive antennas with a gain of approximately 20 dB, objects, especially those within 10 m of the antenna, which cause a shadow sector of greater than 6° are likely to degrade significantly the performance of the equipment.

Annex 3-4-3
Resolution MSC.68(68), annex 4

(Adopted on 6 June 1997)

AMENDMENTS TO RESOLUTION A.807(19) – PERFORMANCE STANDARDS FOR INMARSAT-C SHIP EARTH STATIONS CAPABLE OF TRANSMITTING AND RECEIVING DIRECT-PRINTING COMMUNICATIONS

Modify paragraph 3.8 of the annex, as follows:

"3.8 Facilities should be provided to automatically update the ship's position and the time at which the position was determined from a suitable electronic position-fixing aid which may be an integral part of the equipment. For equipment which does not have an integral electronic position-fixing aid, such facilities should include a suitable interface conforming to the appropriate international standard.*"

Add new paragraphs 3.9 and 3.10 to the annex, as follows:

"3.9 Provisions should also be made for manual entry of position information and of the time at which the position was determined.

3.10 An alarm should be activated when no position data is received from the electronic position-fixing aid or, in the case of manual input, the position information is over 4 hours old. Any position information not updated for more than 24 hours should be clearly identified."

* IEC 1162.

Annex 3-5-1
Resolution A.525(13)
(Adopted on 17 November 1983)

PERFORMANCE STANDARDS FOR NARROW-BAND DIRECT-PRINTING TELEGRAPH EQUIPMENT FOR THE RECEPTION OF NAVIGATIONAL AND METEOROLOGICAL WARNINGS AND URGENT INFORMATION TO SHIPS

THE ASSEMBLY,

RECALLING Article 15(j) of the Convention on the International Maritime Organization concerning the functions of the Assembly in relation to regulations concerning maritime safety,

NOTING resolution A.420(XI)* on the development of the maritime distress and safety system which recommends that Administrations should introduce narrow-band direct-printing broadcasts for the purpose of promulgation of navigational and meteorological warnings to shipping,

NOTING FURTHER that Baltic and North Sea States within NAVAREA I have, after a period of successful trials, established a pre-operational narrow-band direct-printing service (called NAVTEX) of broadcasts for the North Sea and Baltic Sea areas,

CONSIDERING that narrow-band direct-printing broadcasts are an element of the future global maritime distress and safety system,

CONSIDERING FURTHER that similar services may be expected to be established in other areas of the world and that shipborne equipment should be standardized to ensure efficient operation of such services,

HAVING CONSIDERED the recommendation made by the Maritime Safety Committee at its forty-eighth session,

1. ADOPTS the Performance Standards for Narrow-Band Direct-Printing Telegraph Equipment for the Reception of Navigational and Meteorological Warnings and Urgent Information to Ships set out in the annex to the present resolution;

2. RECOMMENDS Administrations to ensure that equipment for the reception of narrow-band direct-printing broadcasts of navigational and meteorological warnings and urgent information to ships conforms to performance standards not inferior to those specified in the annex to the present resolution.

Annex

PERFORMANCE STANDARDS FOR NARROW-BAND DIRECT-PRINTING TELEGRAPH EQUIPMENT FOR THE RECEPTION OF NAVIGATIONAL AND METEOROLOGICAL WARNINGS AND URGENT INFORMATION TO SHIPS

1 The equipment should conform with the provisions of CCIR Recommendation 540† applicable to shipborne equipment and in addition with the provisions given in the following paragraphs.

2 The equipment should comprise a radio receiver, a signal processor and a printing device.

---

* Overtaken by SOLAS 1988 (GMDSS) amendment.

† See Recommendation ITU-R M.540 (annex 3-5-5).

3 Details of the coverage areas and message categories which have been excluded by the operator from reception should be readily available.

4 The receiver should operate on the frequency prescribed by the Radio Regulations for the system.

5 The equipment should be provided with a facility to test that the radio receiver, signal processor and printing device are functioning correctly.

6 The equipment should be capable of internally storing at least 30 message identifications. After between 60 and 72 hours a message identification should automatically be erased from the store. If the number of received message identifications exceeds the capacity of the store, the oldest message identification should be erased.

7 Only message identifications which have been satisfactorily received should be stored; a message is satisfactorily received if the character error rate is below 4%.

8 The receipt of search and rescue information should give an alarm at the position from which the ship is normally navigated. It should be possible only to reset this alarm manually.

9 Information for location (B_1)* and message (B_2)* designators in programmable memories should not be erased by interruptions in the power supply of less than 6 hours.

10 The receiver sensitivity should be such that for a source with an e.m.f. of 2 μV in series with a non-reactive impedance of 50 Ω, the character error rate is below 4%.

11 The printing device should be able to print at least 32 characters per line.

12 If automatic line feed entails division of a word, this shall be indicated in the written text. The printing device should automatically feed paper after completing the printed message.

13 The equipment should print an asterisk if a character is received mutilated.

* See Recommendation ITU-R M.540 (annex 3-5-5).

Annex 3-5-2
Resolution A.664(16)
(Adopted on 19 October 1989)

PERFORMANCE STANDARDS FOR ENHANCED GROUP CALL EQUIPMENT

THE ASSEMBLY,

RECALLING Article 15(j) of the Convention on the International Maritime Organization concerning the functions of the Assembly in relation to regulations and guidelines concerning maritime safety,

RECOGNIZING the need to prepare performance standards for enhanced group call equipment in order to ensure the operational reliability of such equipment and to avoid, as far as practicable, adverse interaction between such equipment and other communication and navigation equipment aboard the ship,

HAVING CONSIDERED the recommendation made by the Maritime Safety Committee at its fifty-fifth session,

1. ADOPTS the Recommendation on Performance Standards for Enhanced Group Call Equipment, the text of which is set out in the annex to the present resolution;

2. NOTES that part A of the Inmarsat design and installation guidelines for enhanced group call equipment is similar to the present performance standards for enhanced group call equipment and to the performance standards for shipborne radio equipment – general requirements (resolution A.569(14)*);

3. RECOMMENDS Member Governments to ensure that every enhanced group call equipment which will form part of the global maritime distress and safety system conforms to performance standards not inferior to those specified in the annex to this resolution, which are in accordance with part A of the Inmarsat design and installation guidelines for enhanced group call equipment;

4. INVITES Inmarsat to ensure that any amendments to part A of the Inmarsat design and installation guidelines for enhanced group call equipment be agreed with the Organization prior to their implementation;

5. REQUESTS the Maritime Safety Committee to ensure that any proposed amendments to this resolution be agreed with Inmarsat prior to their consideration by the Assembly.

Annex

RECOMMENDATION ON PERFORMANCE STANDARDS FOR ENHANCED GROUP CALL EQUIPMENT

1 INTRODUCTION

1.1 The enhanced group call equipment to be used in the Inmarsat system should comply with the general requirements set out in Assembly resolution A.569(14)* and the following minimum performance requirements.

1.2 The equipment should be capable of producing a printed copy of received information. Received EGC messages may be stored, with indication that the message has been received, for later printing, except for the vital messages referred to in paragraphs 3.2 and 3.5, which should be printed out upon receipt.

1.3 The enhanced group call installation may be either separate or combined with other installations.†

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* Superseded by resolution A.694(17) (see annex 3-1-1).

† Elements of other installations, e.g. the antenna, low-noise amplifier and down-converter of the ship earth station, may be shared for the reception of enhanced group call messages.

2 TECHNICAL REQUIREMENTS

The equipment should be type-approved by Inmarsat and should comply with the environmental conditions specified in the Inmarsat technical requirements for the enhanced group call receiver.

3 OPERATION

3.1 Means should be provided to enter the ship's position and area code manually so that area group calls can be received. Optionally, the ship's position, as determined by the navigational equipment, may be entered automatically and the area code automatically derived therefrom.

3.2 Provision should be made for a specific aural alarm and visual indication at the position from which the ship is normally navigated to indicate receipt of a distress or urgency call or a call having distress category. It should not be possible to disable this alarm and it should only be possible to reset it manually.

3.3 The equipment should indicate when it is not correctly tuned or synchronized to the enhanced group call carrier.

3.4 Any message should be printed regardless of the character error rate of its reception. The equipment should print a low line mark if a character is received mutilated.

3.5 Acceptance or rejection of service codes* should be under the operator's control except that equipment should be unable to reject relevant navigational warnings, meteorological warnings, search and rescue information and certain special warnings, which are directed to a geographical area within which the ship is operating.

3.6 Means should be provided not to reprint the same message after it has been received without error.

3.7 The printing device should be capable of printing at least the Standard IA Number 5 character set. Other character sets are optionally used according to ISO 2022 or CCITT Recommendation T.61.

3.8 The printing device should be able to print at least 40 characters per line.

3.9 The signal processor and printing device should ensure that if a word cannot be accommodated in full on one line, it should be transferred to the next line. The printing device should automatically feed five lines after completing the printed messages.

4 POWER SUPPLY

4.1 The enhanced group call equipment should normally be powered from the ship's main source of electrical energy. In addition, it should be possible to operate the enhanced group call equipment, and all other equipment necessary for its normal functioning, from an alternative source of energy.

4.2 Changing from one source of supply to another, or any interruption of up to 60 s duration of the supply of electrical energy, should not require the equipment to be manually re-initialized and should not result in loss of received messages stored in the memory.

5 ANTENNA SITING

5.1 Where an omnidirectional antenna is used, it is desirable that the antenna be sited in such a position that no obstacle likely to degrade significantly the performance of the equipment appears in the fore and aft directions down to –5° and in the port and starboard directions down to –15°.

5.2 Where a stabilized directive antenna is used, it is desirable that the antenna be sited in such a position that no obstacle likely to degrade significantly the performance of the equipment appears in any azimuth down to –5°.

5.3 For omnidirectional antennas, objects, especially those within 1 m of the antenna which cause a shadow sector of greater than 2°, are likely to degrade significantly the performance of the equipment.

5.4 For directive antennas, objects, especially those within 10 m of the antenna which cause a shadow sector of greater than 6°, are likely to degrade significantly the performance of the equipment.

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* The meaning of the service codes is the same as for the NAVTEX system (see Recommendation ITU-R M.540 and the NAVTEX Manual) (see annexes 3-5-5 and 4-2).

Annex 3-5-3
Resolution A.699(17)

(Adopted on 6 November 1991)

SYSTEM PERFORMANCE STANDARD FOR THE PROMULGATION AND CO-ORDINATION OF MARITIME SAFETY INFORMATION USING HIGH-FREQUENCY NARROW-BAND DIRECT PRINTING

THE ASSEMBLY,

RECALLING Article 15(j) of the Convention on the International Maritime Organization concerning the functions of the Assembly in relation to regulations and guidelines concerning maritime safety,

RECALLING ALSO regulation V/2 of the International Convention for the Safety of Life at Sea, 1974 (SOLAS 1974), which establishes the requirement for promulgating information on direct dangers to navigation,

NOTING Assembly resolution A.700(17)*, which establishes standards on the promulgation of maritime safety information using a variety of radio teleprinting techniques, including high-frequency (HF) narrow-band direct printing (NBDP),

BEARING IN MIND regulation IV/7.1.5 of SOLAS 1974, as amended by the 1988 GMDSS Conference, which states that "ships engaged exclusively on voyages in areas where an HF direct-printing telegraphy maritime safety information service is provided and fitted with equipment capable of receiving such service, may be exempt from this [Inmarsat enhanced group calling] requirement",

NOTING ALSO that the World Administrative Radio Conference for Mobile Services, 1987, identified channels in the HF band for the transmission of maritime safety information using NBDP, and resolved to invite IMO to develop, jointly with other international organizations, a global co-ordinated plan for the use of these channels (WARC-MOB-87, resolution 333),

HAVING CONSIDERED the recommendation made by the Maritime Safety Committee at its fifty-eighth session,

1. ADOPTS the System Performance Standard for the Promulgation and Co-ordination of Maritime Safety Information using High-Frequency Narrow-Band Direct Printing, set out in the annex to the present resolution;

2. DECIDES that broadcasts of maritime safety information using HF NBDP techniques, intended to meet the requirements of regulation IV/7.1.5 of the 1974 SOLAS Convention, as amended in 1988, should be in accordance with the recommendation set out in the annex to the present resolution;

3. URGES Governments to co-operate by ensuring that maritime safety information using HF NBDP techniques is provided in accordance with this system;

4. REQUESTS the Secretary-General to convey this system performance standard to the executive heads of the International Telecommunication Union (ITU), the World Meteorological Organization (WMO) and the International Hydrographic Organization (IHO) inviting them to participate in this co-ordination effort in accordance with resolution 333 of WARC-MOB-87.

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* See annex 3-5-4.

Annex

SYSTEM PERFORMANCE STANDARD FOR THE PROMULGATION AND CO-ORDINATION OF MARITIME SAFETY INFORMATION USING HIGH-FREQUENCY NARROW-BAND DIRECT PRINTING

1 Administrations desiring to broadcast maritime safety information using high-frequency (HF) narrow-band direct printing (NBDP), in accordance with the provisions of regulation IV/7.1.5 of the 1974 SOLAS Convention, as amended in 1988, should notify their intentions to the IMO Sub-Committee on Radiocommunications*. The Sub-Committee will co-ordinate proposals with other Administrations, and will make recommendations on frequencies, schedules, transmit power, broadcast duration, and broadcast content, as well as on other pertinent characteristics. The Sub-Committee on Radiocommunications* may authorize a correspondence panel to perform this co-ordination function between sessions if, in the Sub-Committee's view, this becomes necessary. Administrations may notify their intentions to the correspondence panel.

2 The Sub-Committee on Radiocommunications* may periodically recommend revision and adjustments to the broadcast schedule, including shifting existing broadcasts to other schedules, in order to meet the needs of Administrations.

3 Broadcasts should be made simultaneously on groups of frequencies in accordance with CCIR Recommendation 688† and Radio Regulation N 3243.

4 Following approval of these broadcasts by the Sub-Committee on Radiocommunications*, Administrations should notify the International Frequency Registration Board‡ in accordance with the requirements of the Radio Regulations.

5 IMO will co-ordinate broadcasts with the World Meteorological Organization (WMO) and the International Hydrographic Organization (IHO) and will periodically issue schedules of broadcasts.

6 Administrations providing an HF NBDP maritime safety information service should make provisions to alert vessels with respect to unscheduled broadcasts by digital selective calling. The system should, in future, be made capable of automatic reception.

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* The Sub-Committee on Radiocommunications (COM) was renamed as "Sub-Committee on Radiocommunications and Search and Rescue (COMSAR)" due to the restructuring of the Sub-Committees by the Maritime Safety Committee from 1996.

† See annex 3-5-6.

‡ The task of the IFRB was taken over by ITU Radiocommunication Bureau after the restructuring of ITU in 1993.

Annex 3-5-4
Resolution A.700(17)

(Adopted on 6 November 1991)

PERFORMANCE STANDARDS FOR NARROW-BAND DIRECT-PRINTING TELEGRAPH EQUIPMENT FOR THE RECEPTION OF NAVIGATIONAL AND METEOROLOGICAL WARNINGS AND URGENT INFORMATION TO SHIPS (MSI) BY HF

THE ASSEMBLY,

RECALLING Article 15(j) of the Convention on the International Maritime Organization concerning the functions of the Assembly in relation to regulations and guidelines concerning maritime safety,

NOTING resolution A.420(XI)* on the development of the maritime distress and safety system which recommends that Administrations should introduce narrow-band direct-printing (NBDP) broadcasts for the promulgation of navigational and meteorological warnings to shipping,

NOTING FURTHER resolution A.525(13)† on performance standards for NBDP telegraph equipment for the reception of navigational and meteorological warnings and urgent information to ships on the frequency 518 kHz,

CONSIDERING that high-frequency (HF) NBDP broadcasts may be used in the global maritime distress and safety system (GMDSS),

HAVING CONSIDERED the recommendation made by the Maritime Safety Committee at its fifty-eighth session,

1. ADOPTS the Performance Standards for Narrow-Band Direct-Printing Telegraph Equipment for the Reception of Navigational and Meteorological Warnings and Urgent Information to Ships (MSI) by HF, set out in the annex to the present resolution;

2. RECOMMENDS Governments to ensure that equipment for the reception of NBDP broadcasts of navigational and meteorological warnings and urgent information to ships (MSI) by HF conforms to performance standards not inferior to those specified in the annex to the present resolution;

3. RECOMMENDS FURTHER Governments to allow ships carrying MF/HF radio installations in accordance with resolution A.613(15)‡ to use such equipment in lieu of equipment complying with the standard specified in the annex to the present resolution, until the GMDSS is fully implemented in accordance with regulations IV/1.5.2 and IV/1.6 of the 1988 amendments to the International Convention for the Safety of Life at Sea, 1974.

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* Overtaken by 1988 SOLAS (GMDSS) amendments.

† See annex 3-5-1.

‡ This has been superseded by resolution A.806(19) (see annex 3-2-5).

Annex

PERFORMANCE STANDARDS FOR NARROW-BAND DIRECT-PRINTING TELEGRAPH EQUIPMENT FOR THE RECEPTION OF NAVIGATIONAL AND METEOROLOGICAL WARNINGS AND URGENT INFORMATION TO SHIPS (MSI) BY HF

1 The equipment should conform to the provisions of CCIR Recommendation 688* applicable to shipborne equipment and, in addition, to the provisions given in the following paragraphs.

2 The equipment should be capable of producing a printed copy of received information. The equipment functions should include signal reception, processing, printing and the means to control the frequency of the radio receiver both manually and automatically.

3 Details of the coverage areas and message categories which have been excluded by the operator from reception should be readily available.

4 The receiver should operate on the frequencies prescribed by the Radio Regulations for the system.

5 The equipment should be provided with a facility to test that the radio receiver, signal processor and printing device are functioning correctly.

6 The equipment should be capable of internally storing at least 255 message identifications. After between 60 and 72 h a message identification should automatically be erased from the store. If the number of received message identifications exceeds the capacity of the store, the oldest message identification should be erased.

7 Only message identifications which have been satisfactorily received should be stored; a message is satisfactorily received if the character-error ratio is below 4%.

8 The receipt of search and rescue information should give an alarm at the position from which the ship is normally navigated. It should be possible only to reset this alarm manually.

9 Information for location $(B_1)^\dagger$ and message $(B_2)^\dagger$ designators in programmable memories should not be erased by interruptions in the power supply of less than 6 h.

10 The receiver sensitivity should be equal to or better than 6 μV e.m.f. at the receiver input to produce an NBDP output character-error rate of not greater than 10^{-2}.

11 The printing device should be able to print at least 32 characters per line.

12 If automatic line feed entails division of a word, this shall be indicated in the written text. The printing device should automatically feed paper after completing the printed message.

13 The equipment should print an asterisk if a character is received mutilated.

14 A UTC clock, accurate to at least one second and associated with a reprogrammable memory which contains the frequency sequence and UTC broadcast schedules of all stations, should control the HF receiver to provide automatic MSI reception.

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* See annex 3-5-6.

† See Recommendation ITU-R M.540 (see annex 3-5-5).

Annex 3-5-5

RECOMMENDATION 540-2*

OPERATIONAL AND TECHNICAL CHARACTERISTICS FOR AN AUTOMATED DIRECT-PRINTING TELEGRAPH SYSTEM FOR PROMULGATION OF NAVIGATIONAL AND METEOROLOGICAL WARNINGS AND URGENT INFORMATION TO SHIPS

(Question 5/8)

(1978-1982-1990)

The CCIR,

CONSIDERING

(a) that the availability of navigational and meteorological warnings and urgent information on board ships is of great importance for safety;

(b) that the existing radiocommunication system for promulgation of navigational and meteorological warnings and urgent information to ships can be improved by use of modern techniques;

(c) that the IMO has etablished the following definitions on the promulgation of maritime safety information:

– "NAVTEX" means the system for the broadcast and automatic reception of maritime safety information by means of narrow-band direct-printing telegraphy;

– "international NAVTEX service" means the coordinated broadcast and automatic reception on 518 kHz of maritime safety information by means of narrow-band direct-printing telegraphy using the English language, as set out in the NAVTEX manual, published by the IMO;

– "national NAVTEX service" means the broadcast and automatic reception of maritime safety information by means of narrow-band direct-printing telegraphy using frequencies and languages as decided by the administrations concerned;

(d) that the 1988 Amendments to the International Convention for the Safety of Life at Sea, 1974, require that every ship to which the Convention applies shall be provided with a receiver capable of receiving international NAVTEX service broadcasts;

(e) that several countries are operating a coordinated international NAVTEX service, based on narrowband direct-printing in accordance with Article 14A of the Radio Regulations;

(f) that the system should be applicable to the maritime mobile service (both international and national);

(g) that it is desirable that the service fulfils the requirements of all types of ships desiring to use it;

(h) that although each area may need specific guidance, the use of standard technical and operational characteristics would facilitate the extension of the service,

UNANIMOUSLY RECOMMENDS

1. that the operational characteristics for the promulgation of navigational and meteorological warnings and urgent information using NBDP should be in accordance with Annex I;

2. that the technical characteristics for the promulgation of navigational and meteorological warnings and urgent information using NBDP should be in accordance with Annex II.

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* The Director, CCIR, is requested to bring this Recommendation to the attention of the International Maritime Organization (IMO), the International Hydrographical Organization (IHO), the World Meteorological Organization (WMO) and to the International Association of Lighthouse Authorities (IALA).

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ANNEX I

OPERATIONAL CHARACTERISTICS

1. Narrowband direct-printing techniques should be used for an automated telegraph system for promulgation of navigational and meteorological warnings and urgent information to ships. Common frequencies for such transmissions should be internationally agreed upon and the frequency 518 kHz has been designated for world-wide use in the international NAVTEX service (see Radio Regulations Nos. 474, 2971B and N2971B).

1.1 For national NAVTEX services administrations should also utilize the format of this Recommendation on the appropriate frequencies as defined in the Radio Regulations.

2. The radiated power from the coast station transmitter should only be that sufficient to cover the intended service area of that coast station. The range extension occurring during night hours should also be considered.

3. The information transmitted should primarily be of the type used for coastal waters preferably using a single frequency (Resolution No. 324 (Mob-87)).

4. The transmission time allocated to each station should be restricted to that which is adequate for the anticipated messages to be broadcast to the area concerned.

5. Scheduled broadcasts should take place at intervals not exceeding eight hours and be coordinated, to avoid interference with broadcasts from other stations.

6. Message priorities

6.1 Three message priorities are used to dictate the timing of the first broadcast of a new warning in the NAVTEX service. In descending order of urgency they are:

– VITAL: for immediate broadcast, subject to avoiding interference to ongoing transmissions;

– IMPORTANT: for broadcast at the next available period when the frequency is unused;

– ROUTINE: for broadcast at the next scheduled transmission period.

Note – Both VITAL and IMPORTANT warnings will normally need to be repeated, if still valid, at the next scheduled transmission period.

6.2 In order to avoid unnecessary disruption to the service, the priority marking VITAL is to be used only in cases of extreme urgency, such as some distress alerts. In addition, VITAL messages are to be kept as brief as possible.

6.3 Periods should be scheduled between the regular transmission periods permitting immediate/early transmission of VITAL messages.

6.4 By use of the message serial number 00 in the preamble of a message (see also Annex II § 6) it is possible to override any exclusion of coast stations or of message types which might have been made in the receiving equipment.

7. Initial shore-to-ship distress-related messages should first be broadcast on the appropriate distress frequency by coast stations in whose SAR area distress cases are handled.

8. Participating transmitting stations should be provided with monitoring facilities to enable them to:

– monitor their own transmissions as to signal quality and transmission format;

– confirm that the channel is not occupied.

9. In case a message is repeated by more than one transmitting station within the same NAVTEX region (e.g. for better coverage) the original preamble B_1-B_4 (see Annex II) should be used.

10. In order to avoid overloading of the channel it is desirable to use a single language and where a single language is used it shall be English.

11. Dedicated on-board equipment is recommended.

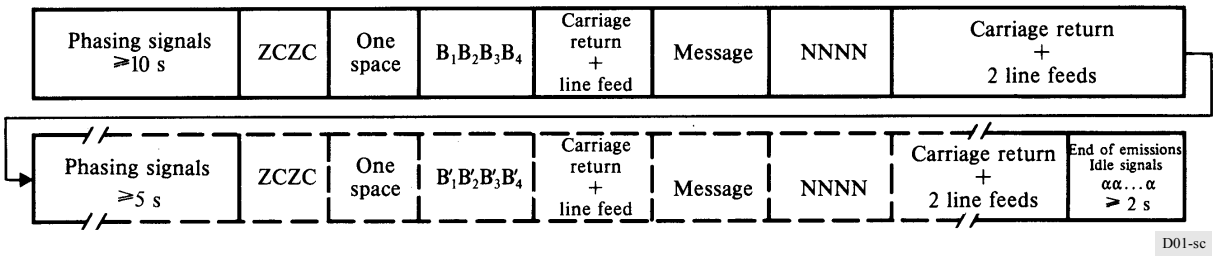
12. Other operational characteristics and detailed guidance are given in the NAVTEX Manual developed by the International Maritime Organization.

ANNEX II

TECHNICAL CHARACTERISTICS

2. The signals transmitted should be in conformity with the collective B-mode of the direct-printing system specified in Recommendations 476 and 625.

3. The technical format of the transmission should be as follows:



in which

ZCZC defines the end of the phasing period,

the B_1 character is a letter (A-Z) identifying the transmitter coverage area,

the B_2 character is a letter (A-Z) for each type of message.

2.1 Both the B_1 characters identifying the different transmitter coverage areas and the B_2 characters identifying the different types of messages are defined by IMO and chosen from Table I of Recommendations 476 and 625, combination numbers 1-26.

2.1.1 Ship equipment should be capable of automatically rejecting unwanted information using character B_1.

2.1.2 Ship equipment should be capable of disabling print-out of selected types of messages using character B_2 with the exception of messages with B_2 characters A, B and D (see also § 2.1).

2.1.3 If any facility is rejected or disabled as described in § 2.1.1 and 2.1.2 above, the extent of any such limitation must be clearly indicated to the user.

2.2 B_3B_4 is a two-character serial number for each B_2, starting with 01 except in special cases where the serial number 00 is used (see § 6 below).

2.3 The characters ZCZC $B_1B_2B_3B_4$ need not be printed.

3. The printer should only be activated if the preamble B_1-B_4 is received without errors.

4. Facilities should be provided to avoid printing of the same message several times on the same ship, when such a message has already been satisfactorily received.

5. The necessary information for the measures under § 4 above should be deduced from the sequence $B_1B_2B_3B_4$ and from the message.

6. A message should always be printed if $B_3B_4 = 00$.

7. Extra (redundant) letter and figure shifts should be used in the message to reduce garbling.

8. In case a message is repeated by another transmitting station (e.g. for better coverage) the original preamble B_1-B_4 should be used.

9. The equipment on board ships should be neither unduly complex nor expensive.

10. The transmitter frequency tolerance for the mark and the space signals should be better than ± 10 Hz.

Annex 3-5-6

RECOMMENDATION 688*

TECHNICAL CHARACTERISTICS FOR A HIGH FREQUENCY DIRECT-PRINTING TELEGRAPH SYSTEM FOR PROMULGATION OF HIGH SEAS AND NAVTEX-TYPE MARITIME SAFETY INFORMATION

(Question 5/8)

(1990)

The CCIR,

CONSIDERING

(a) the 1988 amendments to the International Convention for the Safety of Life at Sea, 1974, which permits ships, engaged exclusively on voyages in areas where an HF direct-printing telegraphy maritime safety information service is provided and which are fitted with equipment capable of receiving such service, to be exempted from the requirement to carry a radio facility for the reception of maritime safety information by the INMARSAT enhanced group calling systems;

(b) that the World Administrative Radio Conference for Mobile Services, Geneva, 1987, allocated an exclusive narrow-band direct-printing channel on the frequencies 4210 kHz, 6314 kHz, 8416.5 kHz, 12 579 kHz, 16 806.5 kHz, 19 680.5 kHz, 22 376 kHz and 26 100.5 kHz, which could meet this requirement;

(c) that the World Administrative Radio Conference for Mobile Services, Geneva, 1987, also allocated an exclusive narrow-band direct-printing channel on the frequency 4209.5 kHz for NAVTEX-type transmissions;

(d) Recommendation 540 – Operational and technical characteristics for an automated direct-printing telegraph system for promulgation of navigational and meteorological warnings and urgent information to ships, i.e. the international NAVTEX system, operating on 518 kHz,

UNANIMOUSLY RECOMMENDS

that both the technical characteristics for transmitting high seas maritime safety information using HF NBDP on the frequencies of CONSIDERING *(b)*, and the technical characteristics for transmitting NAVTEX-type navigational and meteorological warnings and urgent information to ships using 4209.5 kHz should be in accordance with Annex II of Recommendation 540.

* The Director of CCIR is requested to bring this Recommendation to the attention of the International Maritime Organization (IMO).

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Annex 3-6-1
Resolution A.802(19)

(Adopted on 23 November 1995)

PERFORMANCE STANDARDS FOR SURVIVAL CRAFT RADAR TRANSPONDERS FOR USE IN SEARCH AND RESCUE OPERATIONS

THE ASSEMBLY,

RECALLING Article 15(j) of the Convention on the International Maritime Organization concerning the functions of the Assembly in relation to regulations and guidelines concerning maritime safety,

RECOGNIZING the need to prepare performance standards for survival craft radar transponders for use in search and rescue operations to be used in the global maritime distress and safety system (GMDSS) in order to ensure the operational reliability of such equipment and to avoid, as far as practicable, adverse interaction between such equipment and other communication and navigation equipment aboard ship,

NOTING the results of operational trials on 9 GHz SAR transponders reported by Governments to the ITU-R Sector, and being aware that the IEC is preparing a technical standard for a 9 GHz SAR transponder,

HAVING CONSIDERED the recommendation made by the Maritime Safety Committee at its sixty-third session,

1. ADOPTS the Recommendation on Performance Standards for Survival Craft Radar Transponders for Use in Search and Rescue Operations set out in the annex to the present resolution;

2. RECOMMENDS Governments to ensure that survival craft radar transponders for use in search and rescue operations, which will form part of the GMDSS, conform to performance standards not inferior to those specified in the annex to this resolution;

3. REQUESTS the Maritime Safety Committee to keep these Performance Standards under review and to adopt amendments thereto, as necessary;

4. REVOKES resolution A.697(17).

Annex

RECOMMENDATION ON PERFORMANCE STANDARDS FOR SURVIVAL CRAFT RADAR TRANSPONDERS FOR USE IN SEARCH AND RESCUE OPERATIONS

1 INTRODUCTION

The 9 GHz SAR transponder (SART), in addition to meeting the requirements of the relevant ITU-R Recommendation and the general requirements set out in resolution A.694(17), should comply with the following performance standards.

2 GENERAL

The SART should be capable of indicating the location of a unit in distress on the assisting units radars by means of a series of equally spaced dots (see resolution A.530(13)).

2.1 The SART should:

.1 be capable of being easily activated by unskilled personnel;

.2 be fitted with means to prevent inadvertent activation;

.3 be equipped with a means which is either visual or audible, or both visual and audible, to indicate correct operation and to alert survivors to the fact that a radar has triggered the SART;

.4 be capable of manual activation and deactivation; provision for automatic activation may be included;*

.5 be provided with an indication of the stand-by condition;

.6 be capable of withstanding without damage drops from a height of 20 m into water;

.7 be watertight at a depth of 10 m for at least 5 min;

.8 maintain watertightness when subjected to a thermal shock of 45°C under specified conditions of immersion;

.9 be capable of floating if it is not an integral part of the survival craft;

.10 be equipped with buoyant lanyard, suitable for use as a tether, if it is capable of floating;

.11 not be unduly affected by seawater or oil;

.12 be resistant to deterioration in prolonged exposure to sunlight;

.13 be of a highly visible yellow/orange colour on all surfaces where this will assist detection;

.14 have a smooth external construction to avoid damaging the survival craft; and

.15 be provided with a pole or other arrangement compatible with the antenna pocket in a survival craft in order to comply with 2.4, together with illustrated instructions.

2.2 The SART should have sufficient battery capacity to operate in the stand-by condition for 96 h and, in addition, following the stand-by period, to provide transponder transmissions for 8 h when being continuously interrogated with a pulse repetition frequency of 1 kHz.

2.3 The SART should be so designed as to be able to operate under ambient temperatures of –20°C to +55°C. It should not be damaged in stowage throughout the temperature range of –30°C to +65°C.

2.4 The height of the installed SART antenna should be at least 1 m above sea-level.

2.5 The vertical polar diagram of the antenna and hydrodynamic characteristics of the device should permit the SART to respond to search radars under heavy swell conditions. The polar diagram of the antenna should be substantially omnidirectional in the horizontal plane. Horizontal polarization should be used for transmission and reception.

2.6 The SART should operate correctly when interrogated at a distance of up to at least 5 nautical miles by a navigational radar complying with resolutions A.477(XII) and A.222(VII), with an antenna height of 15 m. It should also operate correctly when interrogated at a distance of up to 30 nautical miles by an airborne radar with at least 10 kW peak output power at a height of 3,000 ft.

3 TECHNICAL CHARACTERISTICS

Technical characteristics of the SART should be in accordance with Recommendation ITU-R M.628-2.

4 LABELLING

In addition to the items specified in resolution A.694(17) on general requirements, the following should be clearly indicated on the exterior of the equipment:

.1 brief operating instructions; and

.2 expiry date for the primary battery used.

---

* If an on-board test is performed using a shipborne 9 GHz radar, activation of the SART should be limited to a few seconds, to avoid harmful interference with other shipborne radars and excessive consumption of battery energy.

Annex 3-6-2
Resolution A.809(19)

(Adopted on 23 November 1995)

PERFORMANCE STANDARDS FOR SURVIVAL CRAFT TWO-WAY VHF RADIOTELEPHONE APPARATUS

THE ASSEMBLY,

RECALLING Article 15(j) of the Convention on the International Maritime Organization concerning the functions of the Assembly in relation to regulations and guidelines concerning maritime safety,

RECALLING ALSO regulation III/6.2.1 of the 1988 amendments to the International Convention for the Safety of Life at Sea (SOLAS), 1974, concerning radiocommunications for the global maritime distress and safety system (GMDSS), which requires that ships be provided with survival craft two-way VHF radiotelephone apparatus and that such apparatus shall conform to appropriate performance standards not inferior to those adopted by the Organization,

RECOGNIZING the need to prepare performance standards for survival craft two-way VHF radiotelephone apparatus to be used in the GMDSS in order to ensure the operational reliability of such equipment and to avoid, as far as practicable, adverse interaction between such equipment and other communication and navigation equipment on board ship,

HAVING CONSIDERED the recommendation made by the Maritime Safety Committee at its sixty-fifth session,

1. ADOPTS the Recommendation on Performance Standards for Survival Craft Portable Two-Way VHF Radiotelephone Apparatus and the Recommendation on Performance Standards for Two-Way VHF Radiotelephone Apparatus for Fixed Installation in Survival Craft set out in annexes 1 and 2, respectively, to the present resolution;

2. RECOMMENDS Governments to ensure that survival craft two-way radiotelephone apparatus for use in search and rescue operations which form part of the GMDSS:

(a) if installed on or after 23 November 1996, conforms to performance standards not inferior to those specified in annexes 1 and 2 to the present resolution;

(b) if installed before 23 November 1996, conforms to performance standards not inferior to those specified in annexes 1 and 2 to resolution A.762(18);

3. REQUESTS the Maritime Safety Committee to keep these Performance Standards under review and to adopt amendments thereto, as necessary.

Annex 1

RECOMMENDATION ON PERFORMANCE STANDARDS FOR SURVIVAL CRAFT PORTABLE TWO-WAY VHF RADIOTELEPHONE APPARATUS

1 INTRODUCTION

The survival craft portable two-way VHF radiotelephone, in addition to meeting the requirements of the Radio Regulations, the relevant ITU-R Recommendations and the general requirements set out in resolution A.694(17), should comply with the following performance standards.

2 GENERAL

2.1 The equipment should be portable and capable of being used for on-scene communication between survival craft, between survival craft and ship and between survival craft and rescue unit. It may also be used for on-board communications when capable of operating on appropriate frequencies.

2.2 The equipment should comprise at least:

.1 an integral transmitter/receiver including antenna and battery;

.2 an integral control unit including a press-to-transmit switch; and

.3 an internal microphone and loudspeaker.

2.3 The equipment should:

.1 be capable of being operated by unskilled personnel;

.2 be capable of being operated by personnel wearing gloves as specified for immersion suits in regulation 33 of chapter III of the 1974 SOLAS Convention;

.3 be capable of single-handed operation except for channel selection;

.4 withstand drops on to a hard surface from a height of 1 m;

.5 be watertight to a depth of 1 m for at least 5 min;

.6 maintain watertightness when subjected to a thermal shock of 45°C under conditions of immersion;

.7 not be unduly affected by seawater, or oil, or both;

.8 have no sharp projections which could damage survival craft;

.9 be of small size and light weight;

.10 be capable of operating in the ambient noise level likely to be encountered on board ships or in survival craft;

.11 have provisions for its attachment to the clothing of the user;

.12 be resistant to deterioration by prolonged exposure to sunlight; and

.13 be either of a highly visible yellow/orange colour or marked with a surrounding yellow/orange marking strip.

3 CLASS OF EMISSION, FREQUENCY BANDS AND CHANNELS

3.1 The two-way radiotelephone should be capable of operation on the frequency 156.800 MHz (VHF channel 16) and on at least one additional channel.

3.2 All channels fitted should be for single-frequency voice communication only.

3.3 The class of emission should comply with appendix 19 of the Radio Regulations.

4 CONTROLS AND INDICATORS

4.1 An on/off switch should be provided with a positive visual indication that the radiotelephone is switched on.

4.2 The receiver should be provided with a manual volume control by which the audio output may be varied.

4.3 A squelch (mute) control and a channel selection switch should be provided.

4.4 Channel selection should be easily performed and the channels should be clearly discernible.

4.5 Channel indication should be in accordance with appendix 18 of the Radio Regulations.

4.6 It should be possible to determine that channel 16 has been selected in all ambient light conditions.

5 PERMISSIBLE WARMING-UP PERIOD

The equipment should be operational within 5 s of switching on.

6 SAFETY PRECAUTIONS

The equipment should not be damaged by the effects of open-circuiting or short-circuiting the antenna.

7 TRANSMITTER POWER

The effective radiated power should be a minimum of 0.25 W. Where the effective radiated power exceeds 1 W, a power-reduction switch to reduce the power to 1 W or less is required. When this equipment provides for on-board communications, the output power should not exceed 1 W on these frequencies.

8 RECEIVER PARAMETERS

8.1 The sensitivity of the receiver should be equal to or better than 2 μV e.m.f. for a SINAD ratio of 12 dB at the output.

8.2 The immunity to interference of the receiver should be such that the wanted signal is not seriously affected by unwanted signals.

9 ANTENNA

The antenna should be vertically polarized and, as far as practicable, be omnidirectional in the horizontal plane. The antenna should be suitable for efficient radiation and reception of signals at the operating frequency.

10 RECEIVER OUTPUT

10.1 The audio output should be sufficient to be heard in the ambient noise level likely to be encountered on board ships or in a survival craft.

10.2 In the transmit condition, the output of the receiver should be muted.

11 ENVIRONMENTAL CONDITIONS

The equipment should be so designed as to operate over the temperature range –20°C to +55°C. It should not be damaged in stowage throughout the temperature range –30°C to +70°C.

12 POWER SUPPLY

12.1 The source of energy should be integrated in the equipment and may be replaceable by the user. In addition, provision may be made to operate the equipment using an external source of electrical energy.

12.2 Equipment for which the source of energy is intended to be user-replaceable should be provided with a dedicated primary battery for use in the event of a distress situation. This battery should be equipped with a non-replaceable seal to indicate that it has not been used.

12.3 Equipment for which the source of energy is intended to be non-user-replaceable should be provided with a primary battery. The portable two-way radiotelephone equipment should be fitted with a non-replaceable seal to indicate that it has not been used.

12.4 The primary battery should have sufficient capacity to ensure 8-hour operation at its highest rated power with a duty cycle of 1:9. This duty cycle is defined as 6-second transmission, 6-second reception above squelch opening level and 48-second reception below squelch opening level.

12.5 Primary batteries should have a shelf life of at least two years, and if identified to be user-replaceable should be of a colour or marking as defined in 2.3.13.

12.6 Batteries not intended for use in the event of a distress situation should be of a colour or marking such that they cannot be confused with batteries intended for such use.

13 LABELLING

In addition to the general requirements specified in resolution A.694(17), the following should be clearly indicated on the exterior of the equipment:

.1 brief operating instructions; and

.2 expiry date for the primary batteries.

Annex 2

RECOMMENDATION ON PERFORMANCE STANDARDS FOR TWO-WAY VHF RADIOTELEPHONE APPARATUS FOR FIXED INSTALLATION IN SURVIVAL CRAFT

1 INTRODUCTION

The survival craft two-way VHF radiotelephone for fixed installations, in addition to meeting the requirements of the Radio Regulations, the relevant ITU-R Recommendations and the general requirements set out in resolution A.694(17), should comply with the following performance standards.

2 GENERAL

2.1 The equipment should be capable of being used for on-scene communication between survival craft, between survival craft and ship and between survival craft and rescue unit.

2.2 The equipment should comprise at least:

.1 a transmitter and receiver;

.2 an antenna which may be fixed to the equipment or mounted separately; and

.3 a microphone with a press-to-talk switch and a loudspeaker.

2.3 The equipment should:

.1 be capable of being operated by unskilled personnel;

.2 be capable of being operated by personnel wearing gloves as specified for immersion suits in regulation III/33 of SOLAS 1974;

.3 withstand such shocks and vibration as may occur in survival craft;

.4 be watertight to a depth of 1 m for at least 5 min;

.5 maintain watertightness when subjected to a thermal shock of 45°C under conditions of immersion;

.6 not be unduly affected by seawater, or oil, or both;

.7 have no sharp projections which could injure personnel;

.8 be capable of operating in the ambient noise level likely to be encountered in survival craft; and

.9 be so designed that it can be readily mounted in a survival craft.

3 CLASS OF EMISSION, FREQUENCY BANDS AND CHANNELS

3.1 The two-way radiotelephone should be capable of operation on the frequency 156.800 MHz (VHF channel 16) and on at least one additional channel.

3.2 All channels fitted should be for single-frequency voice communication only.

3.3 The class of emission should comply with appendix 19 of the Radio Regulations.

4 CONTROLS AND INDICATORS

4.1 An on/off switch should be provided with a positive visual indication that the radiotelephone is switched on.

4.2 The receiver should be provided with a manual volume control by which the audio output of the loudspeaker may be varied. Where a handset is provided, this manual volume control of the loudspeaker should not influence the audio output of the handset.

4.3 A squelch (mute) control and a channel selection switch should be provided.

4.4 Channel selection should be easily performed and the channels should be clearly discernible.

4.5 Channel indication should be in accordance with appendix 18 of the Radio Regulations.

4.6 It should be possible to determine that channel 16 has been selected in all ambient light conditions.

5 PERMISSIBLE WARMING-UP PERIOD

The equipment should be operational within 5 s of switching on.

6 SAFETY PRECAUTIONS

The equipment should not be damaged by the effects of open-circuiting or short-circuiting the antenna.

7 TRANSMITTER POWER

The RF output power should be a minimum of 0.25 W. Where the RF output power exceeds 1 W, a power-reduction switch to reduce the output power to 1 W or less is required.

8 RECEIVER PARAMETERS

8.1 The sensitivity of the receiver should be equal to or better than 2 μV e.m.f. for a SINAD ratio of 12 dB at the output.

8.2 The immunity to interference of the receiver should be such that the wanted signal is not seriously affected by unwanted signals.

9 ANTENNA

The antenna should be vertically polarized and, as far as practicable, be omnidirectional in the horizontal plane. The antenna should be suitable for efficient radiation and reception of signals at the operating frequency.

10 RECEIVER OUTPUT

10.1 The audio output should be sufficient to be heard in the ambient noise level likely to be encountered in survival craft.

10.2 In the transmit condition, the output of the receiver should be muted.

11 ENVIRONMENTAL CONDITIONS

The equipment should be so designed as to operate over the temperature range –20°C to +55°C. It should not be damaged in stowage throughout the temperature range –30°C to +70°C.

12 POWER SUPPLY

12.1 The source of energy may be integrated in the equipment or external to it.

12.2 The source of energy should have sufficient capacity to ensure 8-hour operation at its highest rated power with a duty cycle of 1:9. This duty cycle is defined as 6-second transmission, 6-second reception above squelch opening level and 48-second reception below squelch opening level.

12.3 The two-way radiotelephone equipment may be equipped with a primary or secondary battery. Primary batteries should have a shelf life of at least two years.

12.4 Where secondary batteries are used, suitable arrangements should be made to ensure the availability of fully charged cells at all times.

13 LABELLING

In addition to the general requirements specified in resolution A.694(17), the following should be clearly indicated on the exterior of the equipment:

.1 brief operating instructions; and

.2 expiry date for the primary batteries, if any.

Annex 3-6-3
Resolution MSC.80(70)
(Adopted on 8 December 1998)

ADOPTION OF NEW PERFORMANCE STANDARDS FOR RADIOCOMMUNICATION EQUIPMENT

THE MARITIME SAFETY COMMITTEE,

RECALLING Article 28(b) of the Convention on the International Maritime Organization concerning the functions of the Committee,

RECALLING ALSO resolution A.825(19), by which the Assembly resolved that the functions of adopting performance standards for radio and navigational equipment, as well as amendments thereto, shall be performed by the Maritime Safety Committee on behalf of the Organization,

RECALLING FURTHER regulation IV/7.5 of the International Convention on the Safety of Life at Sea (SOLAS), 1974, as amended by the 1995 SOLAS Conference, which requires every passenger ship to carry means for two-way on-scene radiocommunications for search and rescue purposes using aeronautical frequencies 121.5 MHz and 123.1 MHz,

HAVING CONSIDERED new performance standards prepared at the third session of the Sub-Committee on Radiocommunications and Search and Rescue,

1. ADOPTS the Recommendation on Performance Standards for On-Scene (Aeronautical) Portable Two-Way VHF Radiotelephone Apparatus and the Recommendation on Performance Standards for On-Scene (Aeronautical) Two-Way VHF Radiotelephone Apparatus for Fixed Installations, set out in annexes 1 and 2, respectively, to the present resolution;

2. RECOMMENDS Member Governments to ensure that on-scene (aeronautical) two-way VHF radiotelephone apparatus for use in search and rescue operations installed on or after 1 July 2001 conforms to performance standards not inferior to those specified in the attached annexes.

Annex 1

RECOMMENDATION ON PERFORMANCE STANDARDS FOR ON-SCENE (AERONAUTICAL) PORTABLE TWO-WAY VHF RADIOTELEPHONE APPARATUS

1 INTRODUCTION

The on-scene (aeronautical) portable two-way VHF radiotelephone, in addition to meeting the requirements of the Radio Regulations, the relevant ITU-R Recommendations, the relevant requirements of annex 10 to the ICAO Convention, and the general requirements set out in resolution A.694(17), should comply with the following performance standards.

2 GENERAL

2.1 The equipment should be portable and capable of being used for on-scene communication between a ship and aircraft.

2.2 The equipment should comprise at least:

.1 an integral transmitter/receiver including antenna and battery;

.2 an integral control unit including a press-to-transmit switch; and

.3 a microphone and loudspeaker

2.3 The equipment should:

.1 be capable of being operated by unskilled personnel;

.2 withstand drops on to a hard surface from a height of 1 m;

.3 be of small size and light weight;

.4 be capable of operating in the ambient noise level likely to be encountered during SAR operations;

.5 have provisions for the use of external microphone/headset; and

.6 have a colour which distinguishes it from the portable equipment specified in resolution A.809(19).

2.4 Unless otherwise stated, the equipment should comply with the requirements of chapter II, part 2, paragraph 2.3 of annex 10 to the ICAO Convention.

3 CLASS OF EMISSION, FREQUENCY BANDS AND CHANNELS

The two-way radiotelephone should be amplitude-modulated and capable of operation on the frequencies 121.5 MHz and 123.1 MHz.

4 CONTROLS AND INDICATORS

4.1 An on/off switch should be provided with a positive visual indication that the radiotelephone is switched on.

4.2 The receiver should be provided with a manual volume control by which the audio output may be varied.

4.3 Frequency selection should be easily performed and the frequencies should be clearly discernible.

5 PERMISSIBLE WARMING-UP PERIOD

The equipment should be operational within 5 s of switching on.

6 SAFETY PRECAUTIONS

The equipment should not be damaged by the effects of open-circuiting or short-circuiting the antenna.

7 TRANSMITTER POWER

The carrier power should be between 50 mW and 1.5 W.

8 RECEIVER OUTPUT

8.1 The audio output should be sufficient to be heard in the ambient noise level likely to be encountered during SAR operations.

8.2 In the transmit condition, the output of the receiver should be muted.

9 POWER SUPPLY

9.1 The source of energy should be a primary battery integrated in the equipment and may be replaceable by the user. In addition, provision may be made to operate the equipment using an external source of electrical energy.

9.2 The primary battery should have sufficient capacity to ensure 8-hour operation at its highest rated power with a duty cycle of 1:9. This duty cycle is defined as 6-second transmission, 6-second reception above squelch opening level and 48-second reception below squelch opening level.

9.3 Primary batteries should have a shelf life of at least 2 years.

10 LABELLING

10.1 In addition to the general requirements specified in resolution A.694(17), the following should be clearly indicated on the exterior of the equipment:

.1 brief operating instructions;

.2 expiry date for the primary batteries; and

.3 the following text: ''only for emergency communications with aircraft''.

Annex 2

RECOMMENDATION ON PERFORMANCE STANDARDS FOR ON-SCENE (AERONAUTICAL) TWO-WAY VHF RADIOTELEPHONE APPARATUS FOR FIXED INSTALLATIONS

1 INTRODUCTION

The on-scene (aeronautical) two-way VHF radiotelephone for fixed installations, in addition to meeting the requirements of the Radio Regulations, the relevant ITU-R Recommendations, the relevant requirements of annex 10 to the ICAO Convention, and the general requirements set out in resolution A.694(17), should comply with the following performance standards.

2 GENERAL

2.1 The equipment should be capable of being used for on-scene communication between the ship and airborne rescue unit(s).

2.2 The equipment should comprise at least:

.1 a transmitter and receiver;

.2 an antenna which may be fixed to the equipment or mounted separately, and

.3 a microphone with a press-to-talk switch and a loudspeaker.

2.3 The equipment should :

.1 be capable of being operated by unskilled personnel; and

.2 be capable of operating in the ambient noise level likely to be encountered on board ships.

2.4 Unless otherwise stated, the equipment should comply with the requirements of chapter II, part 2, paragraph 2.3 of annex 10 to the ICAO Convention.

3 CLASS OF EMISSION, FREQUENCY BANDS AND CHANNELS

The two-way radiotelephone should be amplitude-modulated and capable of operation on the frequencies 121.5 MHz and on 123.1 MHz.

4 CONTROLS AND INDICATORS

4.1 An on/off switch should be provided with a positive visual indication that the radiotelephone is switched on.

4.2 The receiver should be provided with a manual volume control by which the audio output of the loudspeaker may be varied.

4.3 Frequency selection should be easily performed and the frequencies should be clearly discernible.

5 PERMISSIBLE WARMING-UP PERIOD

The equipment should be operational within 5 s of switching on.

6 SAFETY PRECAUTIONS

The equipment should not be damaged by the effects of open-circuiting or short-circuiting the antenna.

7 TRANSMITTER POWER

The carrier output power should be between 50 mW and 1.5 W.

8 RECEIVER OUTPUT

8.1 The audio output should be sufficient to be heard in the ambient noise level likely to be encountered on board ships.

8.2 In the transmit condition, the output of the receiver should be muted.

9 POWER SUPPLY

9.1 The radio installation should be powered from the ship's main source of electrical energy. In addition, it should be possible to operate the installation from an alternative source of electrical energy.

9.2 Alternatively, the source of energy may be a primary battery integrated in the equipment and may be replaceable by the user.

9.3 The primary battery should have sufficient capacity to ensure 8-hour operation at its highest rated power with a duty cycle of 1:9. This duty cycle is defined as 6-second transmission, 6-second reception above squelch opening level and 48-second reception below squelch opening level.

9.4 Primary batteries should have a shelf life of at least 2 years.

10 LABELLING

10.1 In addition to the general requirements specified in resolution A.694(17), the following should be clearly indicated on the exterior of the equipment:

.1 brief operating instructions;

.2 the following text: "only for emergency communications with aircraft"; and

.3 if applicable, expiry date for the primary batteries.

Annex 3-6-4
Resolution A.811(19)

(Adopted on 23 November 1995)

PERFORMANCE STANDARDS FOR A SHIPBORNE INTEGRATED RADIOCOMMUNICATION SYSTEM (IRCS) WHEN USED IN THE GMDSS

THE ASSEMBLY,

RECALLING Article 15(j) of the Convention on the International Maritime Organization concerning the functions of the Assembly in relation to regulations and guidelines concerning maritime safety,

RECALLING ALSO regulations IV/6 and 14 of the 1988 amendments to the International Convention for the Safety of Life at Sea (SOLAS), 1974, concerning radiocommunications for the global maritime distress and safety system (GMDSS), which require, respectively, that every ship be provided with radio installations and that all the equipment in these installations shall conform to appropriate performance standards not inferior to those adopted by the Organization,

RECOGNIZING the need to take into account the human element in identifying measures to increase the effectiveness and efficiency of the human performance by designing equipment that is more suited to the operators who use it,

RECOGNIZING ALSO that increased effectiveness and efficiency in the use of GMDSS equipment would be achieved by integrating the radiocommunication equipment into a shipborne integrated radiocommunication system, thereby providing simpler procedures for operators,

RECOGNIZING FURTHER the need to prepare performance standards for such a shipborne integrated radiocommunication system to ensure that the functional requirements of SOLAS regulation IV/4 are met,

HAVING CONSIDERED the recommendation made by the Maritime Safety Committee at its sixty-fifth session,

1. ADOPTS the Recommendation on Performance Standards for a Shipborne Integrated Radiocommunication System (IRCS) when used in the GMDSS set out in the annex to the present resolution;

2. RECOMMENDS Governments to ensure that a shipborne Integrated Radiocommunication System (IRCS) when used in the GMDSS conforms to performance standards not inferior to those specified in the annex to this resolution;

3. REQUESTS the Maritime Safety Committee to keep these Performance Standards under review and to adopt amendments thereto, as necessary.

Annex

RECOMMENDATION ON PERFORMANCE STANDARDS FOR A SHIPBORNE INTEGRATED RADIOCOMMUNICATION SYSTEM (IRCS) WHEN USED IN THE GMDSS

1 INTRODUCTION

1.1 The IRCS is a system in which individual radiocommunication equipment and installations are used as sensors, i.e. without the need for their own control units, providing outputs to and accepting inputs from the operator's position, called ''workstations''.

1.2 Such workstations are called "GMDSS workstations" if they include control and monitoring of all equipment and installations provided on a ship for the GMDSS which are also suitable for general radiocommunications.

1.3 The IRCS, in addition to meeting the general requirements set out in resolution A.694(17), should comply with the following performance standards.

2 GENERAL

2.1 The IRCS should comply with the applicable functional requirements of the GMDSS. All functional requirements of the item of radiocommunication equipment and installations integrated into the IRCS should be available. The functional requirements for a specific item of radiocommunication equipment or installation should not impair the availability of any other functional requirement for any other item of radiocommunication equipment or installation integrated into the IRCS.

2.2 All functional requirements of the equipment integrated into the IRCS should conform to the appropriate provisions of the performance standards for that equipment.

2.3 No single fault should impair the operation of more than one radiocommunication sensor or more than one workstation at any time.

2.4 The IRCS should:

.1 comprise at least two GMDSS workstations, each connected to each GMDSS radiocommunication sensor over a network or connecting system;

.2 comprise at least two printers;

.3 have facilities for automatically updating ship's position and time data in addition to the provision for manual input of this data;

.4 have a power supply arrangement which ensures that it is not possible inadvertently to switch off any part of the IRCS;

.5 include detecting facilities such that failure of any part of the IRCS activates an alarm; and

.6 be protected against the effects of computer viruses.

2.5 The GMDSS workstations should:

.1 have an identical user interface and an identical access to each function for different sensors;

.2 be capable of being operated independently of each other;

.3 be capable of allowing simultaneous operation of at least two GMDSS radiocommunication sensors; and

.4 be capable of transmitting distress alerts. The distress alert should only be initiated by means of a dedicated button for each GMDSS sensor; the button should not be used for any other purpose. Each button should be clearly identified, protected against inadvertent operation, require two independent actions to initiate the distress alert and produce an indication that the distress alert has been activated. Each distress alerting button should be electrically separate from the IRCS network or connecting system. It should be possible to interrupt or initiate the distress alert at any time.

2.6 Integration of the VHF radiotelephone required for navigational safety should only be permitted if it does not prevent compliance with SOLAS regulation IV/6.3.

2.7 Additional workstations intended only for general radiocommunications should not have access to the distress alerting functions; neither should they impair or slow down the distress alerting and alarm functions. The GMDSS workstations should have priority access over additional workstations.

2.8 Additional sensors not required for the GMDSS should neither impair nor slow down the distress alerting and alarm functions.

Annex 3-6-5
Resolution A.662(16)
(Adopted on 19 October 1989)

PERFORMANCE STANDARDS FOR FLOAT-FREE RELEASE AND ACTIVATION ARRANGEMENTS FOR EMERGENCY RADIO EQUIPMENT

THE ASSEMBLY,

RECALLING Article 15(j) of the Convention on the International Maritime Organization concerning the functions of the Assembly in relation to regulations and guidelines concerning maritime safety,

RECOGNIZING the need to prepare performance standards for float-free release and activation arrangements for use in the global maritime distress and safety system (GMDSS) for emergency radio equipment to ensure the operational reliability of such equipment,

HAVING CONSIDERED the recommendation made by the Maritime Safety Committee at its fifty-fifth session,

1. ADOPTS the Recommendation on Performance Standards for Float-Free Release and Activation Arrangements for Emergency Radio Equipment, the text of which is set out in the annex to this resolution;

2. RECOMMENDS Member Governments to ensure that arrangements for the float-free release and activation of appropriate equipment for use in the GMDSS conform to performance standards not inferior to those specified in the annex to this resolution.

Annex

RECOMMENDATION ON PERFORMANCE STANDARDS FOR FLOAT-FREE RELEASE AND ACTIVATION ARRANGEMENTS FOR EMERGENCY RADIO EQUIPMENT

1 Float-free release and activation arrangements enable the automatic release of specified radio apparatus from a sinking ship and its automatic activation.

2 The float-free arrangement should:

.1 be designed so that the release mechanism should operate before reaching a depth of 4 m in any orientation;

.2 be capable of operating throughout the temperature range of –30°C to +65°C;

.3 be constructed of non-corrosive compatible materials, so as to prevent deterioration which may cause any malfunction of the unit. Galvanizing or other forms of metallic coating on parts of the float-free release mechanism should not be accepted;

.4 be constructed to prevent release when seas wash over the unit;

.5 not be unduly affected by seawater or oil or prolonged exposure to sunlight;

.6 be capable of operating properly after exposure to shock and vibration and other severe environmental conditions encountered above deck on seagoing vessels;

.7 if the ship navigates in areas where icing may be expected, be so designed as to minimize the formation of ice and prevent its effects from hindering the release of the radio equipment as far as practicable;

.8 be mounted in such a way that the radio equipment, after being released, is not obstructed by the structure of the sinking ship; and

.9 carry a label indicating clearly the operating instructions for manual release.

3 For radio equipment requiring external power or data connection, or both, the means of connection should not inhibit the release or activation of the radio apparatus.

4 It should be possible to assess the proper functioning of the automatic release mechanism by a simple method without activation of the radio equipment.

5 It should be possible to release the radio equipment manually from the float-free mechanism.

Annex 3-6-6
Resolution A.665(16)
(Adopted on 19 October 1989)

PERFORMANCE STANDARDS FOR RADIO DIRECTION-FINDING SYSTEMS

THE ASSEMBLY,

RECALLING Article 15(j) of the Convention on the International Maritime Organization concerning the functions of the Assembly in relation to regulations and guidelines concerning maritime safety,

BEARING IN MIND that regulations V/12(p) and (r) of the International Convention for the Safety of Life at Sea, 1974, as amended in 1988, require that ships of 1,600 tons gross tonnage and upwards shall be fitted with radio direction-finding apparatus and that such apparatus shall conform to appropriate performance standards not inferior to those adopted by the Organization,

NOTING that the technical requirements of regulation IV/11 of the 1974 SOLAS Convention, in force prior to entry into force of the 1988 amendments, are no longer included in the Convention but continue to apply to equipment installed on ships,

HAVING CONSIDERED the recommendation made by the Maritime Safety Committee at its fifty-seventh session,

1. ADOPTS the Performance Standards for Radio Direction-Finding Systems, the text of which is set out in the annex to the present resolution;

2. RECOMMENDS Member Governments to ensure that radio direction-finding apparatus fitted in compliance with regulation V/12(p) of the 1974 SOLAS Convention conforms to performance standards not inferior to those specified in the annex to the present resolution.

Annex

PERFORMANCE STANDARDS FOR RADIO DIRECTION-FINDING SYSTEMS

1 INTRODUCTION

1.1 The direction-finding equipment should be capable of indicating both the bearing and sense of radio transmissions in the frequency bands specified in paragraph 2.

1.2 In addition to meeting the general provisions contained in resolution A.574(14),* the direction-finding equipment should comply with the following minimum performance requirements.

2 FREQUENCY RANGES AND CLASSES OF EMISSION

The equipment should be capable of receiving signals of classes of emission A1A, A2A and H2A in the frequency range 255 kHz to 525 kHz and A1A, A2A, H2A, A3E and H3E in the frequency range 2,167 kHz to 2,197 kHz.

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* Superseded by resolution A.694(17) (see annex 3-1-1).

3 SELECTIVITY

The selectivity should be such as to allow a bearing to be taken readily without interference from other radio transmissions on frequencies more than 2 kHz from the desired signal.

4 SIGNAL IDENTIFICATION

4.1 Means of audio-monitoring should be provided regardless of the method used for direction-finding.

4.2 The equipment should be suitable for use with headphones. If a loudspeaker is provided, it should be capable of being rendered inoperative by simple means.

5 BEARING INDICATION

Means should be provided to indicate the bearing of the desired transmission. Such indication should be capable of being easily, rapidly and precisely resolved within 0.25°.

6 BEARING ACCURACY

6.1 The instrumental accuracy in taking relative bearings should be within $\pm 1°$. This requirement should be met at all frequencies in the frequency bands specified in paragraph 2 of this recommendation and throughout the whole 360° of azimuth at field strength values between 50 μV/m and 50 mV/m.

Note: The instrumental accuracy referred to above does not apply to the operational accuracy attainable in service, which should be determined for each installation taking into account paragraphs 10.3, 10.4 and 10.5 of this recommendation. In particular, the operational accuracies in the 2 MHz band should be sufficient for homing purposes.

6.2 Pre-set facilities to correct the quadrantal error should normally be provided for the frequency band 255 kHz to 525 kHz.

7 MANUAL CONTROLS AND THEIR OPERATION

A tuning scale or indicator should be provided, calibrated to indicate directly the carrier frequency of the signal to which the equipment is intended to be tuned.

.1 If a tuning scale is provided, 1 mm should correspond, at all points in its range, to not more than 2.5 kHz in the frequency range 255 kHz to 525 kHz.

.2 The maritime distress frequencies should be marked prominently.

.3 Where other means of frequency indication are provided, the resolution should be at least 1 kHz.

8 OPERATIONAL AVAILABILITY

The equipment should be ready for operation within 60 s of switching on.

9 SPECIAL REQUIREMENTS FOR DIFFERENT METHODS OF DIRECTION-FINDING

9.1 Aural minimum method

.1 With a field strength sufficient to ensure a signal/noise ratio of at least 50 dB, a change in the setting of the bearing indicator of 5° in either direction from the position of minimum output should cause the audio-frequency output to increase by not less than 18 dB. Similarly, a change of 90° in either direction should cause an increase of not less than 35 dB.

.2 The equipment should be provided with a minimum-clearing control giving a noticeable minimum of the output at all settings.

.3 The sense should be determined by reference to the lower output.

.4 The sense ratio in the frequency ranges 255 kHz to 525 kHz and 2,167 kHz to 2,197 kHz should be 15 dB and 10 dB, respectively.

.5 The automatic gain control, if provided, should be rendered inoperative automatically when the equipment is used for bearing determination.

9.2 Other methods

.1 There should be means of indicating that the receiver gain and signal strength are sufficient to enable a correct bearing to be taken.

.2 With a field strength of 1 mV/m, the indicated bearing should not change by more than 1° when the receiver is detuned to a point where the indication referred to in subparagraph 9.2.1 above shows that the signal strength is just sufficient to take a bearing.

.3 For any signal strength sufficient to give a bearing indication, there should be no observable change of indicated bearing when the beat-frequency oscillator is switched on.

.4 Fluctuations of the indicated bearing caused by any servo-mechanism should not exceed $\pm 0.5°$ from the mean value.

.5 If, after identifying a station the bearing of which is required, it is necessary to check or alter the adjustment of any control as part of the process of direction-finding, this check and adjustment should be capable of being made within 10 s.

10 MISCELLANEOUS AND INSTALLATION RECOMMENDATIONS

10.1 The equipment should be protected from excessive voltages induced in the antennas.

10.2 An efficient two-way means of calling and voice communication should be provided between the direction-finder and the navigating bridge.

10.3 As far as practicable, the direction-finder should be so located that as little interference as possible from mechanical or other noise will be caused to the efficient determination of bearings.

10.4 As far as is practicable, the direction-finding antenna system should be erected in such a manner that the efficient determination of bearings will be hindered as little as possible by the close proximity of other antennas, derricks, wire halyards or other large metal objects.

10.5 All direction-finders should be calibrated to the satisfaction of the Administration on first installation. The calibration should be verified by check bearings or by a further calibration whenever any changes are made in the position of any antennas or of any structures on deck which might affect appreciably the accuracy of the direction-finder. The calibration particulars should be checked at yearly intervals, or as near thereto as possible. A record should be kept of the calibrations and of any checks made of their accuracy.

10.6 When installing and testing direction-finding equipment, due regard should be given to the relevant recommendations of ITU's International Radio Consultative Committee (CCIR).

Annex 3-6-7
Resolution A.530(13)

(Adopted on 17 November 1983)

USE OF RADAR TRANSPONDERS FOR SEARCH AND RESCUE PURPOSES

THE ASSEMBLY,

RECALLING Article 16(j) of the Convention on the International Maritime Organization concerning the functions of the Assembly in relation to regulations concerning maritime safety,

RECALLING FURTHER Assembly resolution A.423(XI)* on radar beacons and shipborne transponders,

RECOGNIZING that the response from radar transponders used for search and rescue purposes should be distinctive when appearing on a radar display,

HAVING CONSIDERED the recommendation made by the Maritime Safety Committee at its forty-eighth session,

1. ADOPTS the Recommendation on the Signal Characteristic of Radar Transponders to Assist in Search and Rescue Operations, set out in the annex to the present resolution;

2. RECOMMENDS Member Governments to ensure that the signal characteristic set out in the annex is not used for any purpose other than search and rescue.

Annex

RECOMMENDATION ON THE SIGNAL CHARACTERISTIC OF RADAR TRANSPONDERS TO ASSIST IN SEARCH AND RESCUE OPERATIONS

Radar transponders intended to be used for search and rescue purposes should be capable of transmitting signals which will appear on a radar display as a series of equally spaced dots.

* Superseded by resolution A.615(15).

Annex 3-6-8

RECOMMENDATION ITU-R M.628-3*

TECHNICAL CHARACTERISTICS FOR SEARCH AND RESCUE RADAR TRANSPONDERS

(Questions ITU-R 28/8 and ITU-R 45/8)

(1986-1990-1992-1994)

The ITU Radiocommunication Assembly,

considering

a) that Regulations III/6.2.2 and IV/7.1.3 of the 1988 Amendments to the International Convention for the Safety of Life at Sea (SOLAS), 1974 require the carriage of radar transponders operating in the 9 GHz frequency band for locating the ship when it is in distress at sea or its survival craft;

b) that such radar transponders may also be used by ships not subject to the 1974 SOLAS Convention; some of these radar transponders may be installed with a float-free release and activation arrangement or with a float-free Emergency Position Indicating Radio Beacon (EPIRB) or float-free satellite EPIRB;

c) that Regulations V/12(g) and (h) of the 1988 Amendments to the 1974 SOLAS Convention prescribe the requirement that passenger ships irrespective of size and cargo ships of 300 tons gross tonnage and upwards carry a radar installation or if they are of 10 000 tons gross tonnage and upwards, two radar installations; from 1 February 1995, the radar installation or at least one of the radar installations shall be capable of operating in the 9 GHz frequency band;

d) that the International Maritime Organization (IMO) has adopted a Recommendation on performance standards for survival craft radar transponders for use in search and rescue operations (Resolution A.697(17));

e) that location is part of the basic requirements for the GMDSS;

f) that a locating system would be more effective if the radar transponder was in conformity with internationally agreed technical and operating characteristics,

recommends

1. that the technical characteristics of search and rescue radar transponders (SART) operating in the frequency range 9 200-9 500 MHz should be in accordance with Annex 1;

2. that the maximum detection range of a SART having technical characteristics in accordance with Annex 1 by a radar conforming with IMO Resolution A.477(XII) should be assessed using its measured technical characteristics in conjunction with the theoretical method given in Annex 2.

Note 1 – The propagation losses of a SART signal caused by a survival craft and its occupants are explained in Annex 3.

* The Director, Radiocommunication Bureau, is requested to bring this Recommendation to the attention of the International Maritime Organization (IMO), the International Civil Aviation Organization (ICAO), the International Electrotechnical Commission (IEC) and the International Association of Lighthouse Authorities (IALA).

This text is reproduced from ITU-R Recommendations, Volume 2000 – M Series – Part 4

ANNEX 1

Minimum technical characteristics for search and rescue radar transponders operating over the band 9 200-9 500 MHz

1. Frequency: 9 200-9 500 MHz.

2. Polarization: horizontal.

3. Sweep rate: 5 μs per 200 MHz, nominal.

4. The response signal should consist of 12 sweeps.

5. Form of sweep: sawtooth, forward sweep time: 7.5 μs ± 1 μs,
return sweep time: 0.4 μs ± 0.1 μs.
The response should commence with a return sweep.

6. Pulse emission: 100 μs nominal.

7. e.i.r.p.: not less than 400 mW (equivalent to +26 dBm).

8. Effective receiver sensitivity: better than –50 dBm (equivalent to 0.1 mW/m^2) (see Note 1).

9. Duration of operation: 96 h in stand-by condition followed by 8 h of transponder transmissions while being continuously interrogated with a pulse repetition frequency of 1 kHz.

10. Temperature range: ambient: –20° C to +55° C,
stowage: –30° C to +65° C.

11. Recovery time following excitation: 10 μs or less.

12. Effective antenna height: ≥ 1 m (see Note 2).

13. Delay between receipt of radar signal and start of transmission: 0.5 μs or less.

14. Antenna vertical beamwidth: at least ± 12.5° relative to the radar transponders' horizontal plane.

15. Antenna azimuthal beamwidth: omnidirectional within ± 2 dB.

Note 1 – Effective receiver sensitivity includes antenna gain.

– Effective receiver sensitivity of better than –50 dBm applies to interrogating radar pulses (medium and long) of > 400 ns.

– Effective receiver sensitivity of better than –37 dBm applies to interrogating radar pulses (short) of ≤ 100 ns.

– The receiver should be capable of correct operation when subjected to the radiated field (28 dB(W/m^2)) emitted from a shipborne radar complying with IMO Resolution A.477(XII) at any distance > 20 m.

Note 2 – This effective antenna height is applicable for equipment required by Regulations III/6.2.2 and IV/7.1.3 of the 1988 Amendments to the 1974 SOLAS Convention.

ANNEX 2

The maximum detection range of a SART of given or measured e.i.r.p. and effective receiver sensitivity when deployed with a radar conforming with IMO Resolution A.477(XII) may be assessed using Fig. 1.

The essential parameters of the radar are:

– transmitter power 25 kW,

– antenna gain 30 dBi,

– antenna height 15 m,

– receiver sensitivity –94 dBm.

Figure. 1 shows the propagation curves for SARTs of height 0.5 m, 1 m and 1.5 m in a fairly calm sea (wave height 0.3 m). For rougher seas, the sea reflection coefficient is reduced and the propagation curves move back towards the free space line depending on atmospheric refraction. For an SART of 1 m height, the maximum detection range is at least 5 nm.

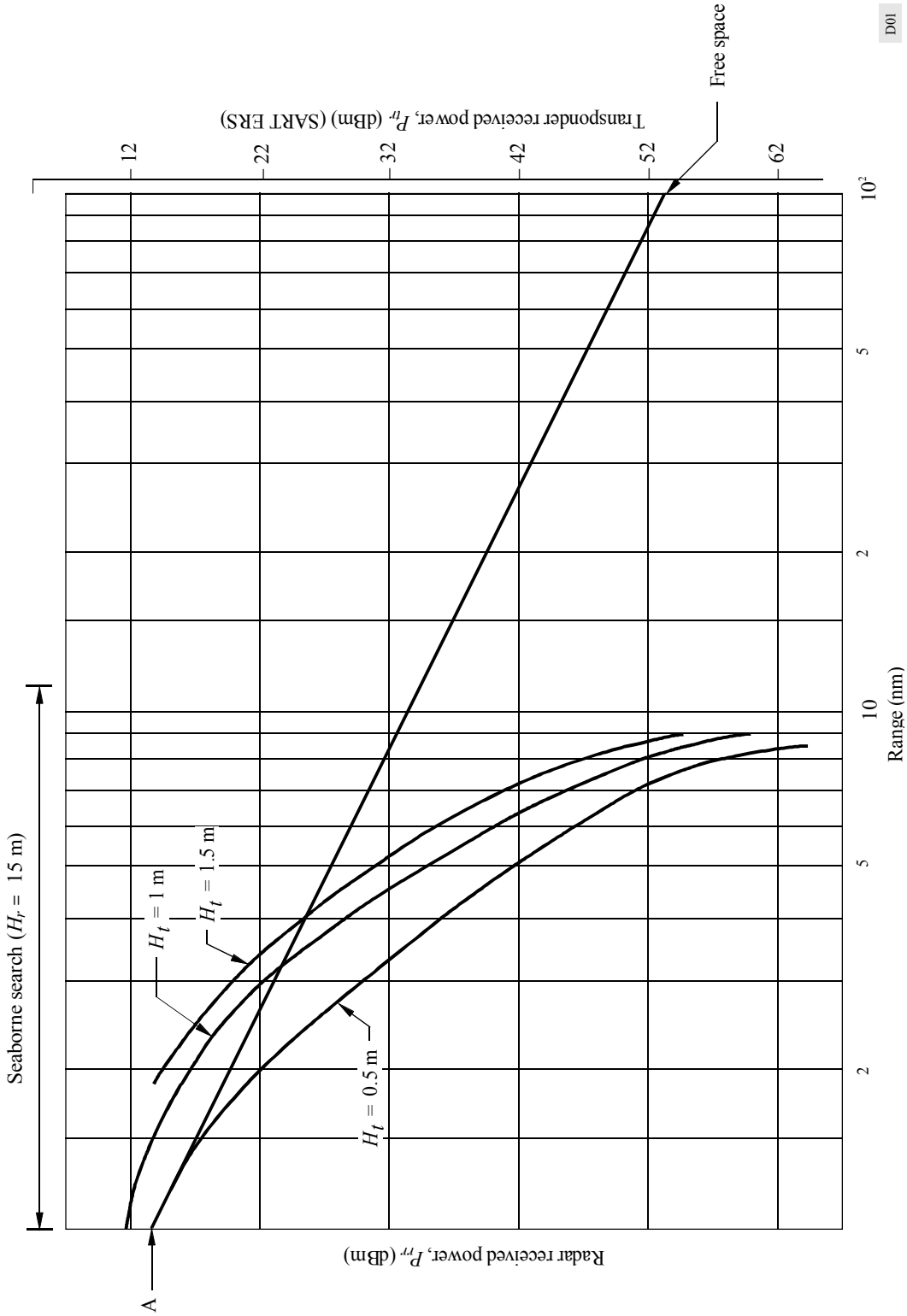


FIGURE 1

Propagation curves for measurement of SART maximum detection range

The method of using Fig. 1 is as follows:

– calculate the radar received power (P_r) at range 1 nm using the formula:

P_r = SART e.i.r.p. × radar antenna gain × $(\lambda/4\ \pi\ R)^2$
that is P_r (dBm) = SART e.i.r.p. (dBm) –87 dB;

– set the calculated P_r against point A on the radar received power scale and complete the scale (10 dB per division);

– set the SART effective receiver sensitivity (ERS) on the transponder received power scale and read the intercept with the appropriate propagation curve at that level to obtain the radar to SART maximum detection range;

– take the –94 dBm level on the radar received power scale and read the intercept with the appropriate propagation curve at that level to obtain the SART to radar maximum detection range.

The smaller of the two maximum detection ranges so obtained is the required assessment of SART maximum detection range, which should be at least 5 nm as required by IMO Resolution A.697(17).

ANNEX 3

Effects of antenna height and obstruction of the signal path by a survival craft and its occupants on the detection range of SARTs

1. Introduction

This Annex discusses the effects on the propagation path of SART signals, taking into account the height of the SART antenna above the surface of the sea and also the attenuation caused by the materials of the survival craft and its occupants.

2. Effects of SART antenna height on detection range

This Recommendation requires that the height of the installed SART antenna should be at least 1 m above the sea surface in order to obtain the five nautical mile detection range required by IMO Resolution A.697(17). Practical tests have confirmed this performance. Tests on a sample of six SARTs from different manufacturers gave detection ranges between 8.2 nm and 9.2 nm with an antenna height of 1 m.

2.1 Tests have also shown the importance of maintaining a SART antenna height of at least 1 m. The following results were obtained with a SART in a survival craft:

– SART lying flat on the floor: range 1.8 nm

– SART standing upright on the floor: range 2.5 nm

– SART floating in the water: range 2.0 nm

3. Effects of survival craft on SART signal

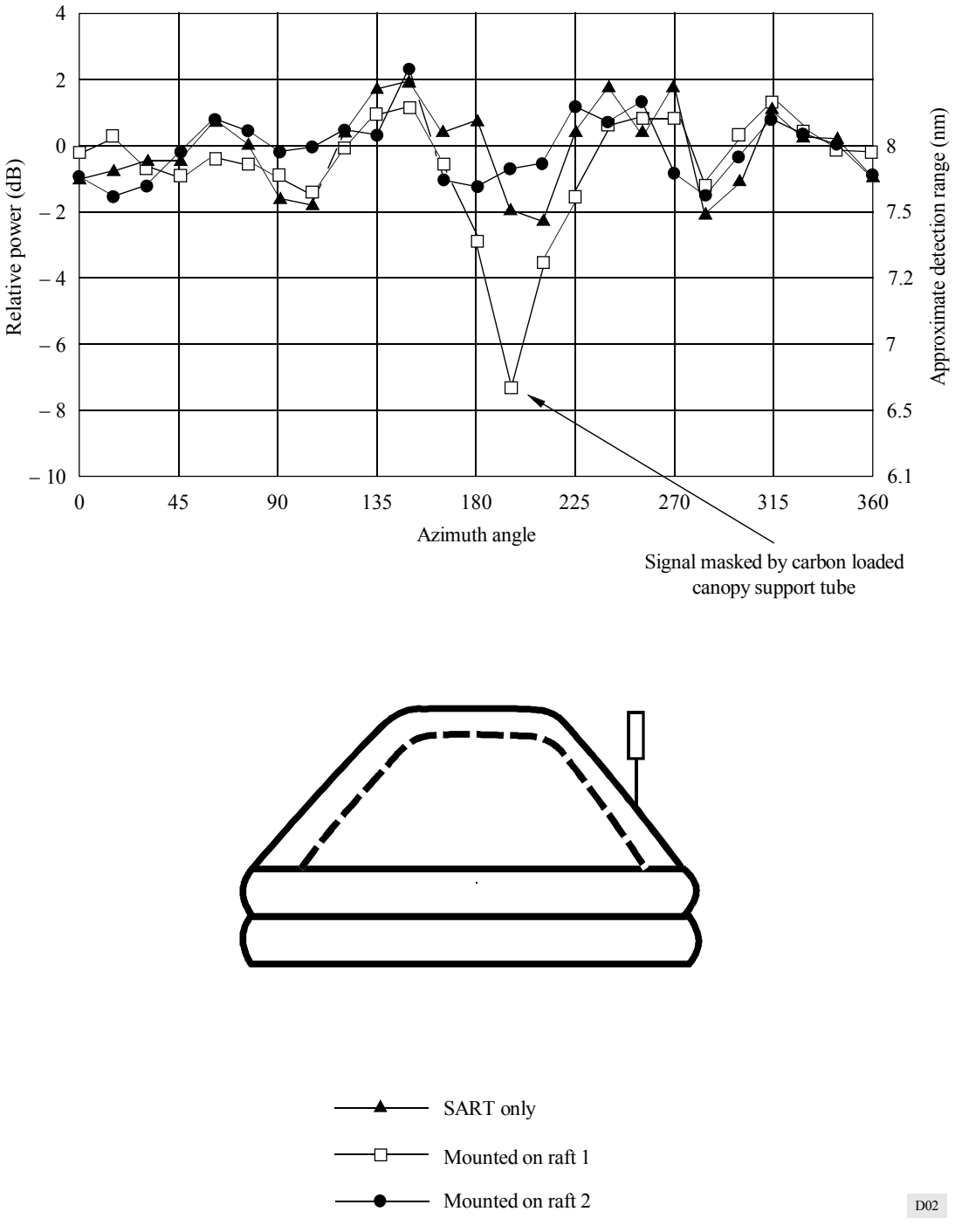
Tests have been made with a SART mounted on a survival craft to give a 1 m antenna height, in order to determine whether the body of the survival craft and its occupants may cause an obstruction.

3.1 Figures 2-4 give the results of these tests carried out on two different models of an eight-man SOLAS life-raft. In each case, the SART was placed at the centre of a turntable in an open field site, and was triggered with a pulsed radar signal. Each set of measurements was conducted with and without the life-raft and "survivors" present, keeping the SART at the centre of the turntable.

3.2 Figure 2 shows the results obtained from a SART mounted on a telescopic pole fitted to the life-raft's antenna mounting. In this case, the SART antenna was level with the canopy support tube of the raft. One of the rafts had little effect on the SART signal, whereas the other (which has carbon in the material of the support tube) caused a dip in the signal through an angle of about 30°.

FIGURE 2

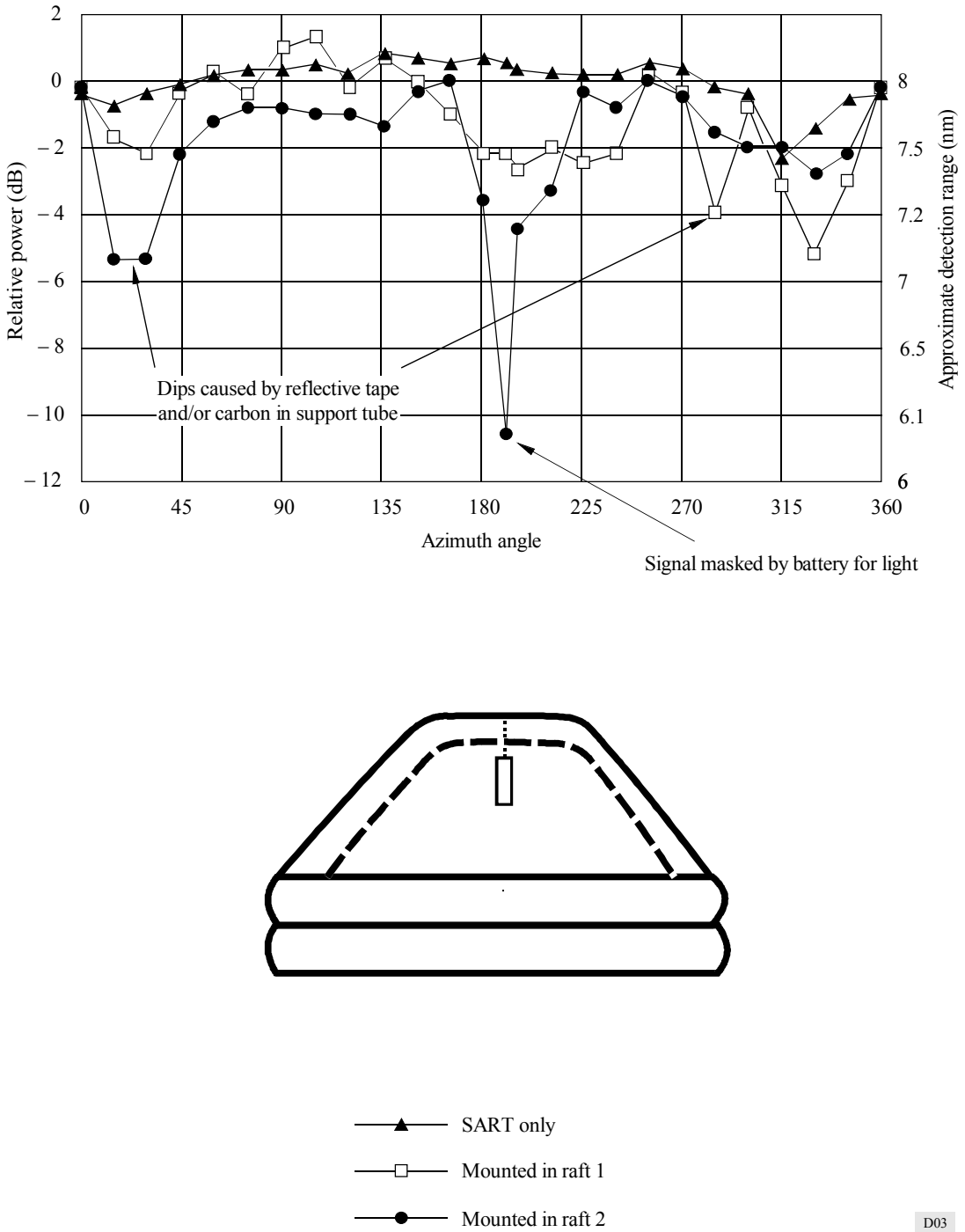
Pole mounted SART



3.3 Figure 3 shows the results obtained with the same rafts, but with a SART designed to hang from the support tube, inside the canopy of the raft. A smaller loss of signal was noted due to the carbon loaded tubes, as the signal was only passing through the vertical sections. Dips were also noted, however, due to the presence of retro-reflective tape on the outside of the life-raft canopies. On one raft, there was a severe reduction in signal over a very small angle, due to the proximity of a Lithium battery pack mounted on the canopy for powering the life-raft location light.

FIGURE 3

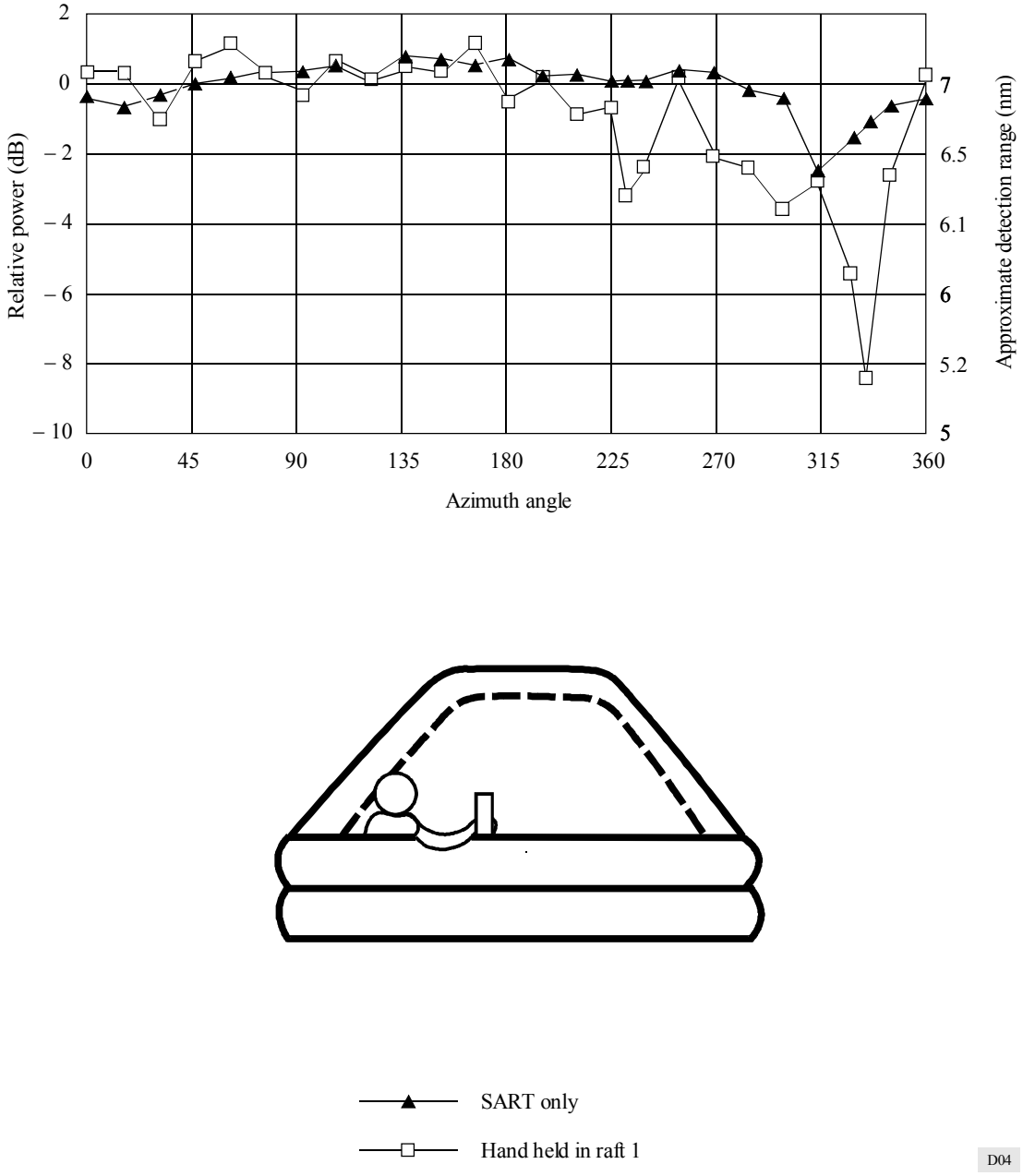
SART hung inside raft



3.4 Figure 4 shows the blanking effect caused by a survivor holding the SART at arm's length. In this case however the SART height was only 0.5 m.

FIGURE 4

Hand-held SART



3.5 On each figure approximate detection ranges are given. These are derived theoretically assuming an 8 nm detection range for a 1 m height SART and a 7 nm range for 0.5 m height.

3.6 It can be seen from the figures that best performance was obtained with the pole mounted SART where the reduction in detection range due to the survival craft was generally no more than 0.5 nm. In all cases there was reduced performance over narrow sectors of 1.5-2.0 nm but in practice with the survival craft moving in the sea this will not be a serious operational problem. The reduction shown in Fig. 4 caused by a person, will not be significant in practice as a person seated in a survival craft is lower in height than 1 m.

3.7 The above results were obtained with the survival craft dry as it was on a test site. Table 1 gives the propagation loss for the canopy and air tube cloths used in a number of different manufacturers' survival crafts. The last two entries give the loss when the materials are sprayed with sea water. It can be seen that in the worst case the additional loss for wet material was 3.35 dB which equates to a reduction in detected range of about a further 0.5 nm.

TABLE 1

Transmission loss through canopy of life-raft (measurement results)

Test	Sample	Thickness (mm)	Weight (kg/m^2)	Transmission loss (dB) vs. slant of canopy			
				Slant			
				$\theta = 0°$	$\theta = 30°$	$\theta = 45°$	$\theta = 60°$
1	Canopy cloth of company A	0.18	0.22	0	–0.1	–0.2	0
2	Air tube cloth of company A	0.53	0.7	–0.05	–0.05	–0.3	–0.2
3	Canopy cloth of company B	0.25	0.27	0	–0.1	–0.15	–0.05
4	Air tube cloth of company B	0.57	0.67	0	–0.4	–0.4	–0.45
5	Canopy cloth of company C	0.26	0.3	–0.2	–0.5	–0.3	–0.4
6	Air tube cloth of company C	0.54	0.67	–0.6	–1.4	–1.9	–2.4
7	Spraying salt water (4.8% NaCl) over "1"	–	–	–0.35	–0.55	–0.95	–1.1
8	Spraying salt water (4.8% NaCl) over "3"	–	–	–1.3	–1.9	–2.6	–3.4

Measurement freqency: 9.4 GHz
Sample size: 600 × 800 mm

4. Conclusions

The tests indicated that properly mounted SARTs will achieve the detection range required by IMO, even allowing for the blanketing effects of the survival craft. There is no necessity to mount the SART more than 1 m above the sea particularly if the extra height is likely to lead to difficulties by survivors in achieving the mounting, but in future improved antenna mountings may be feasible giving additional detection range.

4.1 The tests did not consider the effect on SART performance of a radar reflector but it would be expected that this would seriously degrade the SART response. Survivors are advised not to deploy a SART and a radar reflector on the same survival craft because the reflector may obscure the SART.

Annex 3-6-9

RECOMMENDATION 585-2

ASSIGNMENT AND USE OF MARITIME MOBILE SERVICE IDENTITIES

(1982-1986-1990)

The CCIR,

CONSIDERING

(a) the need for a unique ship identity for safety and telecommunication purposes;

(b) the need for this identity to be usable in automatic systems;

(c) that, in the interest of having a common address format for automatic systems, identities assigned to ship stations, coast stations and used for establishing group calls should be of a similar nature when transmitted over the radio path;

(d) Article 25 and Appendix 43 of the Radio Regulations;

(e) that it is highly desirable that the code which forms the ship identity or part thereof can be used by subscribers to the public switched networks for calling ships automatically;

(f) that the public switched networks in some countries have restrictions, with respect to the maximum number of digits that may be dialled or keyed to indicate ship station identity;

(g) that CCITT Recommendation E.210/F.120 describes a ship station identification method which provides for this contingency;

(h) that whatever restrictions may be required should, in the interests of the development of automatic shore-to-ship operations, be as few as possible,

UNANIMOUSLY RECOMMENDS

1. that ships complying with the International Convention for the Safety of Life at Sea, 1974, as amended in 1988 and other ships equipped with automated radiocommunication systems, including Digital Selective Calling and/or carrying alerting devices of the Global Maritime Distress and Safety System should be assigned ship station identities in accordance with Annex I to this Recommendation;

2. that ship and coast stations using Morse telegraphy may continue to use existing alphanumeric call signs;

3. that ship and coast stations using digital selective-calling equipment in accordance with Recommendation 493 should use their 9-digit numerical identities transmitted as a 10-digit address/self-identity with a digit 0 added at the end of the identity;

4. that administrations issuing 5-digit numbers according to Radio Regulation No. 2134 should, if possible, assign 9-digit numerical identities and 5-digit numbers in such a way that there is a clear relation between them;

5. that the present octal numbering system in use in an existing maritime mobile-satellite system should be converted as early as feasible to a decimal system with 9-digit ship station identities;

6. that any future international automatic maritime telecommunication system should be designed to use the 9-digit ship station identities on the radio path.

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ANNEX I

ASSIGNMENT OF SHIP STATION IDENTIFICATION

1. Introduction

1.1 Ships participating in the maritime radio services mentioned in RECOMMENDS 1 shall be assigned a nine digit unique ship station identity in the format $M_1I_2D_3X_4X_5X_6X_7X_8X_9$ wherein the first three digits represent the Maritime Identification Digits (MID).

1.2 Restrictions may apply with respect to the maximum number of digits which can be transmitted on some national telex and/or telephone networks for the purpose of ship station identification.

1.3 At present, the maximum number of digits that are able to be transmitted over the national networks of many countries for the purpose of determining ship station identity is six. The digits carried on the network to represent the ship station identity is referred to as the "ship station number" in this text and in the relevant CCITT Recommendation. The use of the techniques described below should make it possible for the coast stations of such countries to engage in the automatic connection of calls to ship stations.

1.4 To obtain the required nine digit ship station identity a series of trailing zeros is added to the ship station number by the coast station for shore-originated automatic services, e.g.:

Ship station number	*Ship station identity*
$M_1I_2D_3X_4X_5X_6$	$M_1I_2D_3X_4X_5X_60_70_80_9$

2. As long as the restrictions in § 1 apply in one's own network limiting ship station numbers to 6 digits, ships that intend to receive automatic network traffic from national coast stations only, should be assigned identities wherein X_9, but not X_8, = 0. This assumes that "9" is used to abbreviate the national MID for such ships for network purposes.

Ship station number	*Ship station identity*
9 $X_4X_5X_6X_7X_8$	$M_NI_ND_NX_4X_5X_6X_7X_80_9$

$M_NI_ND_N$ are the Maritime Identification Digits of one's own country. (See also § 3.2 of CCITT Recommendation E.210/F.120). If a country has more than one MID, only one may be used for this purpose.

3. As long as the restrictions in § 1 apply it may be useful for some administrations to expand the capacity for numerical ship station identification by using as many as ten "8 Y" abbreviations for MIDs.

Such a technique may allow the assignment of ship station identities wherein trailing zeros are applied only to X_8 and X_9.

Ship station number	*Ship station identity*
8 Y $X_4X_5X_6X_7$	$M_1I_2D_3X_4X_5X_6X_70_80_9$

The usefulness of this technique to a given administration may depend on whether its abbreviation (e.g. 83) of its own MID is duplicated in other administrations in which some of its ships have a community of interest. When such is the case the ship in question can be called using the same ship station number in all the automatic networks of interest to that ship. As an example, a group of up to ten countries, with community of interest, might agree to assign the same abbreviation for their respective MIDs. The abbreviation should always relate to the numerically lowest MID, when more than one is assigned to a given country.

Country	*"8 Y" Assignment*	
A	80	
B	81	
C	82	
D	83	
E	84	(All countries recognize a particular 8 Y abbreviation
F	85	as associated with a particular country)
G	86	
H	87	
I	88	
J	89	

For example a coast station in any of the countries A to J receiving "83" as the first two digits of a ship station number would transmit the MID of country D.

4. As long as the restrictions in § 1 apply, ships that require regular automatic communications from foreign coast stations additional to those that may conform to the abbreviation arrangement noted in § 3 shall only be assigned ship station identities with $X_7X_8X_9 = 000$ to support 6 digit ship station numbers.**5.** When it becomes necessary to progress to stage 2, (seven digit ship station numbers for automatic shore-originated traffic) in the ship station identity scheme the format of ship station identities in § 4 would change from $M_1I_2D_3X_4X_5X_6 0_7 0_8 0_9$ to $M_1I_2D_3X_4X_5X_6X_7 0_8 0_9$. If "8 Y" abbreviations are used in stage 1 (six digit ship station numbers for automatic shore-originated traffic) some ship station identity assignments will already have taken the $M_1I_2D_3X_4X_5X_6X_7 0_8 0_9$ format. It would therefore be useful to reserve at least one value in the X_7 digit position if ship station identity assignments are made on the basis of "8 Y" network abbreviations:

Ship station number

8 Y $X_4X_5X_6X_7$

Ship station identity

$M_1I_2D_3X_4X_5X_6X_7 0_8 0_9$

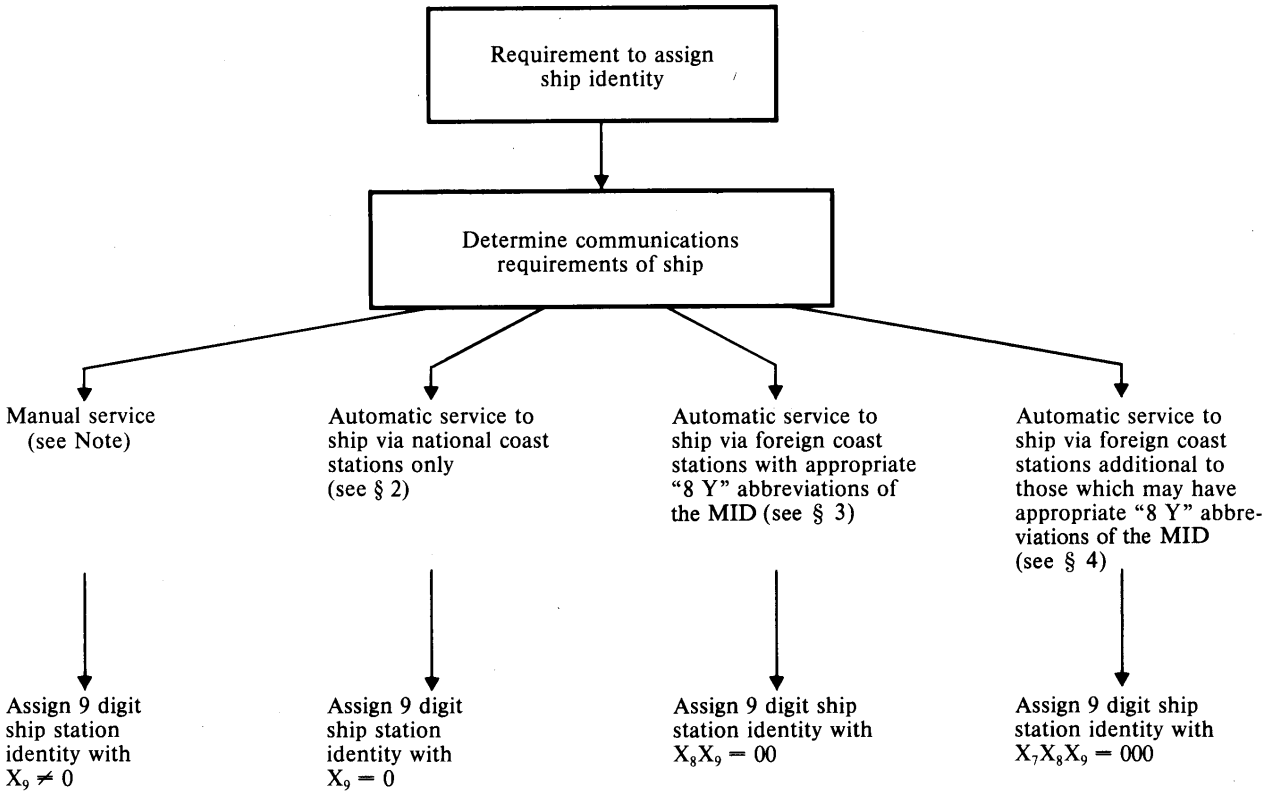


FIGURE 1 – *Procedure for selecting numerical ship station identities as long as network restrictions apply*

Note. – "Manual" refers to manual operation in the terrestrial telecommunication networks.

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Annex 3-6-10

RECOMMENDATION 830*

OPERATIONAL PROCEDURES FOR MOBILE-SATELLITE NETWORKS OR SYSTEMS IN THE BANDS 1 530-1 544 MHz AND 1 626.5-1 645.5 MHz WHICH ARE USED FOR DISTRESS AND SAFETY PURPOSES AS SPECIFIED FOR GMDSS

(Question 90/8)

(1992)

The CCIR,

considering

a) Resolution No. 208 of the World Administrative Radio Conference (Geneva, 1987);

b) that multiple mobile-satellite networks or systems are operating or being developed to operate in the 1 530-1 544 MHz and 1 626.5-1 645.5 MHz bands;

c) that the bands 1 530-1 544 MHz (No. N3045 of the Radio Regulations (RR)) and 1 626.5-1 645.5 MHz (RR No. N3051) available for GMDSS distress and safety communications are also available for other radio services;

d) that with the introduction of mobile-satellite networks or systems within these frequency bands, some of which may not be participants in the GMDSS, the integrity, effectiveness and protection of distress and safety communications must be continuously maintained;

e) that maritime mobile-satellite distress and safety communications must be protected from harmful interference;

f) that maritime distress and safety communications require priority access with real time preemptive capability or dedicated channels in the mobile-satellite service;

g) that account must be taken of the priority of safety-related communications (Article 61 of the RR);

h) that maritime mobile-satellite distress and safety communications must be relayed to the appropriate Rescue Coordination Centres (RCCs) in the most rapid and expedient manner;

j) that priority relay of distress alerts from ships in distress to the appropriate RCCs must be preserved and be in accordance with Article 61 of the RR;

k) that internetwork or intersystem linking of mobile-satellite systems may be provided via means other than the mobile-satellite service links operating in the 1.5-1.6 GHz frequency bands,

recommends

1. that mobile-satellite networks or systems participating in the GMDSS be equipped with the means for intersystem linking between coast earth stations;

2. that mobile-satellite networks or systems operating in the frequency bands 1 530-1 544 MHz and 1 626.5-1 645.5 MHz participating in the GMDSS be equipped with the means to ensure that maritime mobile-satellite distress and safety communications are given the necessary priority access with real time preemptive capability or dedicated channels to ensure the most expeditious handling and relay of the messages to the appropriate RCCs.

Note 1 – Section 2 does not apply to MSS systems providing distress and safety services, for which the technical and operational characteristics have already been established in accordance with the relevant provisions of the RR or of the IMO, as applicable.

3. that communications of mobile-satellite system stations operating in the frequency bands 1 530-1 544 MHz and 1 626.5-1 645.5 MHz not participating in the GMDSS shall operate on a secondary basis to distress and safety communications of stations operating in the GMDSS. Account shall be taken of the priority of safety-related communications in the other mobile-satellite services.

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* The Director, CCIR, is requested to bring this Recommendation to the attention of the International Maritime Organization (IMO), the International Civil Aviation Organization (ICAO) and the CCITT.

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Annex 4
Maritime Safety Information (MSI)

Annex 4-1 – IMO/IHO World-Wide Navigational Warning Service Guidance Document – *Resolution A.706(17) annex 1, as amended by MSC/Circ.685 and MSC/Circ.750*

Annex 4-2 – NAVTEX Manual (1994 Edition)

Annex 4-3 – International SafetyNET Manual (1994 Edition)

Annex 4-1

IMO/IHO WORLD-WIDE NAVIGATIONAL WARNING SERVICE GUIDANCE DOCUMENT

INTRODUCTION

The original resolution of the tenth International Hydrographic Conference in 1972 recommended the formation of an *ad hoc* joint IMO/IHO Commission to study the "establishment of a co-ordinated, efficient global radio navigational warning service". Subsequently, this became a purely IHO Commission known as the Commission on Promulgation of Radio Navigational Warnings which nevertheless consulted continuously with IMO. In its report to the eleventh International Hydrographic Conference in 1977, the Commission submitted a Draft Plan for the Establishment of a World-Wide Navigational Warning System, also referred to as Plan for the Establishment of a Co-ordinated Radio Navigational Warning Service. The title *World-wide navigational warning service* or *WWNWS* used for this revised edition of the document reflects the evolution of the system from a proposed action to an effective co-ordinated service which now has all of its 16 NAVAREAs in operation. This revised edition contains changes necessitated by the advent of the global maritime distress and safety system (GMDSS), as adopted by the Conference of Contracting Governments to the International Convention for the Safety of Life at Sea, 1974, on the Global Maritime Distress and Safety System in November 1988, effective on 1 February 1992.

Future amendments to the guidance document will be considered formally and approved by IHO normally through the use of circular letters and by IMO through its Maritime Safety Committee in accordance with the procedures set out in annex 2 to this document. Proposed amendments will normally be evaluated by the IHO Commission on Promulgation of Radio Navigational Warnings, which includes as an *ex-officio* member a representative of the IMO Secretariat, prior to any extensive IHO or IMO consideration.

World-Wide Navigational Warning Service (WWNWS)

1 INTRODUCTION

This document provides specific guidance for the promulgation of internationally co-ordinated NAVAREA and coastal warnings via HF Morse (A1A), NAVTEX and International SafetyNET services. It includes the situation where International SafetyNET is used in lieu of NAVTEX as the primary means of transmitting coastal warnings. Its guidance does not apply to purely national warnings services which supplement those internationally co-ordinated services.

2 DEFINITIONS

2.1 For the purposes of this service, the following definitions apply:

2.1.1 *Navigational warning:* A broadcast message containing urgent information relevant to safe navigation. Types of information suitable for transmission as navigational warnings are described in 4.2.1.3.

2.1.2 *Maritime safety information (MSI):* Navigational and meteorological warnings, meteorological forecasts and other urgent safety-related messages.

2.1.3 *NAVAREA:* A geographical sea area, as shown in the appendix, established for the purpose of co-ordinating the transmission of radio navigational warnings. Where appropriate, the term NAVAREA followed by an identifying roman numeral may be used as a short title. The delimitation of such areas is not related to and shall not prejudice the delimitation of any boundaries between States.

2.1.4 *Subarea:* A subdivision of a NAVAREA in which a number of countries have established a co-ordinated system for the promulgation of coastal warnings. The delimitation of such areas is not related to and shall not prejudice the delimitation of any boundaries between States.

2.1.5 *Region:* The part of a NAVAREA or subarea established for the purpose of co-ordinating the transmission of coastal warnings by NAVTEX or International SafetyNET broadcast.

2.1.6 *NAVAREA co-ordinator:* The authority charged with co-ordinating, collating and issuing long-range navigational warnings and NAVAREA warnings bulletins to cover the whole of the NAVAREA.

2.1.7 *Subarea co-ordinator:* The authority charged with the co-ordination of navigational warnings information within a designated subarea.

2.1.8 *National co-ordinator:* The national authority charged with collating and issuing coastal warnings in a region.

2.1.9 *NAVAREA warning:* A navigational warning issued by the NAVAREA co-ordinator for the NAVAREA.

2.1.10 *NAVAREA warnings bulletin:* A list of serial numbers of those NAVAREA warnings in force issued and broadcast by the NAVAREA co-ordinator during at least the previous six weeks.

2.1.11 *Coastal warning:* A navigational warning promulgated by a national co-ordinator to cover a region. (Coastal warnings may also be broadcast by means other than those of the WWNWS as a national option.)

2.1.12 *Local warning:* A navigational warning which covers inshore waters, often within the limits of jurisdiction of a harbour or port authority.

3 BROADCAST SYSTEMS

3.1 Broadcast systems

3.1.1 The radio systems to be used internationally for the promulgation of maritime safety information are laid down in the International Convention for the Safety of Life at Sea, 1974 (SOLAS), as amended. These include:

.1 NAVTEX: Single-frequency time-shared broadcast system with automated reception and message-rejection/-selection facilities. Use of NAVTEX is regulated by the IMO NAVTEX Manual (IMO publication IMO-951E);*

.2 International (enhanced group call) SafetyNET service: Dedicated satellite broadcast system with automated reception and message-rejection/-selection facilities. Use of this service is regulated by the International SafetyNET Manual (IMO publication IMO-908E);†

.3 HF Morse (A1A): Traditional manually operated radiotelegraphy system. To be superseded by the automated systems in .1 and .2 above on introduction of the GMDSS between 1992 and 1999.

3.2 Broadcast scheduling

3.2.1 *Automated systems (SafetyNET/NAVTEX)*

3.2.1.1 Navigational warnings should be transmitted as soon as possible or as dictated by the nature and timing of the event. Normally, the initial broadcast should be made as follows:

.1 for SafetyNET, within 30 min of receipt of original information;

.2 for NAVTEX, at the next scheduled broadcast, unless circumstances indicate the use of procedures for VITAL or IMPORTANT warnings.

3.2.1.2 Navigational warnings should be repeated in scheduled broadcasts in accordance with the guidelines promulgated in the following documents, as appropriate:

.1 International SafetyNET Manual (IMO publication IMO-908E);†

.2 NAVTEX Manual (IMO publication IMO-951E).*

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* Refer to annex 4-2.
† Refer to annex 4-3.

3.2.2 *Manual system (HF A1A)*

3.2.2.1 NAVAREA warnings should be transmitted at scheduled times. They should be repeated in the broadcast immediately following the original transmission and thereafter at least every four days for six weeks unless previously cancelled.

3.2.2.2 At least two daily transmission times are necessary to provide adequate promulgation of NAVAREA warnings. When NAVAREAs may extend across more than six time zones, more than two broadcasts should be especially considered to ensure that warnings can be received.

3.2.3 *Schedule changes*

3.2.3.1 NAVAREA co-ordinators should ensure that the times of HF broadcasting do not coincide with those in adjacent NAVAREAs. Times of scheduled broadcasts under the International SafetyNET service should be co-ordinated through the International SafetyNET Co-ordinating Panel.

3.2.3.2 Changes to broadcast schedules should be implemented only after the International Telecommunication Union (ITU) has been given at least three months' notice by the appropriate national authority, unless urgent operational considerations dictate more immediate action.

3.2.3.3 IMO and IHO should be informed of intended changes at the same time as they are communicated to ITU.

3.2.3.4 Arrangements should be made for informing mariners in good time of all changes.

4 NAVIGATIONAL WARNINGS

4.1 General

4.1.1 There are three types of navigational warnings: NAVAREA warnings, coastal warnings and local warnings. The WWNWS guidance and co-ordination are involved with only two of them: NAVAREA warnings and coastal warnings; of the latter, only with those coastal warnings which are broadcast under the internationally co-ordinated services using NAVTEX or, in lieu of NAVTEX, International SafetyNET service as their primary means of transmission.

4.1.2 Navigational warnings should normally refer only to the area concerned.

4.1.3 Navigational warnings should be broadcast for as long as the information is valid or until it is made available by other means

4.1.4 Navigational warnings should remain in force until cancelled by the originating co-ordinator.

4.1.5 The duration of a navigational warning should be given in the text, if known.

4.2 The three types of navigational warnings are:

4.2.1 *NAVAREA warnings*

4.2.1.1 Generally speaking, NAVAREA warnings are concerned with the information detailed below which ocean-going mariners require for their safe navigation. This includes, in particular, failures of important aids to navigation, as well as information which may require changes to planned navigational routes.

4.2.1.2 Warnings for coastal areas may be provided by NAVTEX or the International SafetyNET service, when implemented in lieu of NAVTEX. From the date a NAVTEX receiver is mandatory on all ships sailing in areas of NAVTEX service (1 August 1993), it is intended that such information not be rebroadcast as a NAVAREA warning unless it is deemed of such significance that the mariner should be aware of it before entering the area of NAVTEX coverage. The national co-ordinator will evaluate the significance of the information for consideration as a NAVAREA warning while the NAVAREA co-ordinator will make the final determination (see 6.6.7 and 6.2.3 respectively).

4.2.1.3 The following subject areas are considered suitable for transmission as NAVAREA warnings. This list is not exhaustive and should be regarded only as a guideline. Furthermore, it presupposes that sufficiently precise information about the item has not previously been disseminated in a notice to mariners:

.1 casualties to lights, fog signals and buoys affecting main shipping lanes;

.2 the presence of dangerous wrecks in or near main shipping lanes and, if relevant, their marking;

.3 establishment of major new aids to navigation or significant changes to existing ones when such establishment or change might be misleading to shipping;

.4 the presence of large unwieldy tows in congested waters;

.5 drifting mines;

.6 areas where search and rescue (SAR) and anti-pollution operations are being carried out (for avoidance of such areas);

.7 at the request of the controlling MRCC, notification of ships and aircraft on or over the open sea reported in distress, seriously overdue or missing;

.8 the presence of newly discovered rocks, shoals, reefs and wrecks likely to constitute a danger to shipping, and, if relevant, their marking;

.9 unexpected alteration or suspension of established routes;

.10 cable- or pipe-laying activities, the towing of large submerged objects for research or exploration purposes, the employment of manned or unmanned submersibles, or other underwater operations constituting potential dangers in or near shipping lanes;

.11 establishment of offshore structures in or near shipping lanes;

.12 significant malfunctioning of radio navigation service and shore-based maritime safety information radio or satellite service;

.13 information concerning special operations which might affect the safety of shipping, sometimes over wide areas, e.g. naval exercises, missile firings, space missions, nuclear tests, etc. It is important that, where the degree of hazard is known, this information is included in the relevant warning. Whenever possible, such warnings should be originated not less than five days in advance of the scheduled event. The warning should remain in force until the event is completed.*

.14 acts of piracy and armed robbery against ships.

4.2.1.4 NAVAREA warnings bulletins should be transmitted not less than once per week at a regularly scheduled time.

4.2.1.5 Arrangements should be made for the text of NAVAREA warnings in force to be available at port offices and, where appropriate, for their eventual inclusion in a generally available printed form.

4.2.2 *Coastal warnings*

4.2.2.1 Coastal warnings promulgate information which is necessary for safe navigation within a given region. Coastal warnings should normally provide sufficient information for safe navigation to seaward of the fairway buoy or pilot station and should not be restricted to main shipping lanes. Where the region is served by NAVTEX, it should provide navigational warnings for the entire IMO-approved service area of the NAVTEX transmitter. Where the region is not served by NAVTEX, it is desirable to include all warnings relevant to the coastal waters up to 250 miles from the coast in the International SafetyNET service transmission.

4.2.2.2 Coastal warnings should include, at a minimum, the types of information required for NAVAREA warnings in 4.2.1.3.

4.2.3 *Local warnings*

4.2.3.1 Local warnings supplement coastal warnings by giving detailed information within inshore waters, including the limits of a harbour or port authority, on aspects which the ocean-going ship normally does not require.

* The Maritime Safety Committee is authorized to review the provisions of this paragraph and, if appropriate, to provide for exemptions from this requirement, under special circumstances.

5 INFORMATION CONTROL

5.1 Message numbering

5.1.1 Navigational warnings in each series should be consecutively numbered throughout the calendar year, commencing with 0001 at 0000 UTC on 01 January.

5.1.2 Navigational warnings should, as a general rule, be transmitted in reverse numerical order on scheduled broadcasts.

5.1.3 At the beginning of every navigational warning scheduled broadcast for which there are no warnings to be disseminated, a brief message should be transmitted to identify the broadcast and advise the mariner that there is no navigational warning message traffic on hand.

5.2 Priority message handling

5.2.1 The guidelines for the handling of navigational warnings are promulgated, as appropriate, in the following documents:

.1 International SafetyNET Manual (IMO publication IMO-908E);*

.2 NAVTEX Manual (IMO publication IMO-951E). †

5.3 Language

5.3.1 All NAVAREA and coastal warnings must be transmitted in English in the internationally co-ordinated services.

5.3.2 In addition, NAVAREA warnings may be broadcast in one or more of the official languages of the United Nations.

5.3.3 Coastal warnings may also be broadcast in the national language, and local warnings may be issued only in the national language as a national service.

6 CO-ORDINATOR RESOURCES AND RESPONSIBILITIES

6.1 NAVAREA co-ordinator resources

6.1.1 The NAVAREA co-ordinator must have:

.1 the expertise and information sources of a well established hydrographic service;

.2 effective communication links with subarea and national co-ordinators in the NAVAREA and with other NAVAREA co-ordinators;

.3 access to effective facilities for transmission to the entire NAVAREA. Reception normally should be possible 700 miles beyond the limit of the NAVAREA (24 hours' sailing by a fast ship).

6.2 NAVAREA co-ordinator responsibilities

6.2.1 The NAVAREA co-ordinator must:

.1 endeavour to be informed of all events that could significantly affect the safety of navigation within the NAVAREA;

.2 immediately upon receipt, assess all information in the light of expert knowledge for relevance to navigation in the NAVAREA;

.3 select information for broadcast in accordance with the guidance given in 4.2.1 above;

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* Refer to annex 4-3.

† Refer to annex 4-2.

.4 draft NAVAREA warning messages in accordance with the IHO/IMO guidance on standardization of texts and message drafting;

.5 direct and control the broadcast of NAVAREA warning messages, making full and efficient use of national broadcast facilities in keeping with the provisions of the International Convention for the Safety of Life at Sea, 1974, as amended;

.6 pass NAVAREA warnings which warrant further promulgation in adjacent areas directly to the appropriate NAVAREA co-ordinators, using the quickest possible means;

.7 ensure that written copies of NAVAREA warnings likely to remain in force for more than six weeks are made available to those NAVAREA co-ordinators or national authorities requesting them. Immediate transmission by telex, facsimile, or by high-speed communications is recommended in the absence of an alternative appropriate delivery arrangement, subject to agreement between the co-ordinators concerned;

.8 as soon as possible after the receipt of information concerning scheduled underwater operations as described in 4.2.1.3.10, or other scheduled operations such as in 4.2.1.3.3 and 4.2.1.3.11, pass such information to those national co-ordinators in his own NAVAREA and other NAVAREA co-ordinators who maintain a notices to mariners service covering the affected area and who have requested such information;

.9 transmit periodical NAVAREA warnings bulletins;

.10 promulgate the cancellation of NAVAREA warnings which contain information which is no longer valid;

.11 arrange for the text of NAVAREA warnings in force to be available at port offices and, where appropriate, for their eventual inclusion in a generally available printed form;

.12 act as the central point of contact on matters relating to navigational warnings within the NAVAREA;

.13 promote the use of established international standards and practices in the promulgation of navigational warnings within the NAVAREA;

.14 when notified by the authority designated to act on reports of piracy and armed robbery against ships, arrange for the broadcast of a suitable NAVAREA warning. Additionally, keep the national or regional piracy control centre informed of long-term broadcast action(s);

.15 monitor the broadcasts which they originate to ensure that the messages have been correctly broadcast;

.16 co-ordinate preliminary discussions between Member States seeking to establish NAVTEX services and neighbouring administrations, prior to formal application.

Note: Although arrangements made by the NAVAREA co-ordinator should enable all ships to receive messages in force for an area either before reaching or on entering an area, nevertheless it should be possible, in exceptional cases, for ships to obtain, on request, texts of messages in force but not included in the current scheduled broadcasts.

6.3 **Subarea co-ordinator resources**

6.3.1 The subarea co-ordinator must have, or have access to:

.1 expertise and information resources of a well established hydrographic service;

.2 effective communication links with national co-ordinators in the subarea;

.3 effective communication links with the NAVAREA co-ordinator.

Note: Normally a subarea co-ordinator will serve also as a national co-ordinator.

6.4 Subarea co-ordinator responsibilities

6.4.1 The subarea co-ordinator must:

.1 endeavour to be informed of all events that could significantly affect the safety of navigation within the subarea;

.2 inform the NAVAREA co-ordinator of any events in the subarea which warrant the promulgation of a NAVAREA warning;

.3 co-ordinate and promote the exchange of information between national co-ordinators in the subarea and the NAVAREA co-ordinator;

.4 act as the central point of contact on matters relating to navigational warnings within the subarea;

.5 promote the use of established international standards and practices in the promulgation of navigational warnings within the subarea.

6.5 National co-ordinator resources

6.5.1 The national co-ordinator must have:

.1 established sources of information relevant to the safety of navigation within national waters;

.2 effective communication links with the subarea/NAVAREA co-ordinator and adjacent national co-ordinators;

.3 access to effective facilities for the transmission of navigational warnings to the region.

6.6 National co-ordinator responsibilities

6.6.1 The national co-ordinator must:

.1 endeavour to be informed of all events that could significantly affect the safety of navigation within his region or national area of responsibility;

.2 immediately upon receipt, assess all information in the light of expert local knowledge for relevance to safety of navigation in his area of responsibility;

.3 select information for broadcast in accordance with the guidance given in 4.2.1.3 above;

.4 draft coastal warnings in accordance with established international standards;

.5 direct and control the broadcast of coastal warnings by a broadcast system adopted for the WWNWS;

.6 arrange to receive NAVAREA warnings broadcast for his area of responsibility and, where appropriate, coastal warnings from other national co-ordinators;

.7 include relevant warnings in NAVTEX/SafetyNET broadcasts and, if appropriate, in notices to mariners;

.8 arrange for the texts of NAVAREA warnings and relevant coastal warnings to be available at port offices and, where appropriate, for their eventual inclusion in a generally printed form and/or notice to mariners;

.9 inform the NAVAREA co-ordinator or, where established, the subarea co-ordinator of any events in his area of responsibility which warrant the promulgation of a NAVAREA warning;

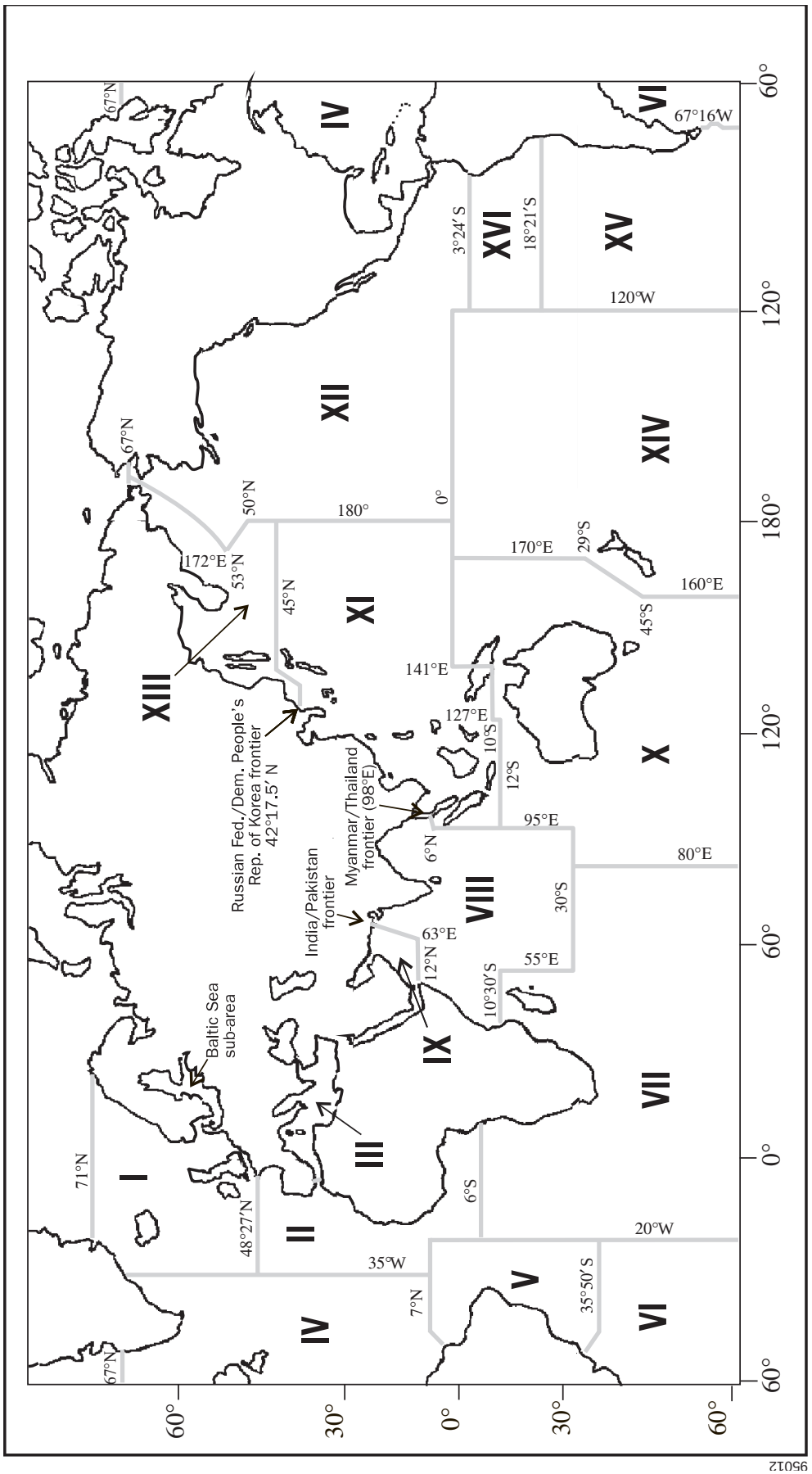
.10 act as the central point of contact on matters relating to navigational warnings within his area of responsibility;

.11 pass coastal warnings which warrant further promulgation in adjacent regions to the appropriate national co-ordinators;

.12 when notified by the authority designated to act on reports of piracy and armed robbery against ships, arrange for the broadcast of a suitable NAVTEX/SafetyNET navigational warning. Additionally, keep the national or regional piracy control centre informed of long-term broadcast action(s);

.13 monitor the broadcasts which they originate to ensure that the messages have been correctly broadcast.

Appendix
Geographical areas for co-ordinating and promulgating NAVAREA warnings



The delimitation of these NAVAREAs is not related to and shall not prejudice the delimitation of any boundaries between States

Annex 4-2
NAVTEX MANUAL (1994 Edition)
(Also available in separate publication IMO-951E)

Foreword

NAVTEX is an international automated direct-printing service for promulgation of navigational and meteorological warnings and urgent information to ships. It has been developed to provide a low-cost, simple and automated means of receiving maritime safety information on board ships at sea and in coastal waters. The information transmitted is relevant to all sizes and types of vessel and the selective message-rejection feature ensures that every mariner can receive a safety information broadcast which is tailored to his particular needs.

NAVTEX fulfils an integral role in the global maritime distress and safety system (GMDSS) developed by the International Maritime Organization (IMO) and is already contributing to safety at sea.

The NAVTEX system is commended to Administrations having responsibility for maritime affairs and to mariners who require an effective maritime safety information service.

This manual is intended for use by seafarers, shipowners, maritime Administrations and others concerned with the preparation, broadcasting and receiving of safety information.

Contents

Page

NAVTEX MANUAL

1 Introduction 5

2 Definitions 5

3 Principal features of NAVTEX 5

4 The transmitter identification character (B_1) 6

5 Allocation of transmission times 6

6 Subject indicator characters (B_2) 6

7 Message numbering 9

8 Message format 9

9 Information control 10

10 Planning a NAVTEX service 12

11 Operation 14

12 Information for mariners and publicity 14

ANNEXES

Annex 1 – IMO Sub-Committee on Radiocommunications – Co-ordinating Panel on NAVTEX . . 15

Annex 2 – Recommendation ITU-R M.540-2 – Operational and Technical Characteristics for an Automated Direct-Printing Telegraph System for Promulgation of Navigational and Meteorological Warnings and Urgent Information to Ships* 15

Annex 3 – IMO resolution A.525(13) – Performance Standards for Narrow-Band Direct-Printing Telegraph Equipment for the Reception of Navigational and Meteorological Warnings and Urgent Information to Ships† 15

Annex 4 – IMO resolution A.706(17) – World-Wide Navigational Warning Service‡ 16

Annex 5 – IMO resolution A.704(17), annex 4 – Criteria for Use when Providing a NAVTEX Service§ 16

Annex 6 – Procedure for amending the NAVTEX Manual 16

* See annex 3-5-5 for text of ITU-R 540-3.
† See annex 3-5-1.
‡ See annex 2-13 and annex 4-1 of this publication.
§ See annex 4 of resolution A.801(19), which has superseded this resolution, within annex 2-16.

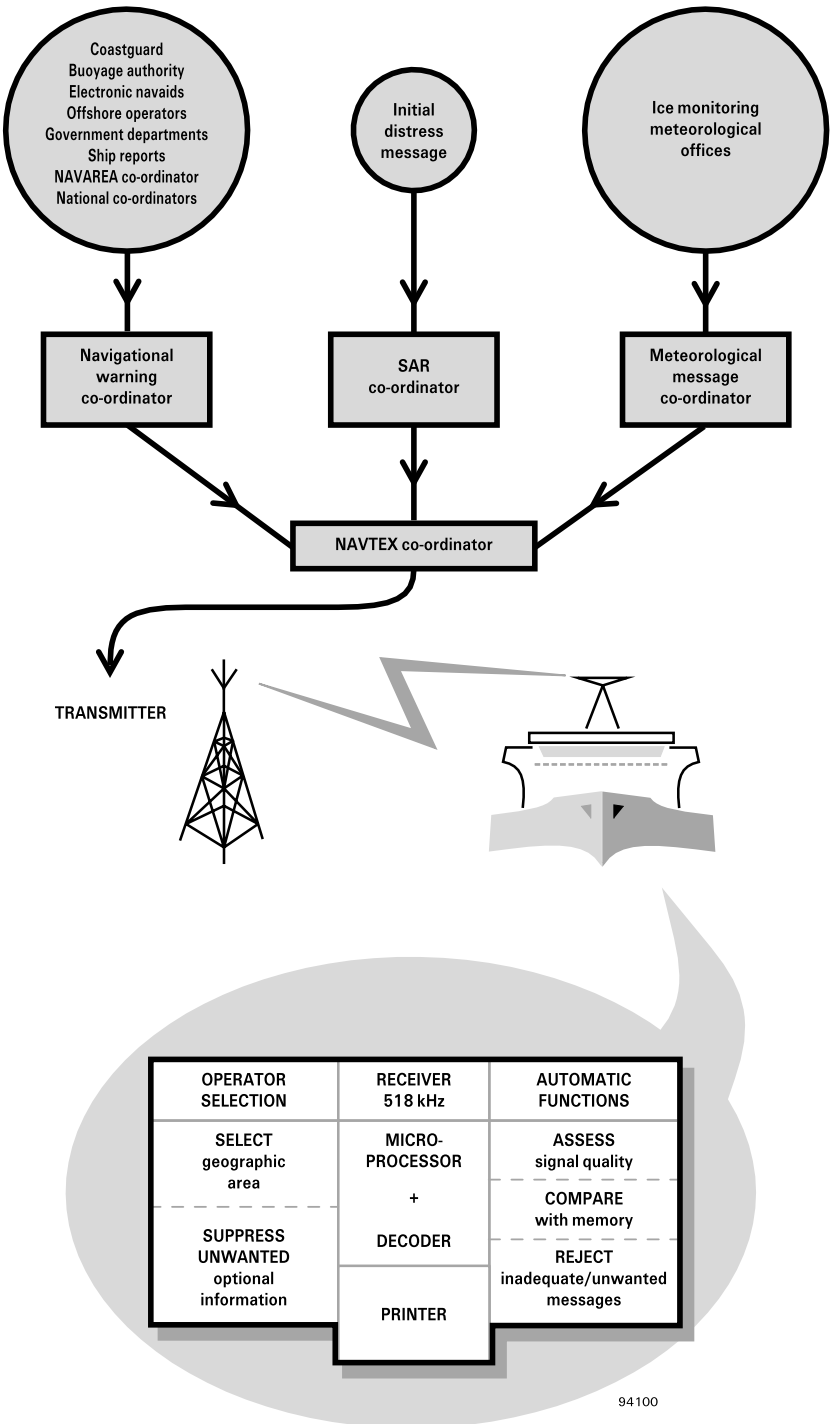


Figure 1 – *The NAVTEX concept*

NAVTEX Manual

1 Introduction

This second edition of the Manual includes all amendments up to and including the sixty-third session of the Maritime Safety Committee (May 1994) and describes the structure, control and operation of the NAVTEX service. It is intended primarily for national Administrations, but may also be useful to the mariner who requires more details than are found in the operational handbooks.

NAVTEX provides shipping with navigational and meteorological warnings and urgent information as listed in paragraph 6.3, by automatic print-out from a dedicated receiver. It is suitable for use in all sizes and types of ships. Figure 1 illustrates the way the service is typically structured.

NAVTEX is a component of the IMO/IHO World-Wide Navigational Warning Service (WWNWS) defined by IMO Assembly resolution A.706(17). It has also been included as an element of the global maritime distress and safety system (GMDSS).

In the GMDSS, since 1 August 1993, NAVTEX receiving capability has become part of the mandatory equipment which is required to be carried in certain vessels under the provisions of the International Convention for the Safety of Life at Sea (SOLAS), 1974, as amended in 1988.

Responsibility for co-ordinating the establishment of the global NAVTEX service has been vested by IMO in its Co-ordinating Panel on NAVTEX. The terms of reference for this panel, attached at annex 1, emphasize some of the most important differences between NAVTEX and the traditional means of information broadcast.

Details of existing NAVTEX services are published periodically in the various national lists of radio signals, in an annex to the International Telecommunication Union's (ITU) list VI – List of Radiodetermination and Special Service Stations – and in the GMDSS Master Plan published by IMO. Procedures applicable to stations transmitting NAVTEX information on the frequency 518 kHz are also given in article 14A of the Radio Regulations and resolution no. 324 (Mob-87) of the World Administrative Radio Conference for the Mobile Services, 1987.

2 Definitions

2.1 *NAVTEX* means the system for the broadcast and automatic reception of maritime safety information by means of narrow-band direct-printing telegraphy.

2.2 *International NAVTEX service* means the co-ordinated broadcast and automatic reception on the frequency 518 kHz of maritime safety information by means of narrow-band direct-printing telegraphy using the English language.*

2.3 *National NAVTEX services* means the broadcast and automatic reception of maritime safety information by means of narrow-band direct-printing telegraphy using frequencies other than 518 kHz and languages as decided by the Administrations concerned.

3 Principal features of NAVTEX

3.1 The operational and technical characteristics of the NAVTEX system are contained in Recommendation ITU-R M.540-2, reproduced in annex 2. Performance standards for shipborne narrow-band direct-printing equipment are laid down in IMO Assembly resolution A.525(13), reproduced in annex 3.

3.2 The principal features are:

.1 The service uses a single frequency with transmissions from nominated stations within each NAVAREA being arranged on a time-sharing basis to eliminate mutual interference. All necessary information is contained in each transmission.

.2 The power of each transmitter is regulated so as to avoid the possibility of interference between transmitters.

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* See also paragraphs 6.6 and 7.7.

.3 A dedicated NAVTEX receiver which has the ability to select messages to be printed, according to:

.3.1 a technical code ($B_1B_2B_3B_4$), which appears in the preamble of each message; and

.3.2 whether or not the particular message has already been printed.

Certain essential classes of safety information such as navigational and meteorological warnings and search and rescue information are non-rejectable to ensure that ships using NAVTEX always receive the most vital information.

.4 NAVTEX co-ordinators exercise control of messages transmitted by each station according to the information contained in each message and the geographical coverage required. Thus a user may choose to accept messages, as appropriate, either from the single transmitter which serves the sea area around his position or from a number of transmitters.

4 The transmitter identification character (B_1)

4.1 The transmitter identification character B_1 is a single unique letter which is allocated to each transmitter. It is used to identify the broadcasts which are to be accepted by the receiver and those which are to be rejected.

4.2 In order to avoid erroneous reception of transmissions from two stations having the same B_1 character, it is necessary to ensure that such stations have a large geographical separation. This is achieved by allocating B_1 characters in line with the general global scheme given in figure 2, which shows the IMO-adopted strategy for allocating B_1 characters by alphabetical sequence through each NAVAREA of the World-Wide Navigational Warning Service.

4.3 NAVTEX transmissions have a designed range of about 400 nautical miles. The minimum distance between two transmitters with the same B_1 identifier must be sufficient to ensure that a receiver cannot be within range of both at the same time.

4.4 Close co-ordination between transmitting stations in adjacent NAVAREAs is necessary to achieve this separation. For this reason, national administrations should request the advice of the IMO Co-ordinating Panel on NAVTEX at an early stage in the planning of a new NAVTEX service. All proposals for B_1 allocations should be approved by IMO before implementation.

5 Allocation of transmission times

5.1 In order to ensure the least possible interference between transmitting stations, the transmitting schedules must take account of the relative geographical location of all stations within range.

5.2 The early co-ordination of transmission schedules is therefore an important consideration when planning NAVTEX services.

5.3 Figure 3 illustrates a basic organizational matrix which may be used by the IMO Co-ordinating Panel on NAVTEX to evaluate and recommend time schedules for each transmitter of a proposed new service. The table shows the breakdown of a representative NAVAREA into four groups of transmitters. Each group has a potential capacity of six transmitters, each with a 10 minute allocated transmission time every 4 hours.

5.4 Only in exceptional circumstances would a large enough number of stations be approved to require the use of all 10 minute time schedules.

5.5 The frequency should remain unused for a high percentage of the time, so as to allow for the immediate broadcast of vital information, e.g. search and rescue information, gale warnings, etc.

5.6 Proposals for the allocation of time schedules should be submitted to IMO for approval.

6 Subject indicator characters (B_2)

6.1 Information is grouped by subject in the NAVTEX broadcast, and each subject group is allocated a subject indicator character, B_2.

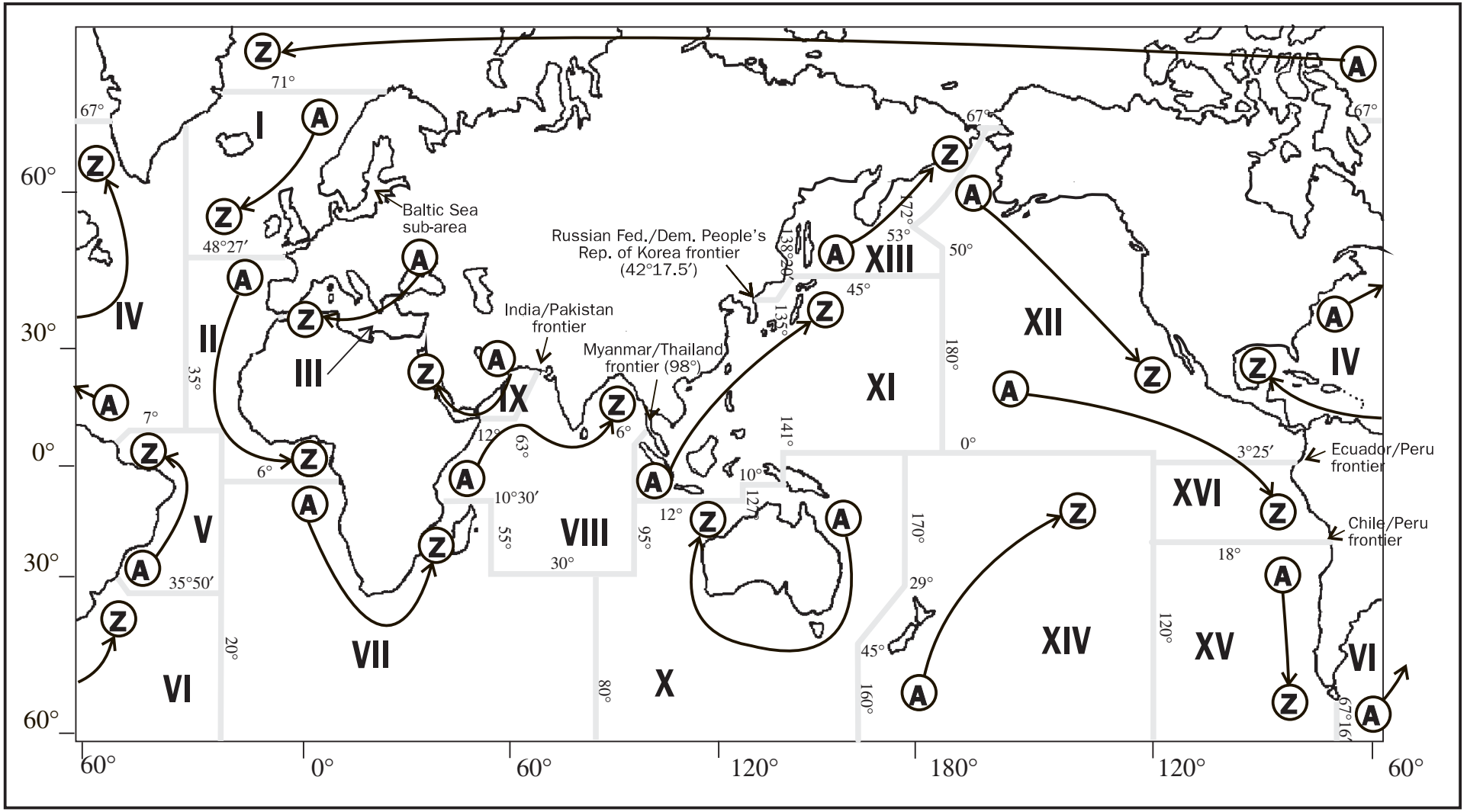


Figure 2 – *NAVAREAs of the World-Wide Navigational Warning Service, showing the basic scheme for allocation of transmitter identification (B_1) characters by the Organization*

SCHEDULED TIMES (UTC)						TRANSMITTER IDENTIFICATION CHARACTERS (B_1)			
						GROUP 1	GROUP 2	GROUP 3	GROUP 4
00	04	08	12	16	20	A B C D E F	G H I J K L	M N O P Q R	S T U V W X
.10	–	–	–	–	–				
.20	–	–	–	–	–				
.30	–	–	–	–	–				
.40	–	–	–	–	–				
.50	–	–	–	–	–				
01	05	09	13	17	21				
.10	–	–	–	–	–				
.20	–	–	–	–	–				
.30	–	–	–	–	–				
.40	–	–	–	–	–				
.50	–	–	–	–	–				
02	06	10	14	18	22				
.10	–	–	–	–	–				
.20	–	–	–	–	–				
.30	–	–	–	–	–				
.40	–	–	–	–	–				
.50	–	–	–	–	–				
03	07	11	15	19	23				
.10	–	–	–	–	–				
.20	–	–	–	–	–				
.30	–	–	–	–	–				
.40	–	–	–	–	–				
.50	–	–	–	–	–				
04	08	12	16	20	24				

94102

Figure 3 – *Scheme for allocation of transmission schedules by the Organization*

6.2 The subject indicator character is used by the receiver to identify different classes of messages as listed in paragraph 6.3. The indicator is also used to reject messages concerning certain optional subjects which are not required by the ship (e.g. OMEGA messages might be rejected in a ship which is not fitted with an OMEGA receiver). Receivers also use the B_2 character to identify messages which, because of their importance, may not be rejected (see paragraph 3.2.3).

6.3 The following subject indicator characters are in use:

A = Navigational warnings[1]
B = Meteorological warnings[1]
C = Ice reports
D = Search and rescue information, and pirate attack warnings[1]
E = Meteorological forecasts
F = Pilot service messages
G = DECCA messages
H = LORAN messages
I = OMEGA messages
J = SATNAV messages
K = Other electronic navaid messages[2]
L = Navigational warnings - additional to letter A[3]
V, W, X, Y = Special services - allocation by NAVTEX Panel
Z = No messages on hand

[1] Cannot be rejected by the receiver.
[2] Messages concerning radionavigation services.
[3] Should not be rejected by the receiver (continuation of B_2 subject group A).

6.4 Special service subject indicator characters are available for trial* allocation on application to IMO. National authorities should obtain the agreement of IMO for all proposals for the use of special service subject indicator characters. Such proposals should meet the following criteria:

.1 The full international service must remain unaffected.

.2 The special service broadcasts should be transmitted only when time allows, and with due regard to the necessity for the frequency to remain unused for a high percentage of the time.

.3 The special service broadcast should be uniquely prepared for its intended purpose.

6.5 New allocations for subject indicator characters, when believed necessary, should be proposed to IMO through the Chairman of the Co-ordinating Panel on NAVTEX.

* Following trial results of national language broadcasts or other applications, the NAVTEX Manual will be modified as appropriate.

6.6 Subject to the provisions of paragraph 6.4.1, broadcasts of a high degree of urgency affecting safety in specific sea areas may be transmitted on the 518 kHz frequency in a national language. Such broadcasts should normally contain only messages in the "VITAL" or "IMPORTANT" categories (see paragraph 9.2)

6.7 *Language and national broadcast options*

There is often a requirement for broadcasts to be made in languages in addition to English and for other types of messages. Methods of achieving these objectives are outlined below:

.1 Use of a separate transmitter identification character (B_1) on 518 kHz. (Subject to co-ordination procedures set out by IMO and ITU.)

.2 Use of additional subject indicator characters (B_2) V, W, X and Y on 518 kHz. (Subject to allocation by the NAVTEX Panel.)

.3 Use of national NAVTEX services as defined in paragraph 2.3.

.4 Provision of national NAVTEX services on the internationally adopted frequency for such services (490 kHz or 4209.5 kHz).

7 Message numbering

7.1 Each message within a subject group is allocated a serial number, B_3B_4, between 01 and 99. This number will not necessarily relate to series numbering in other radionavigational warning systems. On reaching 99, numbering should re-commence at 01 but avoid the use of message numbers still in force.

7.2 A shortage of numbers should, where possible, be alleviated by the allocation of messages to other relevant subject groups. It has been found that 99 messages are not always enough for some subject groups and B_2 = L may be used for additional navigational warnings to receive the overflow from B_2 = A, when necessary.

7.3 Numbers should be allocated by the relevant NAVTEX co-ordinator, the authority responsible for the selection of information to be broadcast by each transmitter within each subject group. Each co-ordinator may have one or more transmitters under his control.

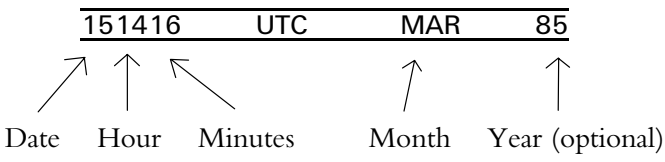
7.4 Certain messages are allocated B_3B_4 = 00. Use of this number should be strictly controlled since messages carrying it will always be printed, if the broadcast containing such messages is identified to be accepted by the receiver (see Recommendation ITU-R M.540-2 (annex 2)). Therefore, the number 00 must only be used for messages of singular importance, such as an initial distress message. Other more routine messages and service messages should not be allocated the number 00. The fact that receivers are in any case unable to reject certain classes of vital safety information should be borne in mind when considering the exceptional use of B_3B_4 = 00.

8 Message format

8.1 The format of all messages should be in strict accordance with figure 4. This defines the essential elements of the messages which influence the operation of the receiver. Great care is required to avoid errors of syntax in the groups ZCZC, $B_1B_2B_3B_4$ and NNNN as they will cause receivers to operate incorrectly, and may well result in the loss of a vital message. Transmitting stations should be particularly aware of this when monitoring their own broadcasts.

8.2 Certain practices have been adopted for the textual content of NAVTEX messages. These contribute to the clarity and uniformity of the messages, and are recognized for use in all cases. They include:

.1 The date, time (UTC) and month of origin may be given at the start of the message text, where this contributes to the value of the message, as follows:



The date, time and month of origin should always be followed immediately by a carriage return/line feed, so that it appears as a separate line at the start of the message text.

.2 The first words of the text should invariably be the message series identity and consecutive number. Note that this consecutive number is not the same as the NAVTEX serial number B_3B_4, but instead identifies the source of the report (e.g. NAVAREA III 274).

.3 It has been found that the clarity of a chain of messages is improved by ensuring that the end of text group NNNN appears on a separate line at the end of each message.

8.3 The following example illustrates the standard format for NAVTEX messages:

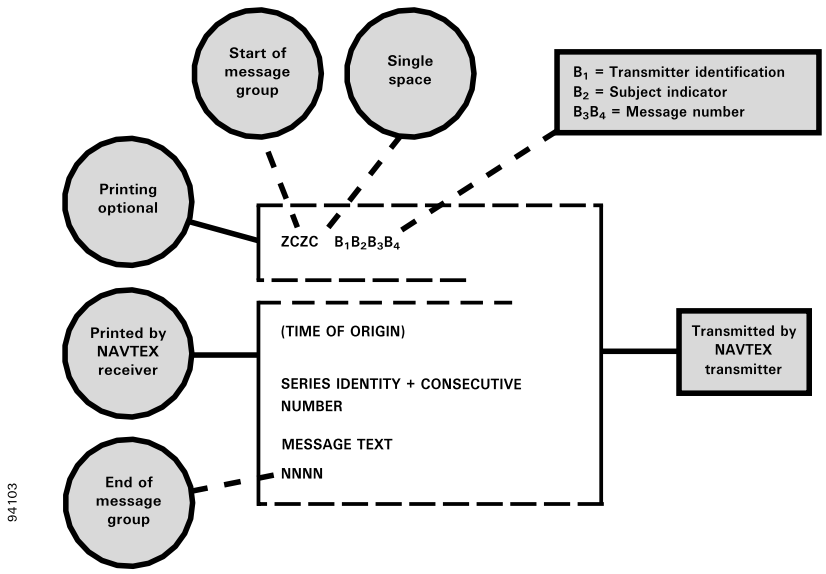


Figure 4 – *Standard format for NAVTEX messages*

9 Information control

9.1 The time-shared nature of NAVTEX imposes the need for strict discipline in controlling the information flow of the broadcast. To achieve this it is necessary to co-ordinate the messages in each B_2 category at each transmitter. In general, all messages should be brief and clear and avoid duplication. Strict adherence to relevant guidelines such as those in IMO Assembly resolution A.706(17) is recommended, but certain additional operating procedures have also been found necessary:

.1 Messages in each category should be broadcast in *reverse* order of receipt, with the latest being broadcast first.

.2 Cancellation messages should be broadcast *once* only. The cancelled message should be removed from the broadcast in which the corresponding cancellation message appears and the cancellation message should then be removed from the broadcast.

.3 *Navigational warnings*

.3.1 Coastal warnings and NAVAREA warnings issued under the guidance of IMO Assembly resolution A.706(17) which would be of concern to ships in the area allocated to the transmitter should be included in the broadcast (see annex 4).

.3.2 Local warnings, as defined by IMO Assembly resolution A.706(17), should *not* be broadcast on NAVTEX (see annex 4).

.3.3 Warnings should normally be repeated at every scheduled transmission for as long as they remain in force.

.3.4 NAVTEX co-ordinators should arrange to receive NAVAREA warnings appropriate to their area for inclusion in their broadcasts.

.3.5 Negative tidal surge and tsunami warnings will normally be the subject of navigational warnings. They should be broadcast on receipt and at subsequent scheduled transmissions.

.4 *Meteorological messages*

.4.1 Gale warnings are placed at the transmitters by nominated national authorities. They are broadcast on receipt and at the next routine scheduled transmission only.

.4.2 NAVTEX sea area weather forecasts should normally be broadcast twice each day. This service should be carefully co-ordinated where transmitters are geographically close together. It is important that such forecasts are dedicated to the specific NAVTEX area concerned.

.4.3 Routine NAVTEX ice reports should normally be broadcast once a day.

.4.4 Ice accretion warnings should normally be included in the NAVTEX ice report but, when separately issued, treated as a meteorological warning using B_2 = B and transmitted immediately on receipt and at the next routine scheduled transmission.

.5 *Search and rescue information, and pirate attack warnings*

.5.1 The NAVTEX broadcast is not suitable for distress traffic. Therefore, the initial distress message only should be re-transmitted on NAVTEX, using B_2 = D, in order to alert mariners to a distress situation. The use of B_3B_4 = 00 is appropriate for distress messages.

.5.2 Requests for reports of ships overdue, etc. should be broadcast as navigational warnings only when they satisfy the requirements of IMO Assembly resolution A.706(17). They are never to be broadcast under B_2 = D (see annex 4).

.5.3 A single authority, which will normally be a maritime rescue co-ordination centre (MRCC), should be designated NAVTEX co-ordinator for search and rescue. Coast radio stations would discharge their responsibility for re-transmitting initial distress messages on NAVTEX by passing the message to the designated SAR co-ordinator for broadcast on NAVTEX. This does not affect a coast radio station's responsibility for re-transmitting initial distress messages on other frequencies.

.5.4 Pirate attack warnings, given by an appropriate authority, should be transmitted under B_2 = D immediately after a pirate attack happens.

.6 *Pilotage service messages*

Category B_2 = F is to be used only for broadcasting temporary alterations to the pilot service. This can include messages which notify the temporary movement or suspension of a pilot service due to stress of weather, etc. This category is for the information of ships approaching a port, and is not to be used for specific instructions to individual ships or pilots.

.7 *Electronic navaid messages*

B_2 categories are provided for the principal electronic navaids which are suitable for use in the NAVTEX region. They should be used to advise mariners of significant degradation of the particular service. Short periods of transmission failure are seldom appropriate since they do not affect prudent navigation. The following thresholds have been found to be appropriate for the majority of users:

.7.1 DECCA – off air or multipulse failures $> \frac{1}{2}$ hour

.7.2 LORAN – off air > 1 hour

.7.3 OMEGA – off air > 4 hours, and polar cap absorption

.7.4 SATNAV – off air > 4 hours.

.8 *No messages on hand*

This facility may be used by transmitting stations to confirm the correct operation of receivers and transmitters at scheduled times when no messages are on hand for transmitting. In accordance with the simple philosophy of NAVTEX, the "Q Code" group QRU is not to be transmitted. Rather, the plain language text NO MESSAGES ON HAND AT . . . . . RADIO should invariably be used instead.

.9 *Use of abbreviations*

Use of abbreviations should be kept to a minimum and be strictly in accord with international accepted usage.

9.2 *Priority message handling*

9.2.1 Three message priorities are used to dictate the timing of the first broadcast of a new warning in the NAVTEX service. In descending order of urgency they are:

.1 VITAL – for immediate broadcast;

.2 IMPORTANT – for broadcast at the next available period when the frequency is unused;

.3 ROUTINE – for broadcast at the next scheduled transmission.

9.2.2 Both VITAL and IMPORTANT warnings will normally need to be repeated, at the minimum, at the next scheduled transmission.

Priority marking

9.2.3 The priority marking is a procedural instruction to the transmitting station. It is not normally to be broadcast.

9.2.4 The priority marking consists of the word VITAL, IMPORTANT or ROUTINE added as a prefix to the NAVTEX message. It should form a separate line immediately before the groups ZCZC $B_1B_2B_3B_4$.

9.2.5 The message originator is responsible for assessing the urgency of the information and inserting the appropriate priority marking.

9.2.6 In order to avoid unnecessary disruption to the service, the priority marking VITAL is to be used only in cases of extreme urgency, such as some distress alerts. In addition, VITAL messages are to be kept as brief as possible.

9.2.7 The message originator is also responsible for ensuring that the operator at the transmitter has his attention drawn to VITAL messages, either by use of the telex alarm or by other means.

9.3 *Broadcast procedures*

9.3.1 *VITAL warnings.* On receipt of a VITAL warning, the NAVTEX transmitting station will immediately commence monitoring the NAVTEX frequency.

.1 If the frequency is clear, the VITAL message is to be transmitted at once.

.2 If the frequency is in use, the transmitter operator is to determine which other station is transmitting. He should then contact that station by any other means at his disposal with a request that they break their transmission to allow the sending of a VITAL warning. As soon as the frequency is clear, the VITAL warning is to be transmitted. Once the VITAL warning has been transmitted, the former station is free to resume scheduled transmissions.

9.3.2 *IMPORTANT warnings.* Messages bearing the priority marking IMPORTANT are to be broadcast during the next available period when the NAVTEX frequency is unused. This is to be identified by monitoring the frequency. It is expected that this level of priority will be sufficient for the majority of urgent information.

9.3.3 *ROUTINE warnings.* ROUTINE messages are to be broadcast at the next scheduled transmission after receipt at the NAVTEX transmitting station. This level of priority will be appropriate for almost all messages broadcast on NAVTEX and is always to be used unless special circumstances dictate the use of a higher priority.

10 Planning a NAVTEX service

10.1 When planning the NAVTEX coverage* for a new region (figure 5), it is essential to appreciate the high level of local and international co-ordination required by this single-frequency service. The central principles which should be borne in mind are as follows:

.1 Although NAVTEX coverage need not be implemented simultaneously over an entire region, it is desirable for IMO to be provided with a draft regional scheme before any service is commenced. The region concerned will usually be a whole NAVAREA.

.2 It is essential for the efficiency and effectiveness of the service that only a minimum number of stations are used to cover a sea area.

.3 Each station should contribute to the overall service of the particular region in a co-ordinated way, bearing in mind the geographical area logically covered by each station and the effective co-ordination and control of information to be transmitted. The information to be transmitted by NAVTEX should be routed between countries using the established communications channels.

* The criteria for use when providing a NAVTEX service and the definitions of *coverage area* and *service area* are given in annex 5 (annex 4 to resolution A.704(17), Provision of Radio Services for the Global Maritime Distress and Safety System (GMDSS)).

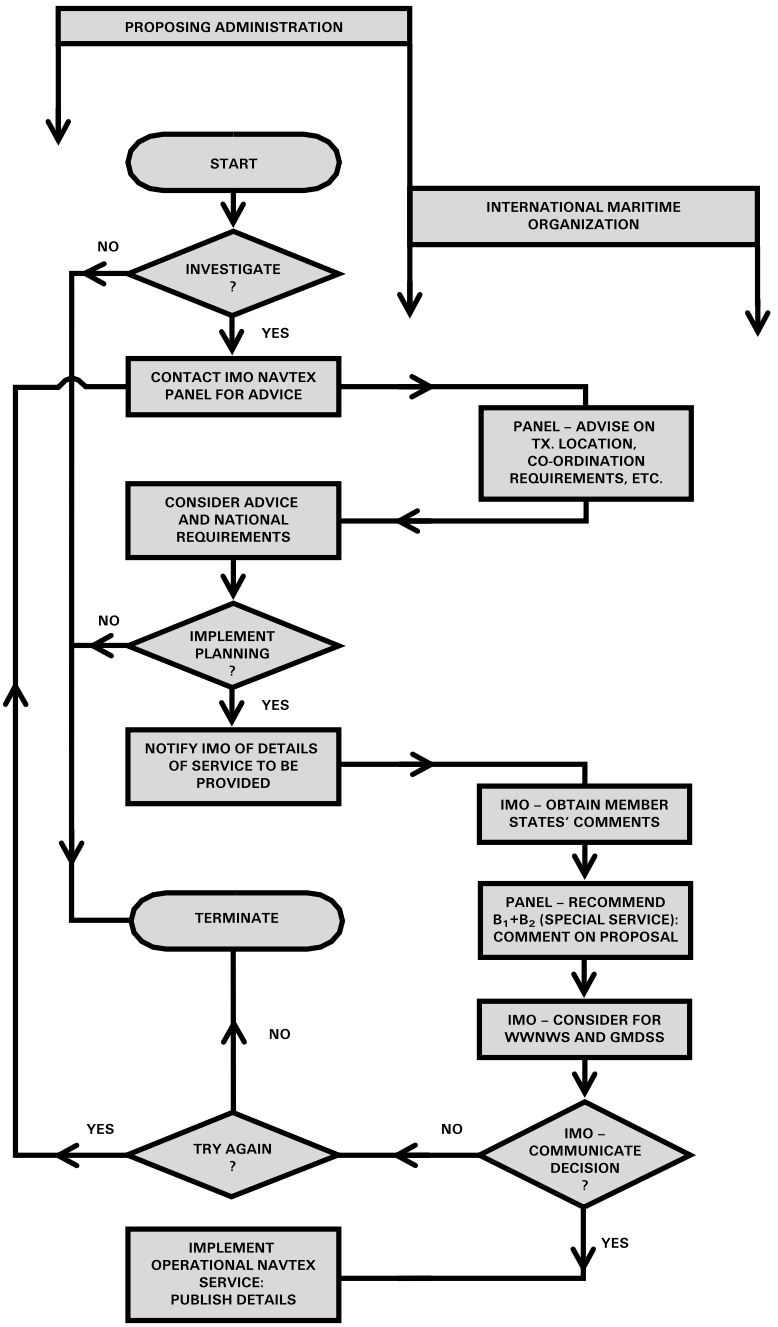


Figure 5 – *Actions and decisions relating to the establishment of, or changes to, NAVTEX services*

.4 Each station will usually provide all the information for a unique and precisely defined sea area which takes full account of the character and volume of information and maritime traffic patterns in the region.

.5 When limitations on resources affect the rate of establishment of NAVTEX, every effort should be made to implement the NAVTEX service first in the areas of highest shipping density.

.6 The range of a NAVTEX transmitter depends on the transmitted power and local propagational conditions. The actual range achieved should be adjusted to the minimum required for adequate reception in the specified service area*, taking into account the needs of ships approaching from other areas. Experience has indicated that the tentatively required range of 250 to 400 nautical miles can often be attained by transmitted power in the range between 100 and 1000 W during daylight with a 60% reduction during night-time.

.7 After the choice of transmitter sites and the allocation of service areas, the main need for co-ordination lies in the assignment of B_1 characters and time schedules.

.8 The national NAVTEX co-ordinator should make arrangements for a quality-control organization in his area which should include both the message-originating offices and the NAVTEX transmitting stations. This organization should aim at confirming, on a continuing basis, that:

- minimum power is used to achieve satisfactory range performance;
- time schedules are not exceeded; and
- the co-ordinated service is operating satisfactorily.

10.2 Guidance on these and the many other factors to be considered when planning NAVTEX services should be obtained at an early stage from IMO, through its Co-ordinating Panel on NAVTEX. Details of how to contact the Panel may be found at annex 1.

11 Operation

11.1 *Setting watch*

It is recommended that, in order to ensure that all necessary maritime safety information has been received, the NAVTEX receiver should be switched on at least 8 hours before sailing.

11.2 *Logging*

The reception of weather forecasts or navigational warnings on NAVTEX is not required to be noted in the radio log. In such cases the NAVTEX printout may replace the log entries required by chapter IV of the 1974 SOLAS Convention, as amended in 1988.

12 Information for mariners and publicity

12.1 The widest publicity should be given to the establishment of a NAVTEX service within those countries concerned.

12.2 National Administrations should ensure that mariners are informed of the establishment of a NAVTEX service by inclusion of full details in Notices to Mariners and lists of radio signals. In addition, full details of the service finally agreed should be forwarded to:

- International Maritime Organization
  4 Albert Embankment
  London SE1 7SR
  United Kingdom

* The criteria for use when providing a NAVTEX service and the definitions of *coverage area* and *service area* are given in annex 5 (annex 4 to resolution A.704(17), Provision of Radio Services for the Global Maritime Distress and Safety System (GMDSS)).

- International Telecommunication Union
  Radiocommunication Bureau
  Place des Nations
  1211 Genève 20
  Switzerland
- Those authorities known to produce international lists of radio signals.

ANNEX 1

IMO SUB-COMMITTEE ON RADIOCOMMUNICATIONS
Co-ordinating Panel on NAVTEX

1 Terms of reference

.1 Advise Government Administrations planning to implement NAVTEX transmissions on the frequencies 518 kHz, 490 kHz or 4209.5 kHz on the operational aspects of the system, and in particular advise on the optimum number of stations, broadcast times, the allocation of identifying letters (B_1) and broadcast message criteria.

.2 Co-ordinate the operational aspects of NAVTEX in the planning stages to ensure the avoidance of mutual interference between States or regions owing to a number of stations, transmitter power, time of broadcasts, or B_1 character assignment, keeping the Radio Regulations (RR) Board informed of proposed implementation plans which have been agreed.

.3 Remain aware of system problems which arise, through correspondence with operational NAVTEX co-ordinators, and suggest solutions to the national Administrations involved or to the Sub-Committee, IHO or WMO, as appropriate.

.4 Prepare documentation supporting the system for the Sub-Committee, including both that needed to inform the user of the service (mariner, shipowner and operator) and that needed by the broadcasting authority to guide its operations.

2 Contact address

The NAVTEX Co-ordinating Panel can be contacted at the following address:

The Chairman
Co-ordinating Panel on NAVTEX
International Maritime Organization
4 Albert Embankment
London SE1 7SR
United Kingdom

Telephone: (+)44 (0)171 735 7611
Telefax: (+)44 (0)171 587 3210
Telex: 23588 IMOLDN G

3 Panel membership

The membership of the NAVTEX Co-ordinating Panel should include experts designated by Administrations willing to participate in the Panel and representatives of concerned international organizations

ANNEX 2

RECOMMENDATION ITU-R M.540-2

Operational and Technical Characteristics for an Automated Direct-Printing Telegraph System for Promulgation of Navigational and Meteorological Warnings and Urgent Information to Ships
(Question 5/8)

[For text of ITU-R M.540-3, see annex 3-5-5 of this publication]

ANNEX 3

IMO RESOLUTION A.525(13)

Performance Standards for Narrow-Band Direct-Printing Telegraph Equipment for the Reception of Navigational and Meteorological Warnings and Urgent Information to Ships

[For text, see annex 3-5-1 of this publication]

ANNEX 4

IMO RESOLUTION A.706(17)

World-Wide Navigational Warning Service

[For text, see annex 2-13 and annex 4-1 of this publication]

ANNEX 5

IMO RESOLUTION A.704(17), annex 4

Criteria for use when providing a NAVTEX service

[For text of resolution A.801(19), which has superseded this resolution, see annex 4 within annex 2-16 of this publication]

ANNEX 6

PROCEDURE FOR AMENDING THE NAVTEX MANUAL

1 Proposed amendments to the NAVTEX Manual should be submitted to the Maritime Safety Committee for evaluation.

2 Amendments to the Manual should normally be adopted at intervals of approximately two years or at such longer periods as may be determined by the Maritime Safety Committee. Amendments adopted by the Maritime Safety Committee will be notified to all concerned, will provide at least 12 months' notification and will come into force on 1 January of the following year.

3 The agreement of the International Hydrographic Organization and World Meteorological Organization, and the active participation of other bodies, should be sought according to the nature of the proposed amendments.

4 When the proposals for amendment have been examined in substance, the Maritime Safety Committee will entrust the Sub-Committee on Radiocommunications with the ensuing editorial tasks.

Annex 4-3
INTERNATIONAL SAFETYNET MANUAL (1994 Edition)

(Also available in separate publication IMO-908E)

Foreword

SafetyNET℠* is an international automatic direct-printing satellite-based service for the promulgation of navigational and meteorological warnings, meteorological forecasts and other urgent safety-related messages – maritime safety information (MSI) – to ships. It has been developed as a safety service of the International Maritime Satellite Organization's (Inmarsat) enhanced group call system to provide a simple and automated means of receiving MSI on board ships at sea and in coastal waters, where appropriate. The information transmitted is relevant to all seagoing vessels and the message-selection features ensure that mariners can receive safety information broadcasts which are tailored to their particular needs.

SafetyNET fulfils an integral role in the global maritime distress and safety system (GMDSS) developed by the International Maritime Organization (IMO) and incorporated into the 1988 amendments to the International Convention for the Safety of Life at Sea (SOLAS), 1974, as a requirement for ships to which the Convention applies. The ability to receive SafetyNET service information will be generally necessary for all ships which sail beyond coverage of NAVTEX and is commended to all Administrations having responsibility for maritime affairs and mariners who require an effective MSI service in waters not served by NAVTEX.

The International SafetyNET Manual is intended for use by seafarers, shipowners, maritime Administrations, SafetyNET information providers, and others concerned with the preparation, broadcast and receiving of maritime safety information.

* SafetyNET℠ and FleetNET℠ are registered servicemarks of the International Mobile Satellite Organization (Inmarsat).

Contents

Page

INTERNATIONAL SAFETYNET MANUAL

1 Introduction 5

2 Definitions 5

3 General features of the enhanced group call system 8

4 Operation of the International SafetyNET Service 10

5 Promulgation of maritime safety information. 10

6 Accessing the SafetyNET service 12

7 Coast earth station function 13

8 Broadcast channel characteristics 13

9 Receiving SafetyNET broadcasts 13

10 Charges for SafetyNET services. 14

11 Planning SafetyNET services. 14

12 Information for mariners and publicity 15

ANNEXES

1 International SafetyNET Broadcast Co-ordinating Panel. 15

2 Recommendation on performance standards for enhanced group call equipment 16

3 The Inmarsat system 17

4 Operational guidance 18

(a) Navigational warning services 18

(b) Meteorological services 20

(c) Search and rescue services 21

(d) Chart correction services. 23

(e) Piracy countermeasures broadcast messages 24

5 Procedure for amending the International SafetyNET Manual. 25

6 Message addressing – Extract from the Inmarsat-C/EGC System Definition Manual (SDM) . . . 25

7 Receiver specifications – Extract from the Inmarsat-C/EGC System Definition Manual (SDM) 31

8 IMO Requirements for the availability of the EGC receive facility. 40

9 Authorization and registration of information providers 40

1 Introduction

1.1 This manual describes the structure and operation of the International SafetyNET[SM]* Service. It is intended primarily for national administrations, but may also be useful to the mariner who requires more operational information than is found in manufacturers' equipment manuals.

1.2 SafetyNET provides shipping with navigational and meteorological warnings, meteorological forecasts, shore-to-ship distress alerts, chart correction data and other urgent information in accordance with the requirements of the International Convention for the Safety of Life at Sea (SOLAS), 1974, as amended. It is suitable for use in all sizes and types of ships. Figure 1 illustrates the way the service is structured.

1.3 SafetyNET is a service of Inmarsat's enhanced group call (EGC) system and was specifically designed for promulgation of maritime safety information (MSI) as a part of the global maritime distress and safety system (GMDSS). The EGC system (technically a part of the Inmarsat-C system) provides an automatic, global method of broadcasting messages to all vessels in both fixed and variable geographical areas or to predetermined groups of ships.

1.4 SafetyNET meets the requirements of SOLAS 1974, as amended, for broadcasting area, regional or local navigational warnings; meteorological warnings and forecasts; chart correction services; and shore-to-ship distress alerts. It is designed with the capability to provide services within the coverage areas of geostationary maritime communications satellites (approximately between 75° N and 75° S). In addition to providing services to ships operating in sea area A3, it also provides the means of disseminating MSI to coastal waters not covered by NAVTEX† on 518 kHz.

1.5 SafetyNET offers the ability to direct a call to a given geographical area. The area may be fixed, as in the case of a NAVAREA or weather forecast area, or it may be uniquely defined by the originator. The call is used for messages, such as a local storm warning or a shore-to-ship distress alert, for which it is inappropriate to alert ships in an entire ocean region. The general EGC system capabilities are shown in figure 2.

1.6 SafetyNET messages can be originated by a registered information provider anywhere in the world and broadcast to the appropriate ocean area via an Inmarsat-C coast earth station. Messages are broadcast according to their priority, i.e. distress, urgency, safety, and routine (see annex 6, paragraph 1.3.1).

1.7 Aboard ship, SafetyNET messages are received through any one of a number of type-approved items of equipment.

2 Definitions

2.1 **Coast earth station (CES):** A land station in the Inmarsat satellite communications system which provides interconnection between the satellite and shore systems such as telex and telephone – may also be called a land earth station (LES).

2.2 **Enhanced group call (EGC):** The system for broadcasting messages via the mobile satellite communications system operated by Inmarsat. EGC is a part of the Inmarsat-C system and supports two services: SafetyNET and FleetNET.

2.3 **FleetNET:** A commercial service for the broadcasting and automatic reception of fleet management and general public information by means of direct printing through Inmarsat's EGC system. Some receivers for FleetNET may not be able to receive SafetyNET.

2.4 **Inmarsat-A:** A satellite communications system for transmission of voice, telex, facsimile or data using directional antennas in the Inmarsat satellite system.

2.5 **Inmarsat-C:** A satellite communications system for telex or data messaging using small terminals and omnidirectional antennas in the Inmarsat satellite system.

2.6 **International NAVTEX service:** The system for the broadcasting and automatic reception of MSI by means of narrow-band direct printing on 518 kHz, using the English language. (NAVTEX receiving capability is part of the mandatory equipment which is required to be carried in certain ships under the provisions of chapter IV of SOLAS 1974, as amended.)

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* SafetyNET[SM] and FleetNET[SM] are registered servicemarks of the International Maritime Satellite Organization (Inmarsat).

† NAVTEX is an international automatic direct-printing service for promulgation of navigational and meteorological warnings and urgent information to ships on 518 kHz, using the English language (see the *NAVTEX Manual*, Sales Number IMO-951E).

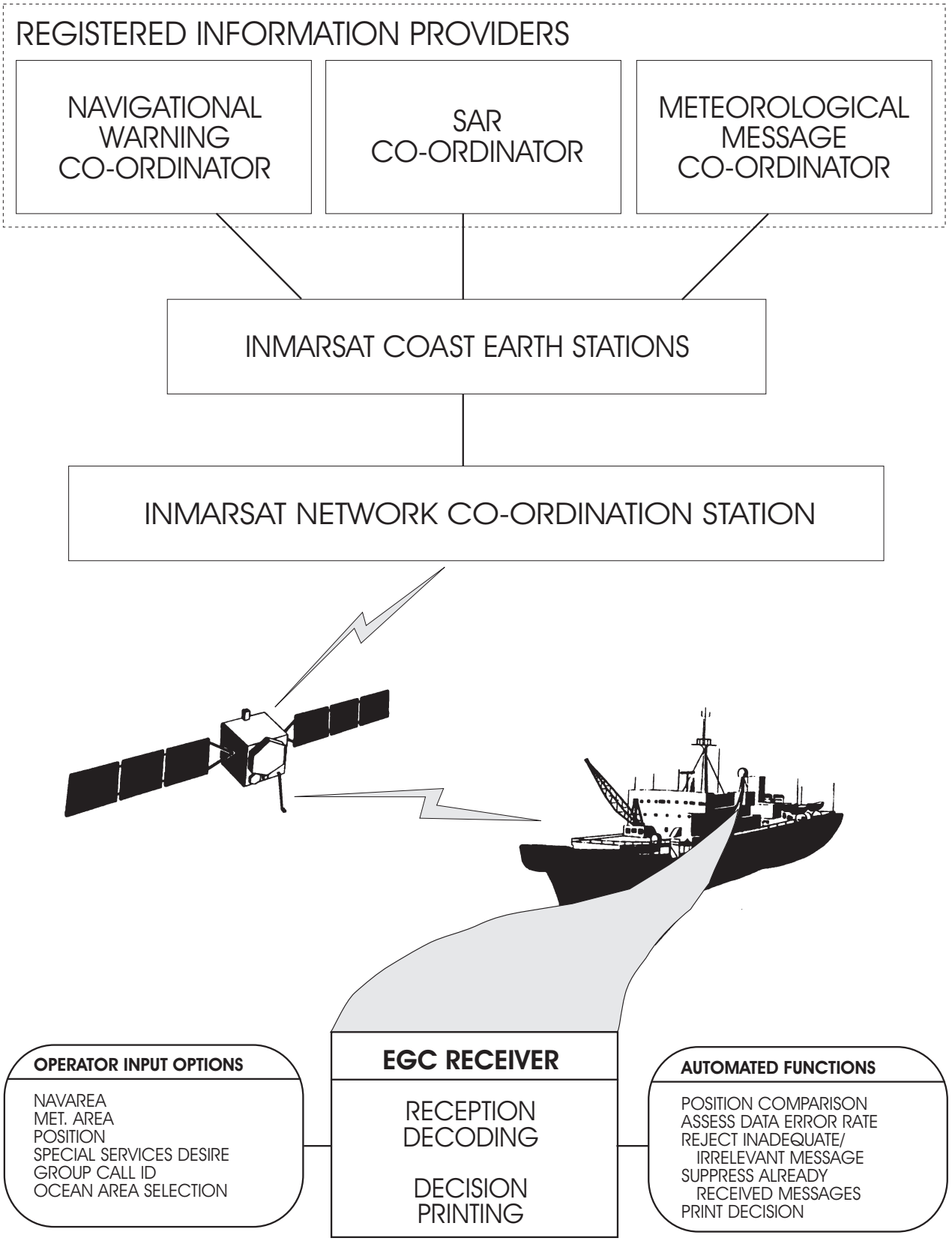


Figure 1 – *The International SafetyNET Service system*

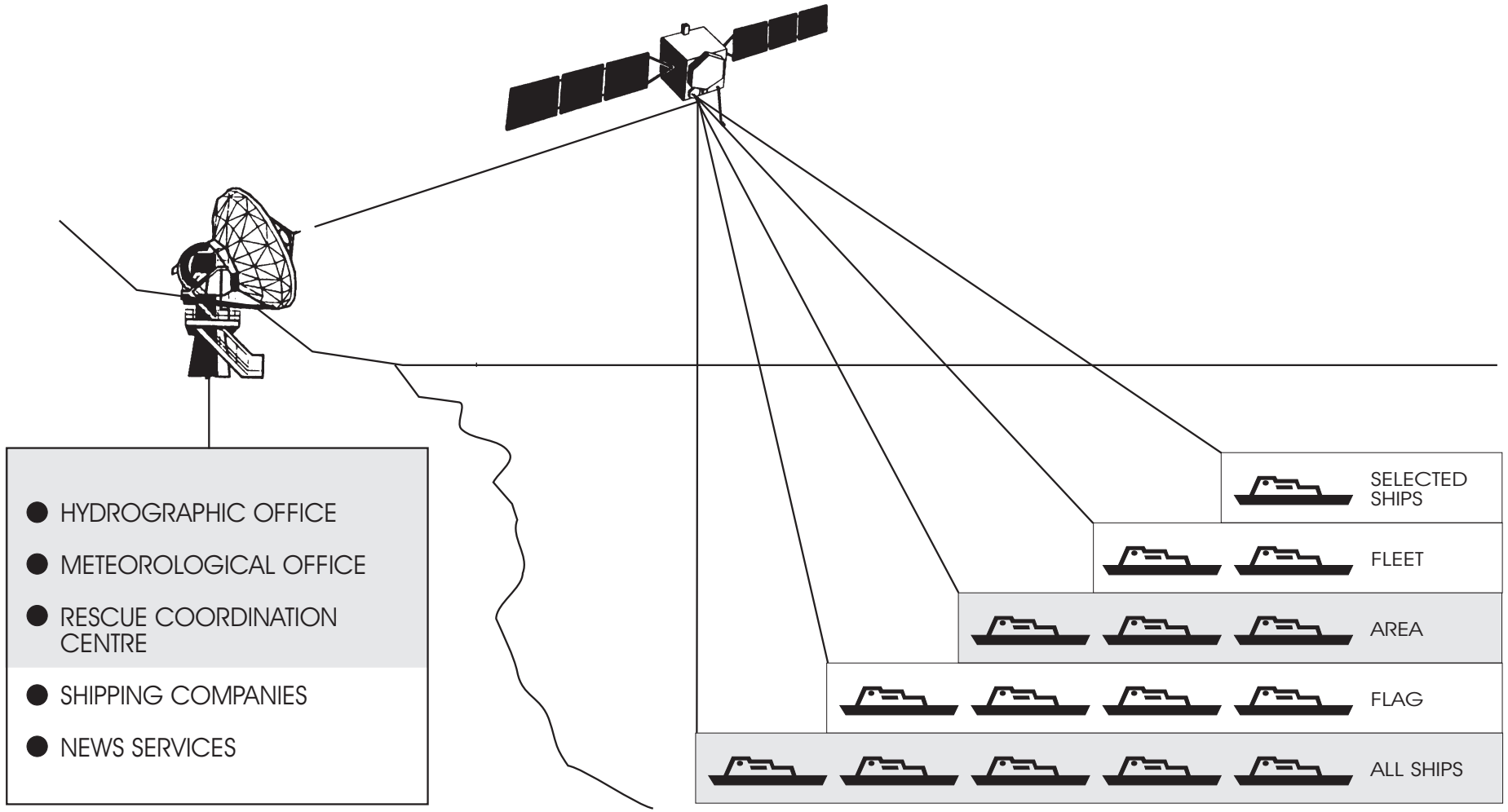


Figure 2 – *Basic concept of the Inmarsat enhanced group call system*

The shaded area indicates functions of the SafetyNET service

2.7 **International SafetyNET Service:** The co-ordinated broadcasting and automated reception of MSI via the Inmarsat EGC system, using the English language, to meet the requirements of chapter IV of SOLAS 1974, as amended.

2.8 **Maritime safety information (MSI):** Navigational and meteorological warnings, meteorological forecasts and other urgent safety-related messages broadcast to ships.*

2.9 **National SafetyNET Service:** The broadcasting and automated reception of MSI via the Inmarsat EGC system, using languages as decided by the Administration concerned.

2.10 **Network co-ordination station (NCS):** A land station in the Inmarsat satellite communications system which controls channel assignments and other communications functions through a satellite for an entire ocean region.

2.11 **Registered information provider:** An MSI provider, authorized in accordance with annex 9 of this Manual, which has an agreement with one or more CESs for providing SafetyNET broadcast information.

2.12 **Rescue co-ordination centre (RCC):** A unit responsible for promoting efficient organization of search and rescue services and for co-ordinating the conduct of search and rescue operations within a search and rescue region.

2.13 **SafetyNET:** The international service for the broadcasting and automatic reception of MSI by means of direct printing through Inmarsat's EGC system. (SafetyNET receiving capability is part of the mandatory equipment which is required to be carried in certain ships under the provisions of chapter IV of SOLAS 1974, as amended.)

2.14 **Sea area A1:** An area within the radiotelephone coverage of at least one VHF coast station in which continuous DSC† alerting is available, as may be defined by a Contracting Government.

2.15 **Sea area A2:** An area, excluding sea area A1, within the radiotelephone coverage of at least one MF coast station in which continuous DSC† alerting is available, as may be defined by a Contracting Government.

2.16 **Sea area A3:** An area, excluding sea areas A1 and A2, within the coverage of an Inmarsat geostationary satellite in which continuous alerting is available.

2.17 **Sea area A4:** An area outside sea areas A1, A2 and A3.

2.18 **Ship earth station (SES):** A mobile earth station in the maritime mobile satellite service located aboard a ship.

3 General features of the enhanced group call system

3.1 Inmarsat's EGC system is part of the Inmarsat-C system and is complementary to the international NAVTEX service. The EGC system supports two services:

.1 SafetyNET for promulgation of MSI; and

.2 FleetNET – for transmission of fleet management and general public information to fleets or groups of ships.

3.2 Virtually all navigable waters of the world are covered by the operational satellites in the Inmarsat system. Each satellite transmits EGC traffic on a designated channel. Any ship sailing within the coverage area of an Inmarsat satellite will be able to receive all SafetyNET messages broadcast over this channel by that satellite. The EGC channel is optimized to enable the signal to be monitored by a small receive-only ship earth station which is dedicated to the reception of EGC messages. This capability can also be built into other standard ship earth stations. It is a feature of satellite communications that reception is not generally affected by the position of the ship within the ocean region, atmospheric conditions or time of day.

3.3 Messages can be addressed either to geographical areas (*area calls*) or to groups of ships (*group calls*):

.1 *Area calls* can be to a fixed geographical area, such as one of the 16 NAVAREAS (figure 3), or to a temporary geographical area selected by the originator. Area calls will be received automatically by any ship whose receiver has been set to one or more fixed areas or recognizes a temporary area by the geographic position.

---

* Includes electronic chart correction data (COM 35/17, section 4.4).

† *Digital selective calling (DSC)* means a technique using digital codes which enables a radio station to establish contact with and transfer information to another station or group of stations and complying with the relevant recommendations of the International Radio Consultative Committee ((CCIR) – "Radiocommunications Bureau of the International Telecommunication Union" from 1 March 1993).

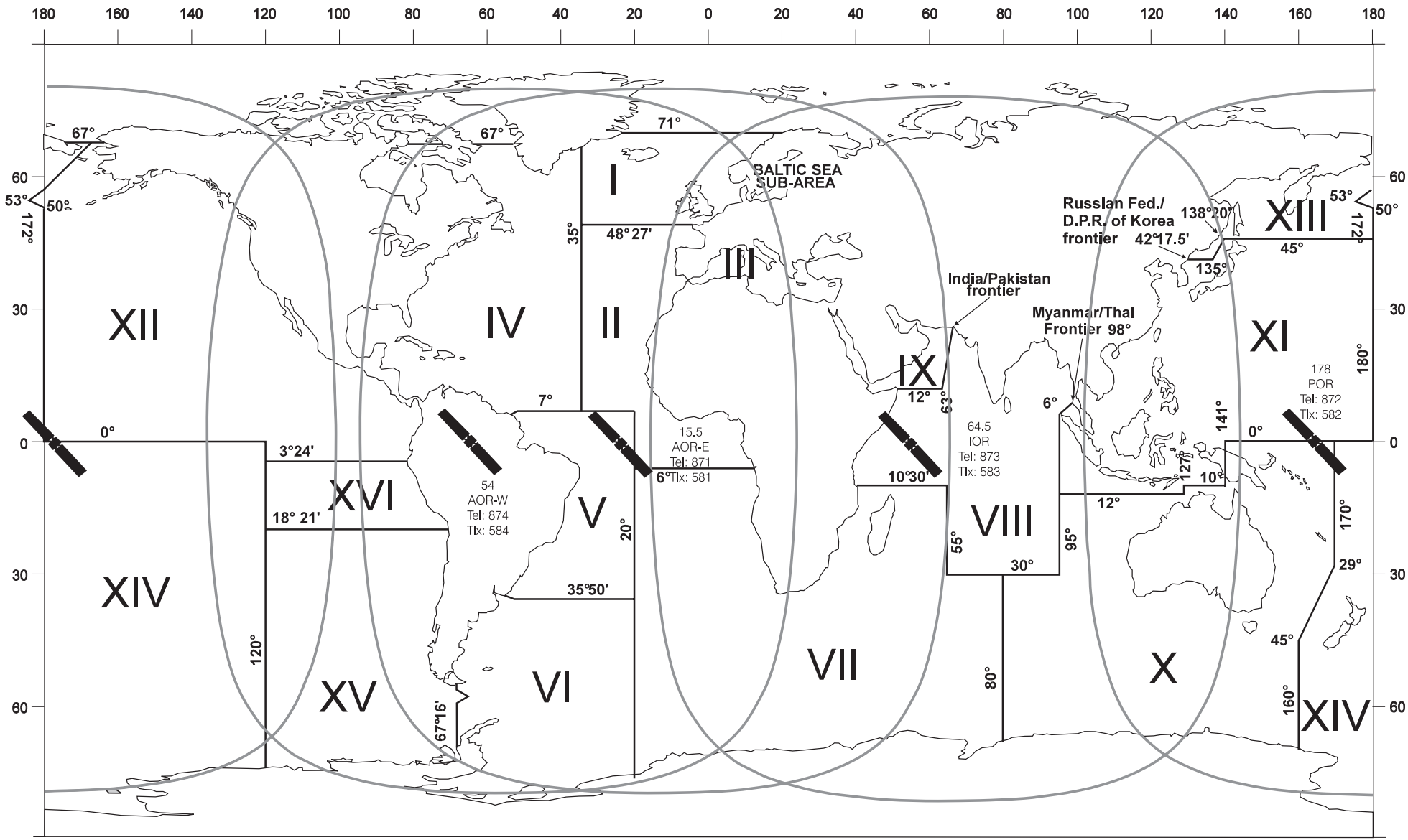


Figure 3 – *Inmarsat global coverage, showing 0° elevation contours*

.2 *Group calls* will be received automatically by any ship whose receiver acknowledges the unique group identity associated with a particular message.

3.4 Reliable delivery of messages is ensured by forward error-correction techniques. Sea trials have demonstrated that the transmission link is generally error-free and low-error reception is achieved under normal circumstances.

4 Operation of the International SafetyNET Service

4.1 Given the "whole-ocean" coverage of a single satellite channel, some form of discrimination and selectivity in printing the various messages is required. Area calls will be received by all ships within the ocean region coverage of the satellite. However, they will be printed only by those receivers which recognize the fixed area or the geographical position in the message. The message format includes a preamble which will enable the microprocessor in a ship's receiver to decide to print only those MSI messages which relate to present position, to intended route, or to fixed areas programmed by the operator. This preamble also allows suppression of certain types of MSI which are not relevant to a particular ship.

4.2 As each message will also have a unique identity, the printing of messages already received correctly is automatically suppressed.

4.3 When a message has been received error-free, a record is made of the message sequence number and the CES identifier associated with that message. This information is stored in memory and used to inhibit the printing of repeated transmissions of the same message. An EGC receiver is capable of storing at least 250 message identities. As the number of received message identifications exceeds the storage limit, the oldest message identification is erased.

4.4 Reception of certain types of messages, such as shore-to-ship distress alerts and meteorological and navigational warnings, is mandatory and cannot be suppressed by ships in the affected area. These messages are identified by service codes (C_2) 00, 04, 14, 24, 31, 34, and 44. (Refer to annex 2, paragraph 3.5).

4.5 SafetyNET messages can be addressed to temporary geographical areas, which may be circular (figure 4) or rectangular (figure 5) in shape. A circular area is described by a radius (in nautical miles) from a location specified in degrees of latitude and longitude. A rectangular area is described in degrees of latitude and longitude from the latitude and longitude of the south-west corner of the rectangle.

4.6 In the case of a ship in distress, the need may exist to create a temporary geographical area to facilitate the locating of potential assisting ships. One approach might be to transmit a shore-to-ship distress alert to a circular area defined by the position of the casualty and a radius about the casualty. This can be done so that only those ships likely to be in the vicinity, potentially in a position to help, are alerted. If no response is received from any ship at the first call, the area can, if necessary, be expanded in steps until an acknowledgement by one or more ships is received.

5 Promulgation of maritime safety information

5.1 Maritime safety information is promulgated by various official registered information providers around the world. Messages for transmission through the SafetyNET service will, in many cases, be the result of co-ordination between authorities. Information providers will be registered and authorized to broadcast via SafetyNET by the International Maritime Organization (IMO) in accordance with the procedures in annex 9. Registered information providers will be:

.1 national hydrographic offices for navigational warnings and electronic chart correction data;

.2 national weather services for meteorological warnings and forecasts;

.3 rescue co-ordination centres for shore-to-ship distress alerts and other urgent information; and

.4 the International Ice Patrol for North Atlantic ice hazards.

5.2 Broadcasts of MSI in the International SafetyNET Service will be in English; however, there is often a national requirement for broadcasts to be made also in other languages. Guidance on the use of other languages is contained in the relevant technical publications of IMO, the International Hydrographic Organization (IHO) and the World Meteorological Organization (WMO).

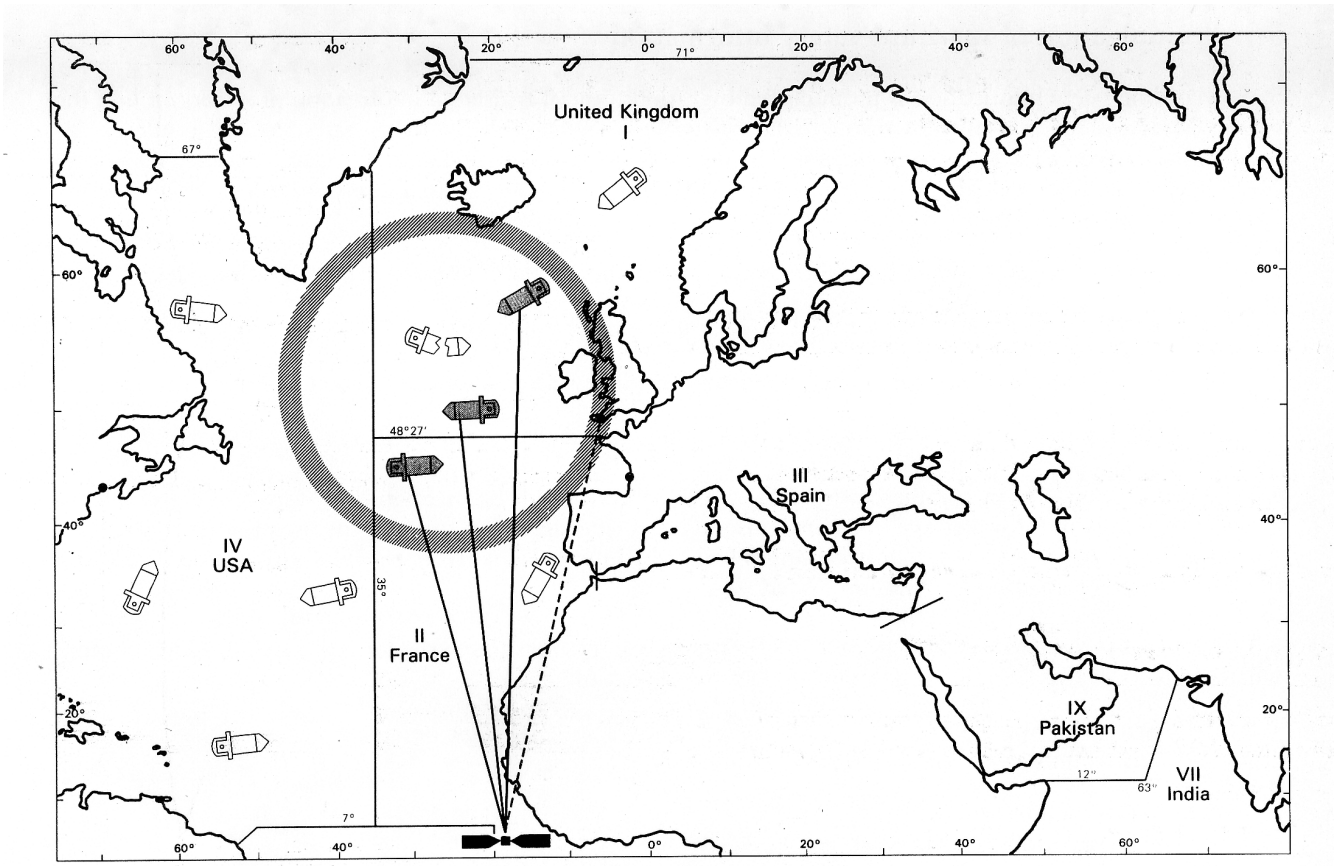


Figure 4 – *SafetyNET circular geographic addressing*

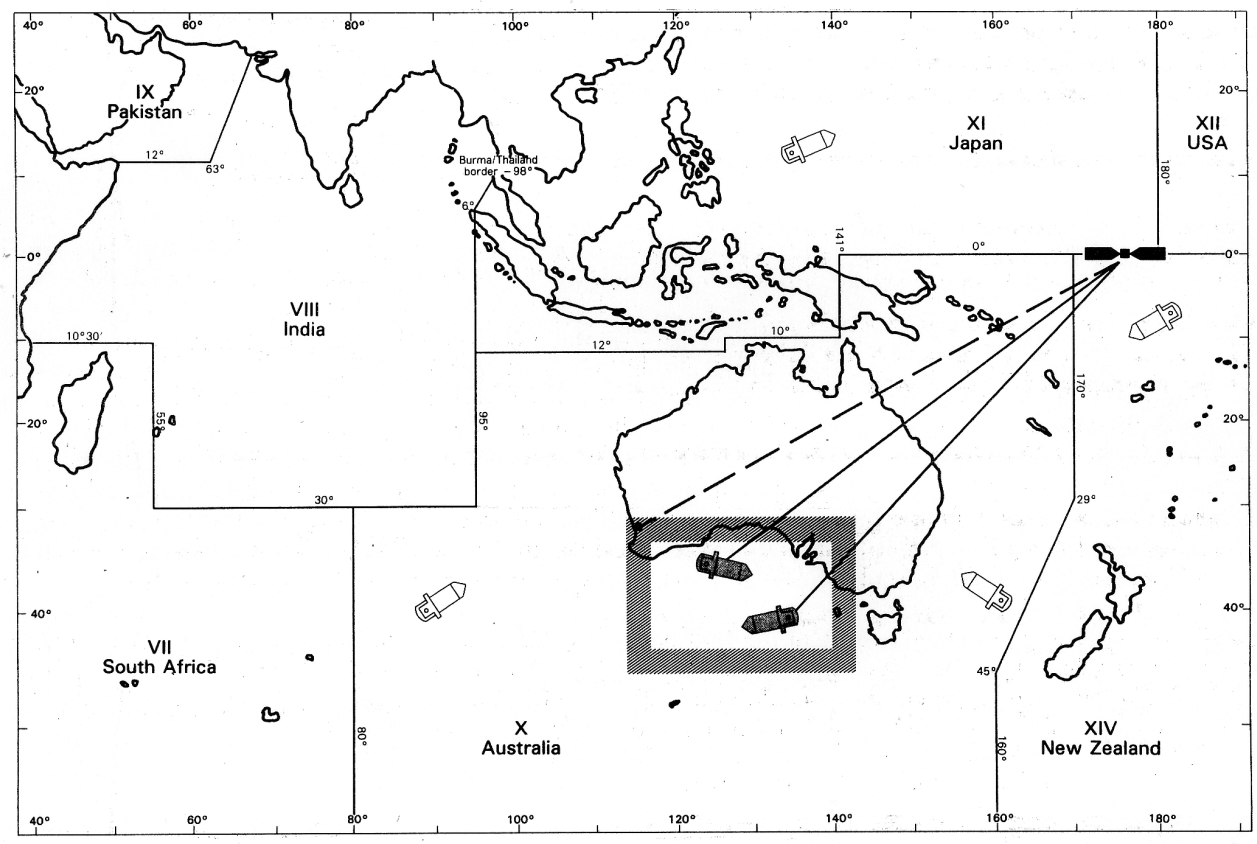


Figure 5 – *SafetyNET rectangular geographic addressing*

5.3 Messages include instructions to the CES for processing the messages in the form of a special address header which consists of five C codes as described below (see annex 6):

C_1	**priority code** (distress, urgency, safety, routine)	1 digit
C_2	**service code** (e.g. meteorological forecast, etc.)	2 digits
C_3	**address code** (e.g. meteorological warning to circular area)	12 alphanumeric characters or fewer
C_4	**repetition rate** (e.g. transmit once on receipt)	2 digits
C_5	**presentation code** (e.g. International Alphabet number 5, odd parity)	2 digits

5.4 SafetyNET messages are stored at the CES until transmitted the appropriate number of times, as specified by the C_4 code.

5.5 The originator may also cancel a message before the desired number of repetitions has been made by sending an appropriate cancellation message to the CES. Examples of SafetyNET messages are given in annex 4.

5.6 Messages destined for satellite coverage overlap areas and intended to be transmitted through more than one satellite to ensure they are received by all intended ships (which may be working through either satellite) are sent to more than one CES, i.e. one CES in each ocean region. Most authorized MSI providers avoid the necessity of such multiple broadcasts by specifying which satellite will be used to serve particular sea areas and scheduling their broadcasts at fixed times. In an area of overlap coverage from two or three ocean region satellites, unscheduled distress alert relays and urgency warnings will be broadcast over all satellites which cover the affected region. Scheduled broadcasts will be made over nominated satellites and at specified times, as selected by the meteorological and hydrographic services. Tables of these schedules are contained in the Master Plan of Shore-Based Facilities for the Global Maritime Distress and Safety System, published by IMO.*

5.7 In order to ensure the integrity of the MSI being received by mariners, MSI providers must monitor the broadcasts which they originate. Monitoring is especially important in a highly automated system which is dependent on careful adherence to procedure and format. This may be accomplished by installation of an EGC receive facility ashore for use by each information provider to:

.1 check that the message has been broadcast;

.2 confirm that the message is received correctly;

.3 ensure that cancellation messages are properly executed; and

.4 observe any unexplained delay in the message being broadcast.

5.8 When an EGC receive facility is established ashore, the most reliable and highest-quality reception will normally be achieved with the use of a helical directional antenna.

6 Accessing the SafetyNET service

6.1 MSI messages are transmitted by telex, datalink, Inmarsat-A or Inmarsat-C to CESs providing Inmarsat-C services in accordance with national and international routeing arrangements. Access to the SafetyNET service will be granted only to registered information providers authorized by IMO and Inmarsat and registered with one or more Inmarsat-C CES operators.

6.2 Telex is the standard method for delivery of traffic to the CESs; however, some CESs will have the capability to receive data transmissions from intelligent microcomputers using the X.25 (packet switching protocol) and X.400 message-handling standards.

6.3 Alternatively, a rescue co-ordination centre, hydrographic office or meteorological office, with the approval of the national licensing authority and subject to suitable facilities being provided at the CES, may install a ship earth station (SES) on the premises to transmit SafetyNET messages to the serving Inmarsat-C CES, which would then schedule the messages for transmission in the normal manner. The normal Inmarsat communications charges will apply to this method of access, in addition to the EGC broadcast charges. Such an approach could

* See annex 5 of this publication.

prove particularly attractive to those originators located in countries without a CES, as potential delays and problems in the international terrestrial telecommunications networks could be avoided. It could also serve as an emergency back-up to normal terrestrial communications systems for urgent messages.

6.4 Computer software which can prepare messages for direct telex (and data) input to the EGC system is commercially available.

7 Coast earth station function

7.1 Messages for transmission via the SafetyNET service are received and processed automatically at the CES. Because the system is automatic, success depends on accurate preparation of messages.

7.2 Messages are not reviewed for corruption or accuracy at the CES; therefore, the originator must take special care to adhere to the format specified in annex 6. This dependence on syntax is one reason why MSI providers must monitor the broadcasts they originate.

7.3 Participating CESs transmit SafetyNET messages over an interstation signalling link to the ocean region network co-ordination station (NCS) for transmission over the broadcast channel (see figure 1).

7.4 Messages will be queued at the CES according to priority and scheduled for retransmission according to instructions contained in the special address headers (C_1 and C_4); messages with the highest priority will be transmitted first. Shore-to-ship distress alerts will be broadcast first followed by urgency, safety and then routine messages. The originator of each message will specify in the message parameters the desired number of repetitions and the interval between transmissions.

8 Broadcast channel characteristics

8.1 The modulation rate of the broadcast channel is 1200 bits per second. Forward error correction is applied to this, creating an effective information transfer of 600 bits per second (rate 1/2 convolutional coding with interleaving is used to disperse error bursts which arise when deep fades are present). This ensures that there is a high probability of receiving a message correctly at the first transmission, irrespective of the atmospheric conditions or the ship's position within the satellite's coverage.

9 Receiving SafetyNET broadcasts

9.1 The basic requirements of the EGC receiver are that it should continuously receive the broadcast channel (the Inmarsat-C NCS common channel) and process the messages being transmitted through the satellite. However, certain classes of receiving equipment may not provide wholly uninterrupted monitoring of the broadcast channel. For this reason, authorized MSI providers must repeat their most important unscheduled messages 6 minutes after the first broadcast.

9.2 Although the receiver receives all SafetyNET messages on the broadcast channel, it incorporates a microprocessor which can be programmed to reject some messages for printing automatically, for example:

.1 messages concerning subject matter of no relevance to the ship; and

.2 messages directed to geographic areas (rectangular or circular) which do not include the ship's position.

9.3 Messages which have been rejected will not be printed. The receiver also inhibits the multiple printing of correctly received messages. It is not possible to reject mandatory "all ship" messages such as shore-to-ship distress alerts. When a distress or urgency message is received, an alarm will be given.

9.4 Although reception of SafetyNET traffic is automatic, the shipboard operator must set up the receiver properly at the start of the voyage:

.1 Selection of the appropriate broadcast channel (this may be an automatic function): In an area of overlap coverage from two or three ocean region satellites, unscheduled distress alert relays and urgency warnings will be broadcast over all satellites which cover the affected region. Scheduled broadcasts will be made over nominated satellites and at specified times, as selected by the meteorological and hydrographic services. Tables of these schedules are contained in the Master Plan of Shore-Based Facilities for the Global Maritime Distress and Safety System.*

.2 The identification code of fixed geographical areas, i.e. NAVAREA/METAREA and coastal MSI areas, for which it is desired to receive MSI information must be put into the receiver

.3 The ship's position must also be keyed in at periodic intervals or automatically provided through an interface with the ship's electronic position-fixing system. It is recommended that the ship's position in the receiver be updated at least every 4 hours. If the ship's position has not been updated for more than 24 hours, all geographically addressed messages within the entire ocean region will be printed out or stored on disk.

9.5 It is recommended that, in order to ensure that all necessary MSI is available before sailing, the EGC receiver remain in operation while the ship is in port.

9.6 If the ship's EGC receive facility is a Class 2 Inmarsat-C SES, only MSI broadcasts through the satellite whose calling channel is being monitored by the SES will be received. Therefore the Class 2 Inmarsat-C SES must monitor the calling channel of the appropriate satellite at the times of scheduled broadcasts. Similarly, it is necessary to ensure that the EGC receive facility in a Class 3 Inmarsat-C SES is tuned to the calling channel of the appropriate satellite at the times of scheduled broadcasts as listed in the Master Plan of Shore-Based Facilities for the Global Maritime Distress and Safety System.

9.7 If the ship's EGC receive facility shares a directional antenna with an Inmarsat SES (e.g. an Inmarsat-A SES), only the MSI broadcast through the satellite which is being tracked by the SES will be received. Therefore, the SES antenna must track the appropriate satellite at the times of scheduled broadcasts as listed in the Master Plan of Shore-Based Facilities for the Global Maritime Distress and Safety System.

10 Charges for SafetyNET services

10.1 There are no charges to the mariner for receipt of SafetyNET messages.

10.2 Message transmission charges are set by national telecommunication service providers and coast earth stations offering EGC services.

10.3 Maritime Safety Information to be broadcast through the International SafetyNET service is transmitted to the CES via telex, datalink or an Inmarsat-A/Inmarsat-C transmission, for which the normal charges will apply.

11 Planning for SafetyNET services

11.1 Hydrographic, meteorological and search and rescue authorities planning to provide MSI to ships at sea should co-ordinate their plans with other national authorities and with IHO, IMO and WMO.

11.2 Prospective registered information providers should contact IMO at an early stage for advice and to obtain authorization to broadcast via SafetyNET. The International Maritime Organization, in co-operation with IHO and WMO, undertakes the co-ordination of times for scheduled transmissions.

11.3 Registered information providers should contact the operators of the CES(s) they desire to use for promulgation of information to their areas of responsibility in order to determine specific details for addressing messages, accessing the CES, charges and payment for services, and any other matters with respect to providing MSI to mariners.

11.4 Questions concerning promulgation of MSI through the EGC SafetyNET service can be addressed to the International SafetyNET Broadcast Co-ordinating Panel at the address given in annex 1, paragraph 2. Questions concerning the operation of the Inmarsat system should be addressed to Inmarsat, 99 City Road, London EC1Y 1AX, United Kingdom.

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* See annex 5 of this publication.

12 Information for mariners and publicity

12.1 The widest publicity should be given to the establishment of SafetyNET services. National administrations should ensure that mariners are informed of the establishment of SafetyNET services by inclusion of full details in Notices to Mariners and Lists of Radio Signals. In addition, full details of the services should be forwarded to:

.1 the International SafetyNET Broadcast Co-ordinating Panel (see annex 1, paragraph 2); and

.2 those authorities known to produce Lists of Radio Signals.

Annex 1
International SafetyNET Broadcast Co-ordinating Panel

1 Terms of reference

To co-ordinate the development and use of the International SafetyNET Service, and in particular to:

- develop operating methods for the effective use of the SafetyNET service, including consideration of the need for scheduled broadcasts;
- develop documentation in support of the SafetyNET service, in particular the International SafetyNET Manual;
- co-ordinate tests and trials of SafetyNET services leading to the introduction of a fully operational international service by 1 February 1992;
- advise coast earth station (CES) operators and potential registered information providers on all aspects of the service, including system access and effective operation;
- develop criteria and establish means for the approval and registration of potential information providers;
- co-ordinate the registration of potential information providers; and
- promote a proper understanding of the benefits and use of the International SafetyNET Service among the wider maritime community.

2 Contact address

The International SafetyNET Broadcast Co-ordinating Panel can be contacted at the following address:

The Chairman
International SafetyNET Broadcast Co-ordinating Panel
International Maritime Organization
4 Albert Embankment
London SE1 7SR
United Kingdom
Telephone: +44 (0)171 735 7611
Telex: 23588 IMOLDN G
Telefax: +44 (0)171 587 3210

3 Panel membership

3.1 The International SafetyNET Broadcast Co-ordinating Panel is open to membership by all Member Governments and also includes one member nominated by each of the following international organizations:

International Maritime Organization (IMO)
World Meteorological Organization (WMO)
International Hydrographic Organization (IHO)
International Maritime Satellite Organization (Inmarsat)

3.2 The following may be represented as observers on the panel:

IHO Commission on Promulgation of Radio Navigational Warnings
IMO NAVTEX Co-ordinating Panel.

Annex 2
Annex to IMO Assembly resolution A.664(16): Recommendation on performance standards for enhanced group call equipment

1 Introduction

1.1 The enhanced group call (EGC) equipment to be used in the Inmarsat system should comply with the general requirements set out in Assembly resolution A.569(14) and the following minimum performance requirements.

1.2 The equipment should be capable of producing a printed copy of received information. Received EGC messages may be stored, with indication that the message has been received, for later printing, except for the vital messages referred to in paragraphs 3.2 and 3.5, which should be printed out upon receipt.

1.3 The EGC installation may be either separate or combined with other installations.*

2 Technical requirements

The equipment should be type-approved by Inmarsat and should comply with the environmental conditions specified in the Inmarsat technical requirements for the EGC receiver.

3 Operation

3.1 Means should be provided to enter the ship's position and area code manually so that area group calls can be received. Optionally, the ship's position, as determined by the navigational equipment, may be entered automatically and the area code automatically derived therefrom.

3.2 Provision should be made for a specific aural alarm and visual indication at the position from which the ship is normally navigated to indicate receipt of a distress or urgency call or a call having distress category. It should not be possible to disable this alarm and it should only be possible to reset it manually.

3.3 The equipment should indicate when it is not correctly tuned or synchronized to the EGC carrier.

3.4 Any message should be printed regardless of the character error rate of its reception. The equipment should print a low line mark if a character is received mutilated.

3.5 Acceptance or rejection of service codes† should be under the operator's control except that equipment should be unable to reject relevant navigational warnings, meteorological warnings, search and rescue information and certain special warnings which are directed to a geographical area within which the ship is operating.

3.6 Means should be provided not to reprint the same message after it has been received without error.

3.7 The printing device should be capable of printing at least the Standard International Alphabet Number 5 character set. Other character sets are optionally used according to ISO 2022 or CCITT Recommendation T.61.

3.8 The printing device should be able to print at least 40 characters per line.

3.9 The signal processor and printing device should ensure that if a word cannot be accommodated in full on its line, it should be transferred to the next line. The printing device should automatically feed five lines after completing the printed messages.

4 Power supply

4.1 The EGC equipment should normally be powered from the ship's main source of electrical energy. In addition, it should be possible to operate the EGC equipment, and all other equipment necessary for its normal functioning, from an alternative source of energy.

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* Elements of other installations, e.g. the antenna, low-noise amplifier and downconverter of the ship earth station, may be shared for the reception of EGC messages.

† The meaning of the service codes is the same as for the NAVTEX system (see annex 6, section 1.3.3(c)).

4.2 Changing from one source of supply to another, or any interruption of up to 60 seconds' duration of the supply of electrical energy, should not require the equipment to be manually re-initialized and should not result in loss of received messages stored in the memory.

5 Antenna siting

5.1 Where an omnidirectional antenna is used, it is desirable that the antenna be sited in such a position that no obstacle likely to degrade significantly the performance of the equipment appears in the fore and aft directions down to –5° and in the port and starboard directions down to –15°.

5.2 Where a stabilized directive antenna is used, it is desirable that the antenna be sited in such a position that no obstacle likely to degrade significantly the performance of the equipment appears in any azimuth down to –5°.

5.3 For omnidirectional antennas, objects which cause a shadow sector of greater than 2°, especially those within 1 m of the antenna, are likely to degrade significantly the performance of the equipment.

5.4 For directive antennas, objects which cause a shadow sector of greater than 6°, especially those within 10 m of the antenna, are likely to degrade significantly the performance of the equipment.

Annex 3
The Inmarsat system

1 There are three essential components of the Inmarsat system:

- the Inmarsat space segment – the satellites and their ground support facilities – planned by Inmarsat and funded by its Signatories (participating national communications authorities);
- the coast earth stations (CESs) which provide an interface between the space segment and the national and international fixed telecommunications networks and which are generally funded and operated by Signatories; and
- the ship earth stations (SESs) – the satellite communications terminals which are purchased or leased by individual ship owners/operators.

2 Shore-to-ship communications are in the 6 GHz band (C-band) from the CES to the satellite and in the 1.5 GHz band (L-band) from satellite to ship. Ship-to-shore communications are in the 1.6 GHz band from the ship to the satellite and in the 4 GHz band (C-band) from satellite to CES.

3 The space segment

3.1 To provide its space segment for global coverage, Inmarsat employs its own dedicated satellites.

3.2 This space segment is segmented globally into four regions: Atlantic Ocean Region East (AOR-E), Atlantic Ocean Region West (AOR-W), Indian Ocean Region (IOR), and Pacific Ocean Region (POR). A minimum of one operational and one spare satellite is available over each of the ocean regions. The high polar regions cannot be seen by geostationary satellites (figure 3).

3.3 The Inmarsat Network Control Centre (NCC) in the United Kingdom functions around the clock, co-ordinating the activities of the network co-ordination stations (NCSs) and the coast earth stations (CESs). The NCSs are special CESs in each ocean region which control communications through the satellite.

4 Coast earth stations

The Inmarsat system is connected into the world-wide telecommunications networks via Signatory-owned CESs. Many of these CESs provide Inmarsat-C EGC services. The wide spread of CESs around the world offers flexibility and the prospect of shorter land-lines to access the desired CES.

5 Ship earth stations

5.1 Typical Inmarsat-A SES above-deck equipment includes a steerable antenna mounted on a stabilized platform to enable the antenna to be kept pointed towards the satellite. It is enclosed within a protective radome. Below-deck equipment consists of a telephone, teleprinter and associated electronics. EGC receive capability can be added, as an option, by the manufacturer.

5.2 Inmarsat-C EGC SESs are small, lightweight terminals, with small omnidirectional antennas, for providing message-type services. EGC receive capability is included in the software of Class 2 Inmarsat-C SESs. Interfaces via RS232 ports are provided for a personal computer or any other data terminal equipment device for message generation and display. The antenna is small and light enough to be installed high on the mast of any ship or boat.

5.3 Standalone EGC receivers provide the capability to receive SafetyNET and FleetNET messages only: there is no transmit capability for sending outgoing messages. The EGC antenna is identical to an Inmarsat-C antenna.

5.4 The technical requirements of all classes of equipment are found in annex 7.

Annex 4
Operational guidance

1 This annex contains operational guidance for the benefit of registered information providers who are responsible for preparing messages for broadcast via the International SafetyNET Service. Use of the codes given in this annex is mandatory for all messages in the system.

2 Examples of the various types of messages and message formats are detailed in the sub-sections of this annex.

a – Navigational warning services
b – Meteorological services
c – Search and rescue services
d – Chart correction services (to be developed)
e – Piracy countermeasures broadcast messages.

3 The broadcast parameters are controlled by the use of five C codes which are combined into a generalized message header format as follows:

C_1:C_2:C_3:C_4:C_5

(Spaces, colons or other delimiters between these codes will be required, depending on the coast earth station addressed.)

Each C code controls a different broadcast parameter and is assigned a numerical value according to the available options, which are tabulated in annex 6. An additional code may be required to identify the ocean region when sending a broadcast message to a CES which operates to more than one ocean region.

4 The International Maritime Organization (IMO) requires that, in order to allow the use of non-dedicated receive facilities, the majority of broadcasts on the International SafetyNET Service should be made at pre-determined scheduled times. Broadcast schedules must be co-ordinated through the International SafetyNET Broadcast Co-ordinating Panel, which can also offer advice on ways of scheduling information within the system.

5 Because errors in the header format of a message may prevent its being released, maritime safety information (MSI) providers must install an Inmarsat SafetyNET receiver and monitor broadcasts of messages which they originate.

6 It has been agreed that the indicative key words MAYDAY / PAN PAN / SECURITE should be used in the International SafetyNET Service to highlight the importance of individual MSI messages. Navigational warnings and meteorological information should therefore be preceded by the word SECURITE unless exceptional use of PAN PAN is appropriate for a particular urgency message. Search and rescue information should be broadcast using whichever indicator is appropriate under the circumstances.

Section a
Navigational warning services

1 The following guidelines set out the arrangements to be used for promulgating NAVAREA and coastal warnings via SafetyNET. They are mandatory for broadcasts in the International SafetyNET Service.

2 These guidelines are to be read in conjunction with the IMO/IHO World-Wide Navigational Warning Service (WWNWS) Guidance Document (IMO Assembly resolution A.706(17)), as amended.

3 In order to ensure uniformity of the navigational warning product throughout the world, the following standard C codes are to be used for warnings issued under the auspices of the WWNWS.

3.1 *C_1 – Message priority*

Normally, C_1 = 1 (safety)

Exceptionally C_1 = 2 (urgency) (at discretion of registered information provider).

3.2 *C_2 – Service code*

NAVAREA warnings	C_2 = 31
Coastal warnings	C_2 = 13 (Broadcasts using NAVTEX codes to coastal areas where NAVTEX is not provided, or where NAVTEX broadcasts are to be duplicated)

3.3 *C_3 – Address code*

NAVAREA warnings	C_3 = the two digits of the NAVAREA number, with a leading zero where necessary, e.g. 01 or 13
Coastal warnings	C_3 = X_1X_2 to identify the NAVAREA and B_1B_2 to emulate NAVTEX as specified in paragraph 1.3.3(c) of annex 6. Note that B_1 codes will be allocated by IMO in accordance with the procedure for allocating NAVTEX transmitter identities laid down in the *NAVTEX Manual*. B_2 will always be A.

3.4 *C_4 – Repetition code*

Urgent navigational warnings should be transmitted as soon as possible after receipt. They should be repeated on a scheduled broadcast, once a day for six weeks unless previously cancelled. The following examples of repetition codes should be used as appropriate:

3.4.1 Initial unscheduled broadcast of NAVAREA and coastal warnings with urgency priority	C_4 = 11 (on receipt, repeated 6 minutes later)
3.4.2 Scheduled broadcast of NAVAREA warnings with safety priority	C_4 = 18 (repeat broadcast every 24 hours, no echo)
3.4.3 Scheduled broadcast of coastal warnings with safety priority	C_4 = 42 (repeat broadcast every 4 hours, no echo)

3.5 *C_5 – Presentation code*

Always C_5 = 00, International Alphabet number 5.

4 NAVAREA warnings should be considered for repromulgation in adjacent NAVAREAs in accordance with paragraph 6.2.6 of the IMO/IHO WWNWS Guidance Document.

5 In a similar way, NAVTEX information which must be received in ships before they enter a NAVTEX area from an area not covered by NAVTEX should be passed to the NAVAREA Co-ordinator for broadcast to the surrounding NAVAREA as a NAVAREA warning.

6 Navigational warnings are to remain on the broadcast for as long as the information remains valid, up to a maximum period of six weeks (42 broadcasts). By the end of the six-week broadcast period, information which is still valid is to have been made available by other means (e.g. Notices to Mariners) or is to be re-issued as a new navigational warning.

7 The same principles and standards apply to broadcasting coastal warnings by SafetyNET (in areas where NAVTEX is not provided) as apply to NAVTEX broadcasts. These standards are laid down in the *NAVTEX Manual*.

8 An example of a NAVAREA warning message is:

1:31:04:18:00
SECURITE
[*text*]
NNNN
CANCEL 16392 AT 271435UTC JUL 90

9 An example of a coastal warning message is:

1:13:03MA:42:00
SECURITE
[*text*]
NNNN

Section b
Meteorological services

1 The following sets out the arrangements to be used for the broadcast of meteorological forecasts and warnings via SafetyNET for the GMDSS. They are mandatory for broadcasts in the International SafetyNET Service.

2 These guidelines are to be read in conjunction with the WMO *Manual on Marine Meteorological Services*, as revised for the GMDSS.

3 In order to ensure uniformity of the broadcast of meteorological bulletins and warnings globally, the following standard C codes should be used for meteorological forecasts and warnings issued via SafetyNET for the GMDSS.

3.1 *C_1 – Message priority*

Always C_1 = 2 (urgency) for warnings
Note: to be used for urgent tropical cyclone warnings only. All other warnings to be classified as safety (C_1 = 1).

Always C_1 = 1 (safety) for forecasts and warnings (see note).

3.2 *C_2 – Service code*

Meteorological warnings (C_1 = 1 or 2) to circular area	C_2 = 24
Meteorological warnings or forecasts to METAREA	C_2 = 31
Meteorological warnings or forecasts to coastal areas	C_2 = 13

3.3 *C_3 – Address code*

Meteorological warnings (C_1 = 1 or 2) to circular area (service code C_2 = 24)	C_3 = 10 characters.

The address code for circular areas is fully described in annex 6, paragraph 1.3.3(d), but is repeated here for ease of reference:

The circular address will consist of 10 characters as follows:
$D_1D_2LaD_3D_4D_5LoR_1R_2R_3$

where:

D_1D_2La *(three characters) is latitude of centre in degrees, and* La *whether north (*N*) or south (*S*). A leading zero should be used for latitudes less than 10°.*

$D_3D_4D_5Lo$ *(four characters) is longitude of centre in degrees, and* Lo *whether east (*E*) or west (*W*) of the prime meridian. One or two leading zeros should be used for longitudes less than 100°.*

$R_1R_2R_3$ *(three characters) is radius of circle in nautical miles, up to 999.*

Example: A circle centred at latitude 56°N longitude 34°W with radius of 10 nautical miles is coded as:
56N034W010

Meteorological warnings (C_2 = 31)	C_3 = the two digits denoting the area of broadcast responsibility (the METAREA), with a leading zero where necessary, e.g., 01, 06, 13.
Coastal warnings (C_2 = 13) – broadcasts using NAVTEX codes to coastal areas where NAVTEX is not provided or where NAVTEX broadcasts are to be duplicated	C_3 = X_1X_2 to identify the METAREA and B_1B_2 to emulate NAVTEX as specified in paragraph 1.3.3(c) of annex 6. Note that B_1 codes will be allocated by IMO in accordance with the procedure for allocating NAVTEX transmitter identities laid down in the *NAVTEX Manual*. B_2 will always be B or E. The METAREA X_1 and X_2 codes and the NAVTEX B_1 and B_2 codes are sent to the CES as a four-character group, in the order $X_1X_2B_1B_2$.

3.4 *C_4 – Repetition code*

Category (a) repetition codes are used for meteorological information as follows:

Meteorological warning	C_4 = 11 (On receipt followed by repeat 6 minutes later. *Note:* a 6 minute repeat is used to ensure that the warning is received by the maximum number of ships.)
Meteorological forecast	C_4 = 01 (Transmit once on receipt).

3.5 *C_5 – Presentation code*

Always C_5 = 00, International Alphabet number 5.

Examples

Meteorological warning to METAREA:

1:31:01:11:00
SECURITE
[*text*]
NNNN

See note.

Meteorological warning (to circular area, i.e. only intended to be received by ships within the area of the address):

2:24:20N065W500:11:00
PAN PAN
[*text*]
NNNN

NB: PAN PAN is used for messages with urgency priority (C_1 = 2).

See note.

Meteorological forecast:

1:31:08:01:00
SECURITE
[*text*]
NNNN

See note.

Note: Broadcast text is to be as required by WMO *Manual on Marine Meteorological Services*.

Section c
Search and rescue services

1 The following guidelines set out the arrangements to be used by rescue co-ordination centres (RCCs) for initiating transmission of shore-to-ship distress alert relays and shore-to-ship search and rescue information. Transmissions should be in accordance with the relevant procedures of the International Telecommunication Union (ITU) *Radio Regulations* (RR), the International Convention on Maritime Search and Rescue, 1979, and the *IMO Search and Rescue Manual.*

2 In order to ensure uniformity of the search and rescue broadcast product throughout the world, C codes should be used as described in this annex.

Shore-to-ship distress alert relays

3 As a general principle, distress alert relays should be addressed to a circular area around the estimated or known position of the distressed vessel. The radius of the circle should be chosen to take account of the accuracy of the datum position, the expected density of shipping in the vicinity and the fact that the position can only be defined in the message address to the nearest whole degree of latitude and longitude. The distress alert relay message must be broadcast via all satellites which cover the area concerned. Shore-to-ship distress alert relays sent by the International SafetyNET Service should contain the identification of the unit in distress, its approximate position and other information which might facilitate rescue (RR N3118). C codes should be as follows:

3.1 *C_1 – Message priority*

C_1 = 3 (distress)

If the RCC determines that the transmission is of an urgency category rather than distress, in accordance with RR article N40, C_1 = 2 (urgency) may be used instead (see also paragraph 4 below).

3.2 *C_2 – Service code*

C_2 = 14 (shore-to-ship distress alert to circular areas)

Messages addressed to circular areas will only be printed out by receivers with positional data located inside the circle or which have not had their position kept up to date.

3.3 *C_3 – Address code*

In messages addressed to service code C_2 = 14, the C_3 code will be a circular address, consisting of ten characters, as follows:

3.3.1 Latitude (D_1D_2La) of vessel in distress in degrees (two digits) and whether north (N) or south (S): e.g., 39N (three characters total). Include a leading zero for latitudes less than 10°.

3.3.2 Longitude ($D_3D_4D_5$Lo) of vessel in distress in degrees (three digits) and whether east (E) or west (W) of the prime meridian: e.g. 059W. Include a leading zero or zeros for longitudes less than 100° or 10° as appropriate: e.g., use 099 for 99° and 008 for 8°.

3.3.3 Alert radius ($R_1R_2R_3$) around distressed vessel in nautical miles. To ensure that position inaccuracies of both the distressed vessel and nearby vessels to which the message is intended do not affect receipt of messages, radius values of 200 nautical miles or larger should normally be used. Note that if a vessel's own position information is not entered into its SafetyNET receiver, every shore-to-ship distress alert relay message transmitted to the Inmarsat ocean region will be printed.

3.4 *C_4 – Repetition code*

C_4 = 11 (transmit on receipt followed by automatic repeat 6 minutes later)

The 6 minute repeat is used to ensure that the information is received by the maximum number of ships (estimated >99%).

3.5 *C_5 – Presentation code*

Always C_5 = 00, International Alphabet number 5.

3.6 Example of a shore-to-ship distress alert relay message:

3:14:56N043W250:11:00
MAYDAY RELAY
[*text*]
NNNN

3.7 *General (all ships) call*

When the RCC has no indication of the position of the vessel in distress, shore-to-ship distress alert relays may be sent as general call (see annex 6, paragraph 1.3.3(a)). This will be printed in every vessel within the Inmarsat ocean region, provided the receiver is tuned to the proper ocean region satellite.

Note: This method of alert should rarely be used.

The C codes for general calls are always as follows:

C_1 = 3 (distress) or 2 (urgency)
C_2 = 00
C_3 = 00
C_4 = 11
C_5 = 00

An example of a general call is:

3:00:00:11:00
MAYDAY RELAY
[*text*]
NNNN

Shore-to-ship urgency and safety traffic

4 As a general principle, only the minimum information consistent with the safety of navigation should be broadcast. However, where such information is deemed essential, shore-to-ship information other than distress should be broadcast to a NAVAREA using C codes as follows:

4.1 *C_1 – Message priority*

C_1 = 2 (urgency), 1 (safety) or 0 (routine)

4.2 *C_2 – Service code*

C_2 = 31

Messages addressed to a NAVAREA in this way are only to be broadcast over the single satellite nominated by IMO to serve that NAVAREA.

4.3 *C_3 – Address code*

$C_3 = X_1X_2$

X_1X_2 = the two digits of the NAVAREA number, with a leading zero where necessary, e.g. 01 or 13.

4.4 *C_4 – Repetition code*

Unscheduled broadcasts of urgency and safety traffic should be made using the echo facility to increase the probability of reception as follows:

C_4 = 11 (on receipt repeated 6 minutes later)

4.5 *C_5 – Presentation code*

Always C_5 = 00, International Alphabet number 5.

Overlap in satellite ocean regions

5 Search and rescue distress and urgency broadcasts should be repromulgated through all Inmarsat satellites serving the area surrounding the vessel in distress. This is to ensure that vessels with receivers tuned to any ocean region satellite serving the area will receive the message. See 4 above for guidance on broadcasting urgency and safety traffic.

Overlap in NAVTEX coverage areas

6 If the area surrounding the vessel in distress is also in a NAVTEX coverage area, the same information should be broadcast to that area over NAVTEX.

Section d
Chart correction services

It is expected that corrections for official electronic chart databases will be broadcast via SafetyNET in due course. However, the standards for this service have not yet been developed (July 1993).

Section e
Piracy countermeasures broadcast messages

1 There are two kinds of MSI broadcast messages associated with piracy countermeasures: the daily situation report (SITREP) and a piracy attack warning. Specific guidance on drafting and broadcasting these messages is given below.

2 The daily situation report should be broadcast via SafetyNET at a regular time around 0800 local time daily. The following paragraphs provide specific guidance on broadcast procedures.

3 The daily situation report should be broadcast to a rectangular area enclosing the region of probable pirate attacks (based on historical data) plus a margin of 700 miles (24 hours' steaming by a fast ship) in every direction.

4 The following standard C codes illustrate those to be used for SafetyNET broadcasts of the daily situation report:

C_1 = 1	Safety
C_2 = 04	Navigational warning to rectangular area
C_3 = 10S090E35040	Rectangular area bounded by 10°S, 25°N, 090°E and 130°E
C_4 = 18	Broadcast every 24 hours (no echo) until cancelled
C_5 = 00	International Alphabet Number 5

5 Piracy attack warnings are to be broadcast, generally as a coastal warning, only when the area is not served by NAVTEX, immediately on receipt of the source information and at the next scheduled broadcast. Further broadcasts will not normally be necessary unless the information is being updated significantly. B_2 = L should be used. The specific area in which the attack has taken place is to be quoted in the first line of text, using no more detail than is necessary to indicate the probable location of further attacks, e.g. WESTERN PHILLIP CHANNEL or VICINITY HORSBURGH LIGHT. The description of the pirate vessel and its last observed movements are to be kept as brief as possible and should give only those details which are of significance in avoiding further attacks.

6 Specimen message formats are as follows:

6.1 *Daily situation report*

[*date/time of origin*]

PIRACY COUNTERMEASURES MESSAGE [*consecutive number*]

SOUTHEAST ASIA, INCLUDING MALACCA STRAIT, SINGAPORE STRAIT AND PHILIPPINES

1. LAST REPORTED ATTACK [*date*] IN [*position*] ON [*type and size of vessel*]. [*amplifying remarks: no. of pirates / type of pirate vessel / nature of attack, etc.*]
2. ATTACKS CONCENTRATED IN PHILLIP CHANNEL BETWEEN [*position*] and [*position*]. REPORTED ATTACKS ALWAYS HAPPEN AT NIGHT.
3. VESSELS ADVISED TO MAINTAIN ANTI-PIRACY WATCHES. ALL SUSPICIOUS OR UNEXPLAINED CRAFT MOVEMENTS OR PIRACY ATTACKS SHOULD BE IMMEDIATELY REPORTED TO REGIONAL PIRACY CENTRE, KUALA LUMPUR. TELEPHONE +60 3 2010014, FAX +60 3 2385769, TELEX MA 31880.

NNNN

6.2 *Piracy attack warning*

[*date/time of origin*]

PIRACY ATTACK WARNING [*consecutive number*]

[*specific area*]

1. PIRATE ATTACK REPORTED [*date/time group*] IN [*position*]
2. [*brief description of pirate vessel*]
3. [*last observed movements of pirate vessel, if significant*]
4. FURTHER ATTACKS PROBABLE. SHIPS IN VICINITY TAKE PRECAUTIONS.

NNNN

7 Date/time should always be quoted in the form DDHHMMUTC MoMoMo YY. For example: 251256UTC JAN 93.

Note: UTC (Universal Co-ordinated Time) is the same time-zone as GMT (Z).

8 Geographical positions should be quoted in the standard format $D_1D_2M_1M_2La\ D_3D_4D_5M_3M_4Lo$

where:

D_1D_2	=	degrees latitude
M_1M_2	=	minutes latitude
La	=	hemisphere (N or S)
$D_3D_4D_5$	=	degrees longitude (with leading zeros if required)
M_3M_4	=	minutes longitude
Lo	=	longitude (E or W)

as in the example:

5419N 10327E

Notes: 1 Decimals of minutes will seldom be necessary or appropriate for reports of this kind.

2 Where the name of a geographical feature is used instead of a geographical position, a name should be chosen that appears on all commonly used charts of the area. Local knowledge should not be required for understanding the message.

Annex 5
Procedure for amending the International SafetyNET Manual

1 Proposed amendments to the *International SafetyNET Manual* should be submitted to the IMO Maritime Safety Committee for evaluation.

2 The agreement of the International Hydrographic Organization, Inmarsat and the World Meteorological Organization, and the active participation of other bodies, should be sought, according to the nature of the proposed amendments.

3 When the proposals for amendment have been examined in substance, the Maritime Safety Committee will entrust the Sub-Committee on Radiocommunications with the ensuing editorial tasks.

Annex 6
Message addressing

1 Addressing the SafetyNET message

1.1 Introduction

This section describes the way in which International SafetyNET Service messages are transmitted to coast earth stations (CESs) by registered information providers for subsequent transmission over the satellite system.

1.2 Routeing of messages

A registered information provider wishing to have a SafetyNET message transmitted via the Inmarsat-C system may use an appropriate terrestrial or satellite service, telex or packet network to gain access to the required coast earth station. See section 6.

1.3 Addressing SafetyNET messages

After gaining access to the CES, the registered information provider must give address instructions so that ships in the desired areas receive the message. This information is sent by means of a special message header at the beginning of each message. The message header consists of five special codes, called C codes, as described in the following paragraphs. At some CESs, the five codes may need to be prefixed by additional characters to indicate that the message is an EGC transmission. A further code, to identify the ocean region, may be necessary when addressing EGC messages to CESs which operate in more than one ocean region.

C codes are transmitted to the CES in the format:

C_1:C_2:C_3:C_4:C_5

where: C_1 is the priority code – 1 digit
C_2 is the service code – 2 digits
C_3 is the address code – 12 digits or less
C_4 is the repetition rate – 2 digits
C_5 is the presentation code – 2 digits

(A digit, in this context, means an alphanumeric character.)

Each of the C codes must be delimited by a valid field delimiter (dependent on the specific CES requirements – see annex 4, paragraph 3).

The meanings of the C codes are explained in the next sections, but for illustration purposes an example is:

1:31:01:11:00
SECURITE
[*text*]
NNNN

This example code is for a safety priority (C_1 = 1) EGC call containing a WMO-type meteorological warning (C_2 = 31) to sea area 1 (C_3 = 01) which will be repeated 6 minutes after the initial transmission (C_4 = 11). The text is transmitted in International Alphabet number 5 (C_5 = 00).

1.3.1 *Priority codes (C_1)*

Format as received at CES – 1 digit.

The C_1 code is used to indicate to the CES the level of priority needed for the message's transmission. The priority number is given in ascending order as follows:

0 routine
1 safety
2 urgency
3 distress

Use of priority 1, 2 and 3 is restricted to those classes of information described in annex 4.

Note that an alarm is triggered at the receiver by messages with priorities 2 (urgency) or 3 (distress).

1.3.2 *Service codes (C_2)*

Format as received at coast earth station – 2 digits.

A C_2 code is adopted that will explicitly indicate to the EGC receiver the length of the address it will need to decode during message processing. The presently allocated service codes are described below together with the number of digits in the C_3 code:

(a) C_2 = 00 general call
C_3 code – 00

(b) C_2 = 04 urgency message (PAN PAN/XXX), navigational warning to rectangular area
C_3 code – 12 digits

(c) C_2 = 13 coastal warning
C_3 code – 4 digits

(d) C_2 = 14 shore-to-ship distress alert to circular area
C_3 code – 10 digits

(e) C_2 = 24 urgency message (PAN PAN/XXX), meteorological and navigational warnings to circular area
C_3 code – 10 digits

(f) C_2 = 31 meteorological and NAVAREA warning and meteorological forecasts to NAVAREA/METAREA
C_3 code – 2 digits

(g) C_2 = 34 search and rescue co-ordination to rectangular area
C_3 code – 12 digits

(h) C_2 = 44 search and rescue co-ordination to circular area
C_3 code – 10 digits

(i) C_2 = 73 chart correction services
C_3 code – 7 digits

1.3.3 *Addresses (C_3)*

The C_3 address codes that are required for each of the C_2 service codes given in 1.3.2 are detailed below:

(a) C_2 = 00 general call
Used to address messages to all ships in the region.

C_3 = 00.

(b) C_2 = 04 urgency message (PAN PAN/XXX), navigational warning to rectangular area

Rectangular addresses will consist of 12 characters as follows:

$D_1D_2LaD_3D_4D_5LoD_6D_7D_8D_9D_{10}$

where: D_1D_2 is latitude of south-west corner of the rectangle in degrees.

La is hemisphere N or S.

$D_3D_4D_5$ is longitude of south-west corner of rectangle in degrees, with leading zeros if required.

Lo is longitude E or W.

D_6D_7 is extent of rectangle in latitude (degrees).

$D_8D_9D_{10}$ is extent of rectangle in longitude (degrees).

A rectangle whose south-west corner is 12° S and 124° E, extending 10° north and 10° east, is coded as:

12S124E10010

Note: Latitude and longitude are limited by values from 00° to 90° latitude and 000° to 180° longitude.

(c) C_2 = 13, coastal warning

The coastal warning broadcast facility is made available for the transmission of coastal information to areas where NAVTEX is not provided. Guidance on the use of this facility is given in annex 4.

The NAVAREA/METAREA X_1 and X_2 codes and the NAVTEX B_1 and B_2 codes are transmitted to the CES as four characters. The order of transmission is $X_1X_2B_1B_2$.

B_1 is a character identifying the NAVTEX transmitter coverage area.

B_2 is a unique character for each type of message as follows:

A Navigational warnings
B Meteorological warnings
C Ice reports
D Search and rescue information
E Meteorological forecasts

F Pilot service messages
G DECCA messages
H LORAN messages
I OMEGA messages
J SATNAV messages
K Other electronic navaid messages
L Additional navigational warnings
Z No message on hand

(d) C_2 = 14 shore-to-ship distress alert to circular area

The circular address consists of 10 characters as follows:

$D_1D_2LaD_3D_4D_5LoR_1R_2R_3$

where: D_1D_2 is latitude of centre in degrees, with a leading zero if required.

La is hemisphere N or S.

$D_3D_4D_5$ is longitude of centre in degrees, with a leading zero if required.

Lo is longitude E or W.

$R_1R_2R_3$ is radius of circle in nautical miles (up to 999).

A circle centred at 56° N 34° W with a radius of 10 nautical miles is coded as:
56N034W010

Note: Latitude and longitude are limited by values from 00° to 90° latitude and 000° to 180° longitude.

(e) C_2 = 24 urgency message (PAN PAN/XXX), meteorological and navigational warnings to circular area

See 1.3.3(d) for description of circular addressing.

(f) C_2 = 31 meteorological and NAVAREA warnings and meteorological forecasts

Meteorological and NAVAREA warnings and meteorological forecasts are addressed to the areas described in annex 4 using the two digits X_1X_2, where X_1X_2 is the numerical designation of the area.

(g) C_2 = 34 search and rescue co-ordination to rectangular area

See 1.3.3(b) for description of rectangular addressing.

(h) C_2 = 44 search and rescue co-ordination to circular areas

See 1.3.3(d) for description of circular addressing.

(i) C_2 = 73 chart correction services

(To be developed)

1.3.4 *Repetition codes (C_4)*

The C_4 repetition codes are divided into two categories:

(a) for messages that are required to be repeated a finite number of times; and

(b) for messages that are required to be repeated at specified intervals until cancelled by the information provider

1.3.4.1 Category (a) repetition codes

01 transmit once on receipt
11 transmit on receipt followed by repeat 6 minutes later
61 transmit 1 hour after initial broadcast (twice)
62 transmit 2 hours after initial broadcast (twice)
63 transmit 3 hours after initial broadcast (twice)
64 transmit 4 hours after initial broadcast (twice)
66 transmit 12 hours after initial broadcast (twice)
67 transmit 24 hours after initial broadcast (twice)
70 transmit 12 hours after initial broadcast then 12 hours after the second broadcast (three times).
71 transmit 24 hours after initial broadcast then 24 hours after the second broadcast (three times).

Note: Other codes may be offered by CES operators.

1.3.4.2 Category (b) repetition codes

A category (b) repetition code allows a message to be repeated indefinitely or until cancelled by the message provider. The repetition period can be set at between 1 and 120 hours. In addition, each transmission can be echoed after a fixed period of 6 minutes.

The repetition codes are of the form:

Multiplier × Delay

where the multiplier specifies the number of delay periods between each broadcast and the delay is a fixed number of hours.

The multiplier digit may be any digit from 1 to 5 as follows:

Multiplier

1 1 specified delay period between broadcasts
2 2 specified delay periods between broadcasts
3 3 specified delay periods between broadcasts
4 4 specified delay periods between broadcasts
5 5 specified delay periods between broadcasts

The delay digit coding is as follows:

Delay

2 1 hour delay; no echo
3 1 hour delay; with echo
4 6 hour delay; no echo
5 6 hour delay; with echo
6 12 hour delay; no echo
7 12 hour delay; with echo
8 24 hour delay; no echo
9 24 hour delay; with echo

The various combinations are shown in the table below:

Delay	**Multiplier**					Echo
	1	**2**	**3**	**4**	**5**	
2	1	2	3	4	5	No
3	1	2	3	4	5	Yes
4	6	12	18	24	30	No
5	6	12	18	24	30	Yes
6	12	24	36	48	60	No
7	12	24	36	48	60	Yes
8	24	48	72	96	120	No
9	24	48	72	96	120	Yes

Examples:

1 Code 19 means "repeat broadcast every 24 hours with an echo 6 minutes after each broadcast".

2 Code 38 means "repeat broadcast every 72 hours with no echo".

1.3.4.3 Cancel facility

A cancellation facility is provided for messages transmitted to a CES with category (b) repetition codes. The-CANCEL instruction takes the form:

CANCEL [*message reference number*] AT [*date/time*]

where the message reference number is the number given to the message provider by the CES on receipt of the initial message and the date/time is in the form DDHHMMZ MoMoMo YY. For example:

CANCEL [*message reference number*] AT 211430UTC FEB 90

For example:

C_1:C_2:C_3:C_4:C_5
[*text*]
NNNN
CANCEL [*message reference number*] AT [*date/time group*]

Notes

1 Only the "text" is for transmission.

2 When included with a message for broadcasting, the CES message-cancellation instructions will appear after the NNNN There will be only one instruction to each line, but the facility to provide for more than one line of instructions is desirable.

3 If the cancellation instruction terminates after the message reference number – i.e. the [*date/time group*] is not included – then the instruction should be executed immediately.

4 It should also be possible for a CANCEL instruction to be sent to the CES's store-and-forward unit.

1.3.5 *Presentation codes (C_5)*

The presentation code is used to define the alphabet in which messages are transmitted and printed. For the International SafetyNET Service the presentation code will always be 00.

Annex 7
Receiver specifications

These technical requirements were prepared by Inmarsat for equipment manufacturers and have been extracted from "Vol. 3, Pt 2: Mobile Earth Station" of the *System Definition Manual (SDM) for the Inmarsat-C Communications System* (Release 2.0, Issue 1 (9/92)). **All the references in this annex are to the SDM unless otherwise stated**.

Enhanced group call (EGC) receive facilities will be used by SOLAS Convention ships as well as ships not required to comply with requirements in the SOLAS Convention, as amended. It should be noted that EGC receive facilities intended to meet 1974 SOLAS Convention requirements must comply with the IMO Performance Standards contained in annex 2 of the present publication.

Chapter 8: Technical Requirements for an Enhanced Group Call Receiver

1 Introduction

1.1 *Enhanced group calls*

Enhanced Group Calls are a message broadcast service within the Inmarsat-C Communications System. It allows terrestrial information providers to pass messages or data to mobile Enhanced Group Call (EGC) receivers, Class 2 or Class 3 MESs [mobile earth stations], or Inmarsat-A and Inmarsat-B MESs equipped with EGC receivers.

Enhanced Group Call messages are sent to Land Earth Stations (LES) by terrestrial based Information Providers using terrestrial facilities such as Telex. The messages are processed at the LESs, and forwarded to an NCS [network co-ordination station] which transmits them on an NCS common channel.

There are two basic services offered by EGC; the SafetyNET[SM] service and the FleetNET[SM] service. SafetyNET is a service provided primarily for the dissemination of maritime safety information (MSI), such as To-Mobile distress alerts, weather forecasts and coastal warnings. FleetNET is a commercial communication service allowing terrestrial information providers to send messages to pre-defined groups of subscribers.

Both the SafetyNET and FleetNET services make use of flexible addressing techniques to allow the reception of messages from a variety of service providers depending on the particular requirements of the user. The SafetyNET service usually utilizes a geographical area addressing technique to direct messages to MESs within a defined boundary. The FleetNET service employs closed user group and unique receiver addressing to provide secure transmission of messages from the terrestrial information provider to the desired service recipient(s).

1.2 *EGC receiver*

An EGC receiver is defined as a single-channel receiver with a dedicated message processor. Mobile earth stations of Classes 2 and 3 provide an EGC capability in addition to To-Mobile and From-Mobile messaging capabilities as indicated in Figure 8-1 and defined in Chapter 2, Section 2.1. Class 0 MESs are self-contained EGC receivers as shown in Figure 8-2.

1.3 *System definition documentation*

This chapter defines the mandatory requirements for reception and processing of EGC messages transmitted on an NCS common channel. Its purpose is to ensure that all EGC receivers provide adequate performance. Requests for changes to or a waiver of the requirements will be considered provided they can be justified as being consistent with the purpose of the document. Such requests should be forwarded to Inmarsat together with all substantiating details necessary to justify the request.

Designers of EGC receivers should familiarize themselves with the other chapters of this volume and with other appropriate system definition documentation (see Chapter 1).

1.4 *Type approval*

This document presents the technical requirements and recommendations for an EGC receiver. These requirements must be satisfied before the equipment can be utilized in the Inmarsat system. Procedures for type approval by Inmarsat of a manufacturer's design are provided in a complementary document entitled *"Type Approval Procedures for Inmarsat-C Mobile Earth Stations".*

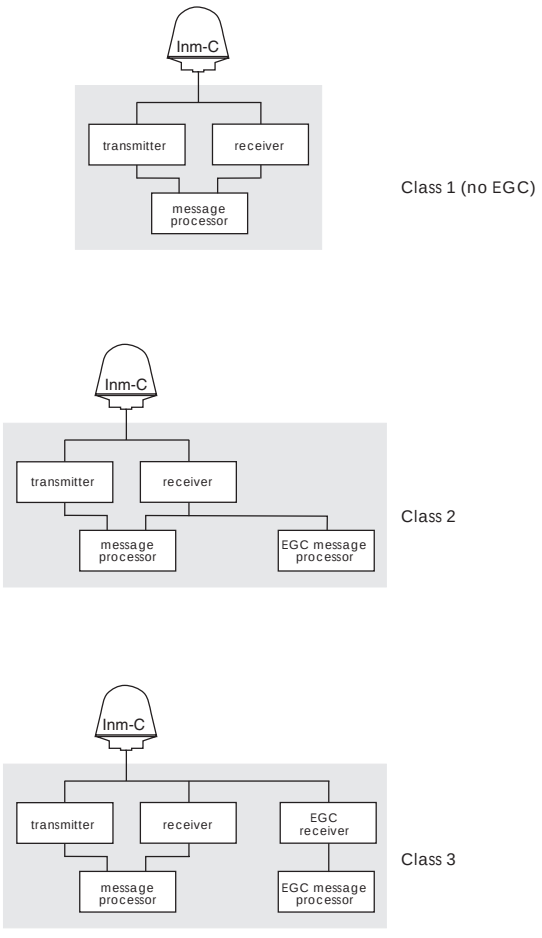
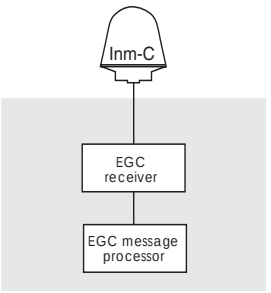
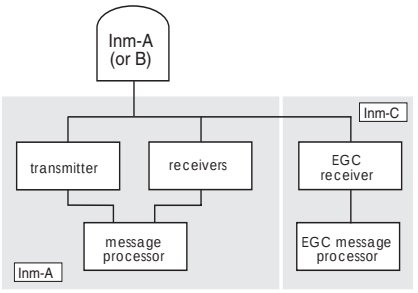


Figure 8-1 – Classes of mobile earth stations



Class 0 (Option 1: stand-alone EGC receiver)



Class 0 (Option 2: add-on to Inmarsat-A or B equipment)

Figure 8-2 – EGC receiver options

2 General requirements

2.1 *Mandatory capabilities*

The mandatory capabilities of an EGC receiver are:

(a) continuous reception of an NCS common channel and processing of the information according to the EGC message protocol;

(b) automatic recognition of messages directed to fixed and absolute geographical areas and service codes as selected by the receiver operator.

2.2 *Optional capabilities*

Additional optional capabilities required for reception of FleetNET service broadcasts are:

(a) automatic recognition of uniquely addressed messages directed to a particular EGC receiver;

(b) automatic recognition of messages directed to a group to which the receiver operator subscribes;

(c) automatic response to group ID updates directed to that EGC receiver, adding or deleting group IDs as commanded.

3 RF subsystem requirements

3.1 *General*

The antenna and receiver requirements of Chapter 2 are applicable to a standalone EGC receiver or an EGC receiver integrated with a Class 2 or Class 3 MES. The applicable sections are:

Section	Title
3.2	Antenna Requirements, Gain and Polarization
3.3.1	Gain-to-Noise Temperature Ratio
3.3.2	Received Signal Levels
3.3.3	Immunity to Out of Band Signals
3.3.4	Receiver Tuning

4 Receiver performance

The signal modulation and channel characteristics are identical to those presented in Chapter 2, Sections 4.1 and 4.2.

4.3 *Receiver selectivity*

As Chapter 2, Section 4.3.

4.4 *Demodulator performance*

As Chapter 2, Section 4.4.

4.5 *Output performance*

The continuous reception output performance shall be measured in terms of the packet error probability (PEP). This is defined as:

$$\text{PEP} = \frac{\text{total packets transmitted} - \text{total packets received correctly}}{\text{total packets transmitted}}$$

The limits for the maximum acceptable PEP for a range of equivalent unfaded power flux-densities (PFDs) at the antenna are as follows:

PFD (dBW/m^2)	PEP (128-byte packet)	PEP (48-byte packet)
–146.5	0.080	0.027
–146.0	0.040	0.014
–145.5	0.020	0.007
–145.0	0.012	0.004
–144.5	0.004	0.002

Note: The power flux-densities are assumed to be pure RHCP [right-hand circularly polarized] (0 dB axial ratio) at the antenna and correspond to the demodulator input C/Nos given in Volume 1, Chapter 3, Table 6 assuming a receiver system *G/T* of –23 dB/K and 5° satellite elevation.

5 Transmitter performance

The requirements relating to this section of Chapter 2 are not applicable to EGC receivers.

6 Access control requirements

The requirements relating to these sections of Chapter 2 are not applicable to EGC receivers with the exception of the following:

6.3 *NCS common channel selection*

6.3.1 *General*

EGC receivers shall be equipped with facilities for storing up to 20 NCS channel numbers. Four of these will be permanently assigned global beam frequencies as follows:

NCS	NCS Common Channel	
	Channel No.	Frequency
AOR (West)	11080	1537.70 MHz
AOR (East)	12580	1541.45 MHz
POR	12580	1541.45 MHz
IOR	10840	1537.10 MHz
Spare	11088	1537.72 MHz

These four Channel numbers shall be stored in ROM and shall not be alterable.

The spare Common channel will be transmitted in the event of interference on the nominated frequency.

The remaining list of up to 16 valid NCS common channel frequencies will be published by Inmarsat and will be assigned as expansion common channels. These shall be held in non-volatile but alterable storage and be capable of operator alteration in the event that Inmarsat decides to update the frequency plan by adding, deleting or changing allocations.

7 Message-processing requirements

The requirements of this section may be amended to comply with future recommendations of the IMO.

7.1 *General*

This Section describes the requirements and recommendations for the message-processing subsystem of the EGC receiver.

Message processing will be based on the header field described in Volume 4, Chapter 3 and in Part 1, Chapter 2, Section 9 in this volume.

For messages with a double header, the two packets must be regarded as a single message and shall be treated in exactly the same manner as the individual packets of single-header messages.

Messages shall not be printed until completely received, even in the case of multi-packet messages.

Acceptance or rejection of service code types shall be under operator control with the following exceptions:

(a) receivers shall always receive navigational warnings, meteorological warnings, search and rescue information and To-Mobile distress alerts which are directed to a geographical area within which the receiver is situated;

(b) unique and group identities shall not be operator-programmable.

Note: The NCS may multiplex the packets of different EGC messages on the Common Channel. Therefore it is possible for one or more messages to be interleaved and be addressed to a particular EGC receiver. It is recommended that EGC receivers be capable of receiving and processing at least four interleaved messages simultaneously.

7.2 *Character codes*

For the EGC service, the International Reference Version of International Alphabet 5 (IA5), as defined in CCITT Red Book Recommendation T.50, is used. Characters are coded as eight bits, using odd parity. Other character sets conforming to ISO 2022 or CCITT Red Book Recommendation T.61 are used optionally for certain services.

2 (ITA2) do not make use of national options for characters numbers 6, 7 and 8 in figure case to avoid varying interpretations in the international Inmarsat-C system (see CCITT Recommendation S.1, §4.2).

7.3 *Display devices*

7.3.1 *Message display*

It is recommended that the EGC receiver has a printer.

The display, or printer if fitted, shall be capable of presenting at least 40 characters per line of text. The EGC receiver should ensure that if a word cannot be accommodated in full on one line it shall be transferred to the next line.

Where a printer is fitted, a local audible alarm shall be sounded to give advanced warning of a printer ''paper-low'' condition. It shall not be possible to confuse the sound of the ''paper-low'' alarm with that of the distress alarm described in Section 5.6.

All SafetyNET messages shall be annotated with the time (UTC) and date of reception. This information shall be displayed or printed with the message. Note that UTC can be deduced from the frame count.

7.3.2 *Status display*

For receive-only EGC receivers, indication of EGC carrier frame synchronization (or loss of synchronization) is required as a minimum.

7.4 *Keyboard*

Where a keyboard is fitted, the requirements of Chapter 2 shall apply.

7.4.1 *Operator controls*

The following control functions and displays shall be provided as a minimum:

(a) selection of EGC carrier frequency (see Section 6.3);

(b) Means of inputting the following information:

  (i) mobile's position co-ordinates;

  (ii) current and planned IHO NAVAREAs of ship operation;

  (iii) current and planned NAVTEX service coverage areas of ship operation.

Receivers shall be fitted with operator controls to allow the operator to select desired geographical areas and message categories as described in Section 7.7. Details of the geographical areas and message categories which have been selected for reception by the operator shall be readily available.

7.5 *EGC receiver memory capacity requirements*

Both temporary and non-volatile memory is required in an EGC receiver for the following purposes:

(i) message buffering;

(ii) maintaining message identification records;

(iii) storing position co-ordinates and NAVAREA geographical area data;

(iv) storing group IDs; and

(v) storing expansion NCS common channel numbers.

7.5.1 *Message buffer*

A message buffer memory with a capacity of not less than 32,768 bytes shall be provided.

7.5.2 *Non-volatile memory*

EGC receivers shall use non-volatile memory for storing ENIDs [EGC receiver closed network identities] and expansion NCS common channel numbers. Provision for storing at least sixty-four 16-bit ENIDs and sixteen NCS common channel numbers in non-volatile memory shall be available.

Additionally, it is recommended that provision is made for non-volatile storage of position co-ordinates and NAVAREA geographical area data.

The non-volatile memory should be capable of retaining the stored data for a minimum of six months under the applicable environmental conditions and in the absence of applied primary power.

7.6 *The DTE–DCE interface*

The requirements relating to the DTE–DCE interface may not be applicable to receive-only EGC receivers.

7.7 *EGC receiver addressing*

The five basic methods of addressing EGC receivers are:

(i) all-mobiles call;

(ii) Inmarsat System Message Addressing;

(iii) group addressing;

(iv) unique addressing; and

(v) geographical area addressing.

The type of address used in the header of an EGC packet is uniquely determined by the service code field.

7.7.1 *EGC receiver unique identities*

The FleetNET service provides a means of transmitting messages to both individual and selected groups of EGC receivers. These receivers will be allocated unique 24-bit identities by Inmarsat.

Unique identities are required for the reception of EGC System Messages (service code 23) and for Download Group ID commands (service code 33).

For further information regarding the allocation of these IDs, refer to ''*Type Approval Procedures for Inmarsat-C Mobile Earth Stations*'' and ''*Commissioning Procedures for Inmarsat-C Mobile Earth Stations*''.

7.7.2 *EGC receiver closed network identities (ENIDs)*

FleetNET services such as Group calls are only available to receivers having 16-bit EGC closed network Identities (ENIDs). The facility for downloading and deleting the ENIDs, which are allocated by Inmarsat, over the satellite link is available as part of the FleetNET service using service code 33.

7.7.2.1 *Operator access*

The ENIDs stored shall only be accessible for downloading and deleting via the satellite path.

It shall be possible for the MES operator to inhibit (or activate as required), via the DTE, selected ENIDs previously downloaded.

Along with the ENID, the name of the service provider shall be stored. This name will be contained in the first 25 characters of the ''free'' field in the initial download command.

Following the initial download, the ENID and ''free'' field shall be printed and/or displayed.

In the event that a download command is received and the ENID storage area is full, then an ENID which has been inhibited (de-activated) by the MES operator shall be overwritten. If none has been inhibited then the new download shall not be accepted.

7.7.3 *Geographical area addressing*

Geographical area addressing refers to messages transmitted to MESs in a particular area. The area may be expressed in terms of a fixed, pre-defined area such as the NAVAREA, or NAVTEX service coverage area, or in terms of an absolute geographical address expressed as latitudinal and longitudinal co-ordinates on the surface of the earth.

An absolute geographical area address is a representation of a closed boundary on the surface of the earth given in the address field of the message header. The receiver shall recognize two forms of absolute geographical addressing: rectangular and circular. Each form is specified in terms of an absolute position in latitude and longitude and further parameters which completely specify the boundary.

In order to process a geographical area address, the receiver must be programmed with the MES's current position. The position may be entered automatically from an external navigation aid or entered manually. It is recommended that the receiver provide notification to the operator when the position has not been updated for four hours. If the MES's position has not been updated for more than 12 hours, or is unknown because the equipment has been powered off, all geographically addressed and SafetyNET messages with priorities higher than routine shall be displayed.

A geographical area address shall be considered valid for a particular MES if its current position falls inside, or on, the boundary specified by the geographical address. It is a mandatory requirement that the operator be able to select more than one area (minimum two areas), so that messages directed to other area(s) of interest can be provided – for example, the receiver can receive messages directed to an area lying on the expected course or itinerary of the ship or vehicle.

7.7.4 *Message sequencing*

All messages will be transmitted with a unique sequence number and the originating LES ID. Each subsequent transmission of the message will contain the original sequence number. This facility allows multiple printing of repeated messages to be inhibited.

When a message has been received error-free, and a permanent record made, the unique 16-bit sequence number, the LES identifier and the service code field associated with that message may be stored in memory and the information used to inhibit the printing of repeated transmissions of the same message.

If the printing of repeated messages is to be inhibited, the EGC receiver should be capable of internally storing at least 255 such message identifications. These message identifications should be stored with an indication of the number of hours that have elapsed since the message was received. Subsequent reception of the same message identification shall reset this timer. After between 60 and 72 hours, message identifications may be automatically erased. If the number of received message identifications exceeds the capacity of memory allocated for the store, the oldest message identification may be erased.

7.7.5 *Error detection*

The EGC message will employ three levels of error detection:

(i) an arithmetical checksum is used to detect packet errors;

(ii) an arithmetical checksum is used to detect header errors; and

(iii) parity checking is used to indicate character errors in the information field.

Only packets with header fields received without error shall be processed for local message recording (even if the packet itself contains an error). In the case of double-header messages, the message may be processed even if only one header has been received correctly. A parity check on all incoming characters shall be performed and, in the event of a parity error in a received character, the "low line" character (5/15 in T.50) shall be displayed and/or printed.

Outputs for multi-packet messages which have been received incomplete should provide a positive indication of the position of the missed packet(s). If further packets of an EGC message are expected but none is received after waiting for three frames, the EGC message should be assumed to be completed: this is to guard against the possibility of the last packet of an EGC message not being received. The MES should return to the idle state and indicate that one or more packets of the EGC message are missing.

Subsequent receptions of messages printed with mutilated characters shall be output again until received error-free.

7.7.6 *Distress priority messages*

Receipt of a valid distress or urgency priority message shall cause the receiver to give an audible alarm. Provision shall be made to extend this alarm to the position from which the ship is normally navigated, or other remote positions. It shall only be possible to reset this alarm manually.

8 Alerting functions

No alerting functions are available on EGC receive-only receivers.

9 Testing functions

It is recommended that all receivers should have some self-testing capability. Means should also be provided for demonstrating that the receiver is functioning correctly and alerting the operator in the event of a malfunction.

It is recommended that, in common with MESs, EGC receivers should utilize the received carrier bulletin-board error rate as a measure of link performance (see Chapter 2, Section 9.2).

10 Electromagnetic compatibility

The electromagnetic compatibility requirements of Chapter 2, Section 10 are mandatory for EGC receivers intended for use aboard vessels meeting the IMO GMDSS carriage requirements.

11 Environmental conditions

11.1 *Purpose*

The purpose of this section is to define the mandatory minimum environmental conditions for EGC receivers intended for use aboard vessels meeting the IMO GMDSS carriage requirements.

11.2 *Minimum environmental conditions for EGC receivers*

The following specification is mandatory for EGC receivers installed on vessels intending to meet the IMO GMDSS carriage requirements; it is recommended for all other EGC receivers.

Models of EGC receivers which are to be type-approved as suitable for maritime use within the Inmarsat system shall be designed so as to operate over the following range of environmental conditions:

EME – externally mounted equipment
IME – internally mounted equipment

(a) Ambient temperature: –35°C to +55°C (EME)
0°C to +45°C (IME);

(b) Relative humidity: up to 95% at +40°C;

(c) Spray: solid droplets from any direction (EME);

(d) Ice: up to 25 mm of ice (EME);

(e) Precipitation: up to 100 mm/h (EME);

(f) Wind: normal operation with relative average wind speeds up to 100 knots (EME);

(g) Solar radiation: maximum flux density 1,200 W/m^2
spectral composition:

Infrared	51%
Visible	44.5%
Ultraviolet	4.5%

(h) Prime power variations:

AC mains supply: frequency ± 6%
voltage ± 10%

DC mains supply: voltage +10%, –20%

Battery supply: voltage +35% (recharge),
–20% (discharge) of nominal;

(j) Vibration:

frequency range (Hz)	*level*
2–10	2.54 mm peak amplitude
10–100	1.0*g* peak acceleration

See figure 8-3, curve (A).

Note: g = 9.807 m/s^2

Acceptable alternative levels for internally mounted equipment only:

frequency range (Hz)	*level*
2–15.8	1.00 mm peak amplitude
15.8–100	1.0*g* peak acceleration

See figure 8-3, curve (B).

During type approval, certain tests that are required to be conducted under vibration conditions may be performed using pink noise vibration spectra instead of the sinusoidal swept frequency range specified above. Refer to "*Type Approval Procedures for Inmarsat-C Mobile Earth Stations*", which is available from Inmarsat.

Note: Consideration will be given to the relaxation of these conditions, if necessary, in respect of a printer if this is an integral part of the equipment (IME only). An example of acceptable minimum conditions with respect to printer operation is given below:

frequency range (Hz)	*level*
2–13.6	0.4 mm peak amplitude
13.6–50	0.3*g* peak acceleration

See figure 8-3, curve (C).

(k) Antenna inclinations: tilt in any direction up to 20° from horizontal for satellite elevations >5°;

(l) Induced acceleration: maximum tangential or linear acceleration of up to 1.2*g*;

(m) Velocity: maximum velocity up to 60 knots (110 km/h).

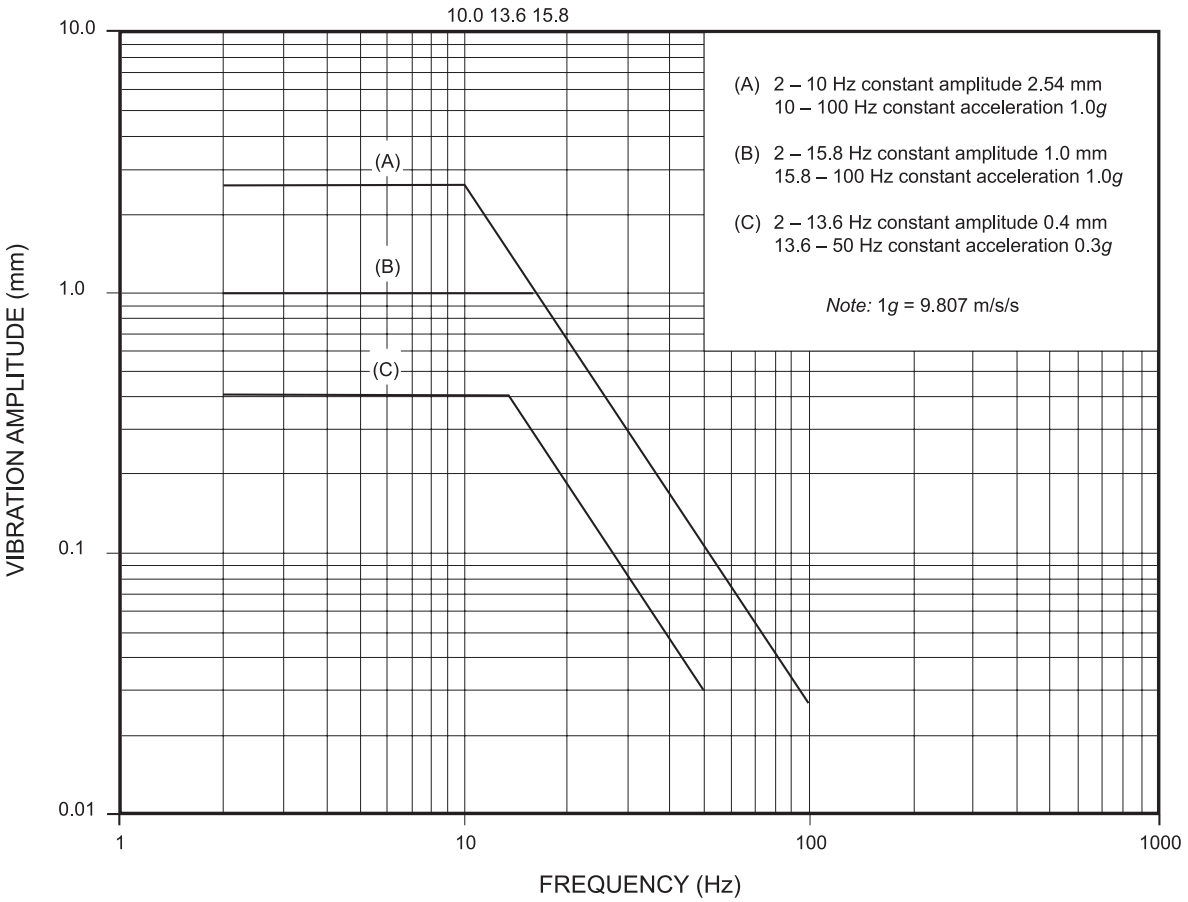


Figure 8-3 – Vibration test curves

12 Optional features

12.1 *Reception of SafetyNET or FleetNET service only*

Manufacturers may choose to produce EGC receivers capable of receiving either the SafetyNET service or the FleetNET service only.

12.1.1 *SafetyNET receivers*

SafetyNET-only receivers shall not be required to respond to uniquely addressed or group-addressed messages, and therefore will not be required to have facilities for the storage of unique or group identities (required capabilities: (a) and (b) of Section 2.1).

12.1.2 *FleetNET receivers*

FleetNET-only receivers shall not be required to respond to geographically addressed messages (required capabilities: (a) of Section 2.1 and (a), (b) and (c) of Section 2.2).

12.2 *EGC reception with Inmarsat-A or Inmarsat-B MESs*

An EGC receiver may be used with existing type-approved Inmarsat-A or Inmarsat-B MES equipment. In such cases the interconnection may be made at IF [intermediate frequency] so that the EGC receiver will not require an antenna and low-noise downconverter. The requirements of Section 3.1 will not apply.

The EGC receiver shall meet the technical requirements of Sections 4, 5, 6, 7, 8 and 9 of this document with a specific model or models of a type-approved Inmarsat-A or Inmarsat-B MES. The performance of the MES shall not be affected in any way by the provision for, or inclusion of, the EGC receiver option.

12.3 *Navigational interface*

In order that a receiver's position may be automatically updated for geographically addressed messages, receivers may be equipped with an interface to navigational instruments. A suggested standard interface is the NMEA 0183 Standard for Interfacing Electronic Marine Navigational Devices.

Annex 8
IMO requirements for the availability of the EGC receive facility

1 At the 34th Session of the Sub-Committee on Radiocommunications, IMO decided that "the EGC receiver should normally be available for reception of maritime safety information for at least 98% of the time. This will permit the use of Inmarsat-C Class 2 equipment. Where 98% availability cannot be achieved because the equipment is expected to be used for other purposes, the Sub-Committee recommends that Administrations should consider requiring the carriage of a second EGC receive facility."

2 In reaching this conclusion, the Organization had regard to the estimated availability of different types of EGC receive facilities as summarized in the following table:

Equipment	Inmarsat-C traffic/day (either direction)	Availability of EGC receiver
Inmarsat-C Class 2 (switchable Inmarsat-C/EGC operation)	1 call 5 calls 10 calls	99.87% 99.36% 98.73%
Inmarsat-C Class 3 dedicated integral EGC receiver	any	100%
Inmarsat-C and EGC Rx (separate)	any	100%

3 These availability estimates have been taken into account when deciding the need to repeat broadcasts of "vital" messages

Annex 9
Authorization and registration of information providers

Two distinct and separate processes must be completed before an information provider will be granted access to the SafetyNET broadcast service. They have been established to protect the integrity of the SafetyNET information service and clearly establish a qualification to the special SafetyNET tariff. They are:

1 Authorization

1.1 Authorization is carried out by IMO and Inmarsat in consultation with IHO and WMO as appropriate.

1.2 In order to obtain authorization to broadcast information through the International SafetyNET Service, an information provider must apply to the relevant international organization for approval to participate in the internationally co-ordinated service:

Meteorological authorities – to WMO;
Hydrographic authorities – to IHO;
Search and rescue authorities – to IMO;
The International Ice Patrol – to IMO;
Others – to IMO

2 In considering such applications, the relevant international organizations will take into account:

.1 the present and expected availability of other information sources for the area concerned;

.2 the need to minimize duplication of information as much as possible.

3 The relevant international organization will inform IMO and Inmarsat of approved applications.

4 Certification

4.1 On receipt of such authorization, the International SafetyNET Broadcast Co-ordinating Panel will issue a Certificate of Authorization to Participate in the International SafetyNET Service directly to the information provider with a copy to IHO or WMO or IMO, as well as to Inmarsat-C coast earth station (CES) operators. A specimen Certificate of Authorization is shown at the end of this annex.

4.2 Inmarsat will maintain the master list of all registered information providers and circulate the list to IMO, IHO, WMO and all Inmarsat-C CES operators.

5 Registration

5.1 After receiving a Certificate of Authorization, an information provider may conclude an agreement with any Inmarsat-C CES operator(s) to obtain access to the system.

5.2 This will involve, in addition to the contractual aspects, registration of the information provider's identity which must be programmed into the CES control equipment.

5.3 CES operators will only register information providers who have received a Certificate of Authorization.

Sample Certificate

IMO **Inmarsat**

4 Albert Embankment, London SE1 7SR
United Kingdom

99 City Road, London EC1Y 1AX
United Kingdom

TO: **Director-General**
Meteorological Office
London Road
Bracknell, Berkshire
RG12 2SZ
United Kingdom

Date: 9 March 1992

Certificate of Authorization to Participate as an Information Provider in the International SafetyNET℠ Service

This is to certify that the **METEOROLOGICAL OFFICE** is authorized to provide meteorological information for broadcast in the International SafetyNET℠ Service in accordance with annex 4 of the *International SafetyNET Manual*.

A. C. FULLER
Chairman
International SafetyNET Co-ordinating Panel

Certificate No. 14

[MSO/0586]

International Maritime Organization
(IMO)

Telephone:
National (071) 735 7611
International +44 71 735 7611
Facsimile +44 71 587 3210
Telex 23588 IMOLDN G

International Maritime Satellite Organization
(Inmarsat)

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Facsimile +44 71 728 1044
Telex 297201 INMSAT G

Annex 5

Circular GMDSS/Circ.8 as amended by GMDSS/Circ.8/Corr.2

Ref. T2/6.04

MASTER PLAN OF SHORE-BASED FACILITIES FOR THE GLOBAL MARITIME DISTRESS AND SAFETY SYSTEM (GMDSS MASTER PLAN)

Introduction

1 This circular(*) supersedes GMDSS/Circ.7 and contains the latest information (February 1999) based on replies received from Member Governments in response to the most up-to-date questionnaires (MSC/Circ.468/Rev.2, COM/Circ.126 and MSC/Circ.641), which were revised by the sixty-fifth session of the Maritime Safety Committee (9 to 17 May 1995) and incorporated into the questionnaire (MSC/Circ.684) set out at annex 14.

2 Regulation 5, chapter IV of the amendments to the 1974 SOLAS Convention adopted in 1988 for the purpose of introducing the Global Maritime Distress and Safety System (GMDSS) therein, requires each Contracting Government to make available, as it deems practical and necessary, either individually or in co-operation with other Contracting Governments, appropriate shore-based facilities for space and terrestrial radiocommunication services having due regard to the recommendations of the Organization. These services are:

.1 a radiocommunication service utilizing geostationary satellites in the Maritime Mobile-Satellite Service;

.2 a radiocommunication service utilizing polar orbiting satellites in the Mobile-Satellite Service;

.3 the Maritime Mobile Service in the bands between 156 MHz and 174 MHz;

.4 the Maritime Mobile Service in the bands between 4,000 kHz and 27,500 kHz; and

.5 the Maritime Mobile Service in the bands between 415 MHz and 535 kHz and between 1,605 kHz and 4,000 kHz.

Regulation 5 also provides that:

> "Each Contracting Government undertakes to provide the Organization with pertinent information concerning the shore-based facilities in the Maritime Mobile Service, Mobile-Satellite Service and Maritime Mobile-Satellite Service, established for sea areas which it has designated off its coasts."

3 This circular includes all corrections made to GMDSS/Circ.7 by Member Governments and information provided by ITU, WMO, Inmarsat, COSPAS-SARSAT, the NAVTEX Co-ordinating Panel and the International SafetyNET Co-ordinating Panel.

4 Governments are invited to check the information contained in this circular and inform the Secretariat of any desired amendments thereto so that they can be included in the next edition of the Master Plan.

(*) For reasons of economy, to ease the IMO Printing Section's workload and facilitate its use, this circular, which is updated at frequent intervals, is issued in loose-leaf format.

5 Governments, who have not yet responded to the questionnaire, given in annex 14, are invited to do so as soon as possible.

6 Any amendments, responses to the questionnaire and relevant inquiries should be forwarded to:

International Maritime Organization
4 Albert Embankment
London SE1 7SR
United Kingdom

Tel: +44-171-735-7611
Fax: +44-171-587-3210

7 Member Governments, ITU, ICAO, WMO, IHO, Inmarsat and the COSPAS-SARSAT Partners are requested to bring this circular, and the information annexed hereto, to the attention of maritime, aviation, telecommunication, hydrographic and meteorological authorities, SAR authorities, Maritime Rescue Co-ordination Centres (MRCCs), Aeronautical Rescue Co-ordination Centres (ARCCs), Coast Earth Stations (CESs), Coast Stations (CSs), COSPAS-SARSAT Mission Control Centres (MCCs), hydrographers, shipowners, training institutions and seafarers.

LIST OF ANNEXES

ANNEX 1 - STATUS OF SHORE-BASED FACILITIES FOR THE GMDSS

ANNEX 2 - LIST OF VHF DSC COAST STATIONS FOR SEA AREAS A1

ANNEX 3 - LIST OF MF DSC COAST STATIONS FOR SEA AREAS A2

ANNEX 4 - LIST OF HF DSC COAST STATIONS FOR SEA AREAS A3 AND A4

ANNEX 5 - LIST OF INMARSAT COAST EARTH STATIONS

ANNEX 6 - LIST OF RESCUE CO-ORDINATION CENTRES USING SHIP EARTH STATIONS

ANNEX 7 - NAVTEX SERVICE

ANNEX 8 - THE INTERNATIONAL SAFETYNET SERVICE

ANNEX 9 - HF NBDP MARITIME SAFETY INFORMATION BROADCAST SERVICE

ANNEX 10 - LIST OF COSPAS-SARSAT MISSION CONTROL CENTRES AND LOCAL USER TERMINALS

ANNEX 11 - MAPS OF SHORE-BASED FACILITIES FOR THE GMDSS

ANNEX 12 - SATELLITE EPIRB REGISTRATION INFORMATION

ANNEX 13 - LIST OF 24-HOUR POINTS OF CONTACT FOR MMSI SHIP'S IDENTIFICATION

ANNEX 14 - QUESTIONNAIRE ON SHORE-BASED FACILITIES FOR THE GMDSS (MSC/Circ.684)

DEFINITIONS AND ABBREVIATIONS USED IN THE GMDSS MASTER PLAN

DEFINITIONS

NAV/MET Area *means* **a geographical sea area, as shown in the appendix**, for the purpose of co-ordinating the transmission of radio navigational warnings (NAVAREA) and meteorological information (METAREA).

Monitor stations *include* **remote-controlled stations**.

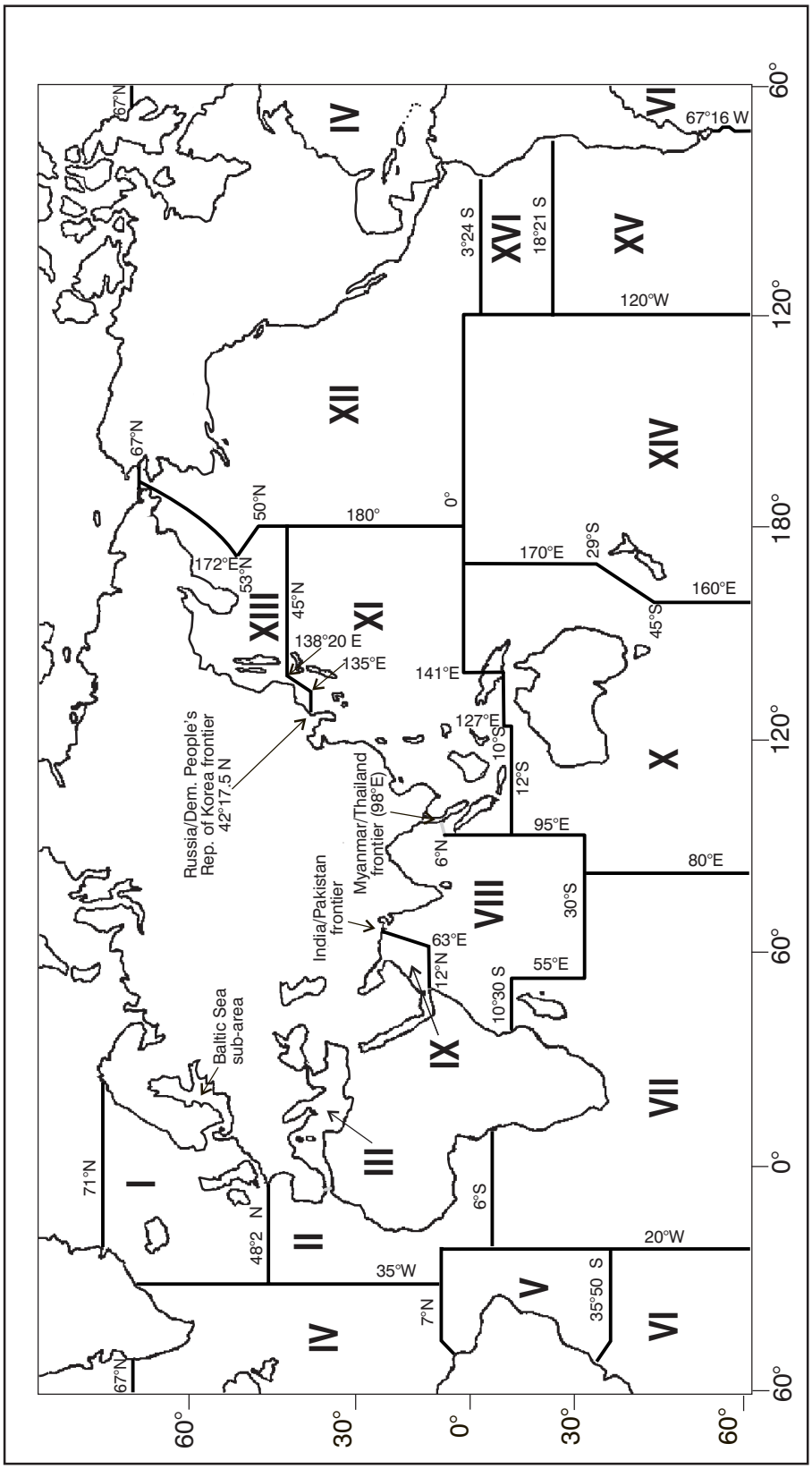
ABBREVIATIONS

AOR-E	-	Atlantic Ocean Region-East
AOR-W	-	Atlantic Ocean Region-West
ARCC	-	Aeronautical Rescue Co-ordination Centre
CES	-	Coast Earth Station
DSC	-	Digital Selective Calling
HF	-	High Frequency
IOR	-	Indian Ocean Region
LUT	-	COSPAS-SARSAT Local User Terminal
MCC	-	COSPAS-SARSAT Mission Control Centre
MF	-	Medium Frequency
MRCC	-	Maritime Rescue Co-ordination Centre
MRSC	-	Maritime Rescue Sub-Centre
NBDP	-	Narrow-band direct printing
NCS	-	Network Co-ordinating Station
N.I.	-	No Information
NM	-	Nautical Mile(s)
POR	-	Pacific Ocean Region
RCC	-	Rescue Co-ordination Centre
RX	-	Receiver
TBD	-	To be decided
TX	-	Transmitter
UTC	-	Co-ordinated Universal Time

Date of operation indicated by shaded appearance (i.e. Planned [1.2.1998]) means that the date has already passed but its operation has not been confirmed yet.

APPENDIX

GEOGRAPHICAL AREAS FOR CO-ORDINATING AND PROMULGATING RADIO-NAVIGATIONAL WARNINGS



The delimitation of these NAVAREAs is not related to and shall not prejudice the delimitation of any boundaries between States

O: Operational
T: Under trial
P: Planned or to be decided

ANNEX 1

STATUS OF SHORE-BASED FACILITIES FOR THE GMDSS

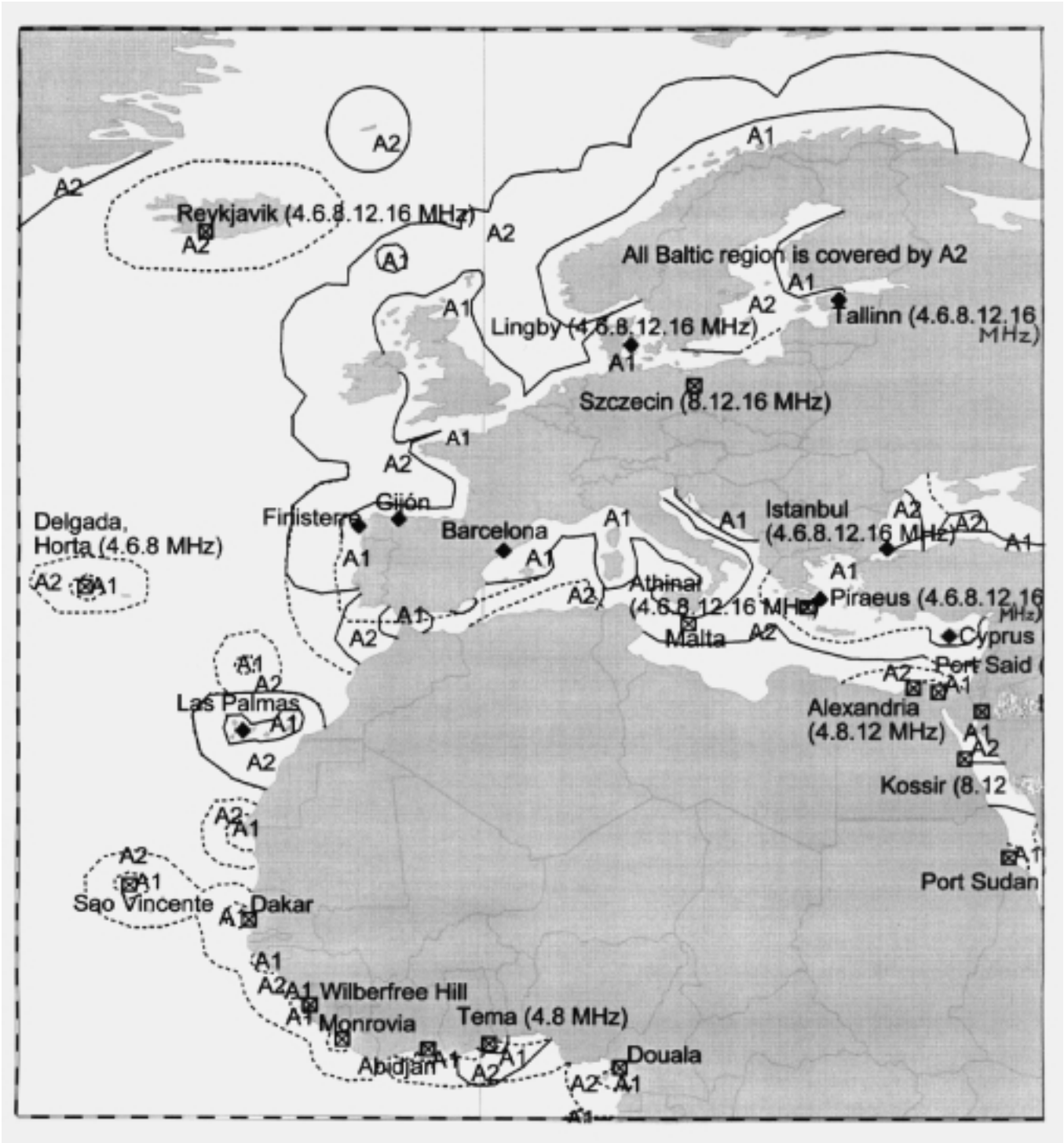
COUNTRY	COAST STATIONS							SES for RCC	MSI BROADCAST SERVICE					COSPAS-SARSAT	
	DSC[1]			INMARSAT CES[2]					NAVTEX[3]	SafetyNET[4]			HF NBDP	MCC	LUT[5]
	A1	A2	A3&4	A	B	C	E			NAV	MET	SAR			
Algeria														O	O
Angola	P	P	P												
Argentina	O	O	O						O	O	O	O	O		
Australia		O	O	O	O	O	O	O		O	O	O		O	O
Bahrain									O						
Belgium	O	O							O & T						
Benin	P	P													
Bermuda (United Kingdom)	O	O						O	O						
Brazil	P			O		O			P	O	O	O		O	O
Bulgaria	P	O						P	O						
Cameroon	P	P							P						
Canada	P	P	P		O				O					O	O
Cape Verde	P	P	P						P			O			
Chile	O & P	O & P	O						O	O	O	O		O	O
China	P	P	P	O	T	O		O	O		O			O	O
Comoros	P	P													
Congo	P	P	P												
Côte D'ivoire	P	P	P												
Croatia	O							P	O						
Cuba															
Cyprus	O	O	O						O						
Democratic Republic of the Congo	P	P													
Denmark	O	O	O			O									

COUNTRY	COAST STATIONS							SES for RCC	MSI BROADCAST SERVICE					COSPAS-SARSAT	
	DSC[1]			INMARSAT CES[2]					NAVTEX[3]	SafetyNET[4]			HF NBDP	MCC	LUT[5]
	A1	A2	A3&4	A	B	C	E			NAV	MET	SAR			
Djibouti	P	P													
Ecuador	O														
Egypt	P	P	P	O				O	O & P				P		
Equatorial Guinea	P														
Estonia	O	O						P	O						
Fiji		O	O												
Finland	O	O						P							
France	O	O		O	O	O			O	O	O	O		O	O
Gambia	P														
Germany	O			O	O	O	O	O				P			
Ghana	O	P	P												
Greece	O&P	O & P	O & P	O	O	O		O	O		O	O	P	P	P
Greenland (Denmark)		O							P						
Guam (United States)	P	P													
Guinea	P	P													
Guinea Bissau	P	P													
Iceland		O	P						O						
India			P	O	O	O			O	T	O	P		O	O
Indonesia	P	P	P		O				O			O	P	O	O
Iran	O			O		O			P				O		
Ireland		O						P	P						
Israel								P	T						
Italy	P	P	P	O	O	O		P	P					O	O
Jamaica	P	P						P							
Japan	P	O	O	O	O	O		P	O	O	O	O		O	O
Jordan	P	P	P												
Kenya	P	P													
Latvia	O	O						O							

COUNTRY	COAST STATIONS							SES for RCC	MSI BROADCAST SERVICE					COSPAS-SARSAT	
	DSC[1]			INMARSAT CES[2]					NAVTEX[3]	SafetyNET[4]			HF NBDP	MCC	LUT[5]
	A1	A2	A3&4	A	B	C	E			NAV	MET	SAR			
Liberia	P	P	P												
Madagascar	P	P													
Malaysia	P	P		O	O				O			O			
Malta	P	P	P						O						
Mauritania	P	P							P						
Mauritius	O	O	P						O						
Mexico	P	O & P	P						P						
Morocco									P						
Mozambique	P	P	P												
Myanmar	P	P	P												
Namibia									O						
Netherlands	O	O		O	O	O		P	O			P			
New Zealand			P							O	O	O		O	O
Norway	O	O		O	O	O		O	O			O		O	O
Oman	P	P	P						O						
Pakistan	P								T	O	P	P		P	O
Peru	P	P	P						O & T	O		O		O	O
Philippines	P	P	P					P	P						
Poland	O	O & P	P	O											
Portugal	P	P	P			O		P	O						
Republic of Korea	O & P	O & P	O & P	O		O			O					O	O
Romania	O	O													
Russian Federation	O&P	O&P		O					O & P	P	O			O	O
Sao Tome and Principe	P														
Saudi Arabia	P	P	P	O					O					P	P
Senegal	P	P	P												
Seychelles	P	P	P												
Sierra Leone	P	P	P												

COUNTRY	COAST STATIONS							SES for RCC	MSI BROADCAST SERVICE					COSPAS-SARSAT	
	DSC[1]			INMARSAT CES[2]					NAVTEX[3]	SafetyNET[4]			HF NBDP	MCC	LUT[5]
	A1	A2	A3&4	A	B	C	E			NAV	MET	SAR			
Singapore	O	O		O	O	O			O	O	O	O		O	O
Slovenia	O														
South Africa			O			O			O	O	O	O		P	P
Spain	P	O	O						O &T	O			O	O	O
Sudan	P	P	P												
Sweden	O	O						O	O						
Tanzania	P	P	P												
Thailand	P	P	P		O	O		P	O					P	P
Togo	P														
Tonga												P			
Turkey	O	O & P	O	O		O		P	O						
Ukraine	O			O					O						
United Arab Emirates	P	P	P		O										
United Kingdom	O	O		O	O	O	O	O	O	O	O	O		O	O
United States	P	O & P	O & P	O	O	O	O		O&P	O	O	O	O	O	O
Uruguay	P	P	P												
Venezuela	P	P							P				P		
Vietnam	P	O&P	O&P						P						
Associate Member of IMO Hong Kong, China	O	O	O	O	O			O	O	O	O	O		O	O

(1) See Figure 1-1 for approximate locations of operational and planned Sea Areas A1, A2 and the DSC HF coast stations.
(2) See Figure 1-2 for locations of Inmarsat CESs.
(3) See Figure 1-3 for approximate locations of operational and planned NAVTEX stations.
(4) See Figure 1-4 for status of the International SafetyNET Services.
(5) See Figure 1-5 for satellite visibility area of existing LUTs.
(6) Operated by Australia.



	Operational (trial) Sea Area (A1&A2)	◆	Operational (trial) HF DSC station
….	Planned Sea Area (A1&A2)	⊠	Planned HF DSC station

Figure 1-1-1 Approximate locations of operational and planned Sea Areas A1, A2 and the HF DSC coast stations (Europe and Africa)

INDICATIVE ONLY AND NOT TO BE USED FOR NAVIGATIONAL PURPOSE

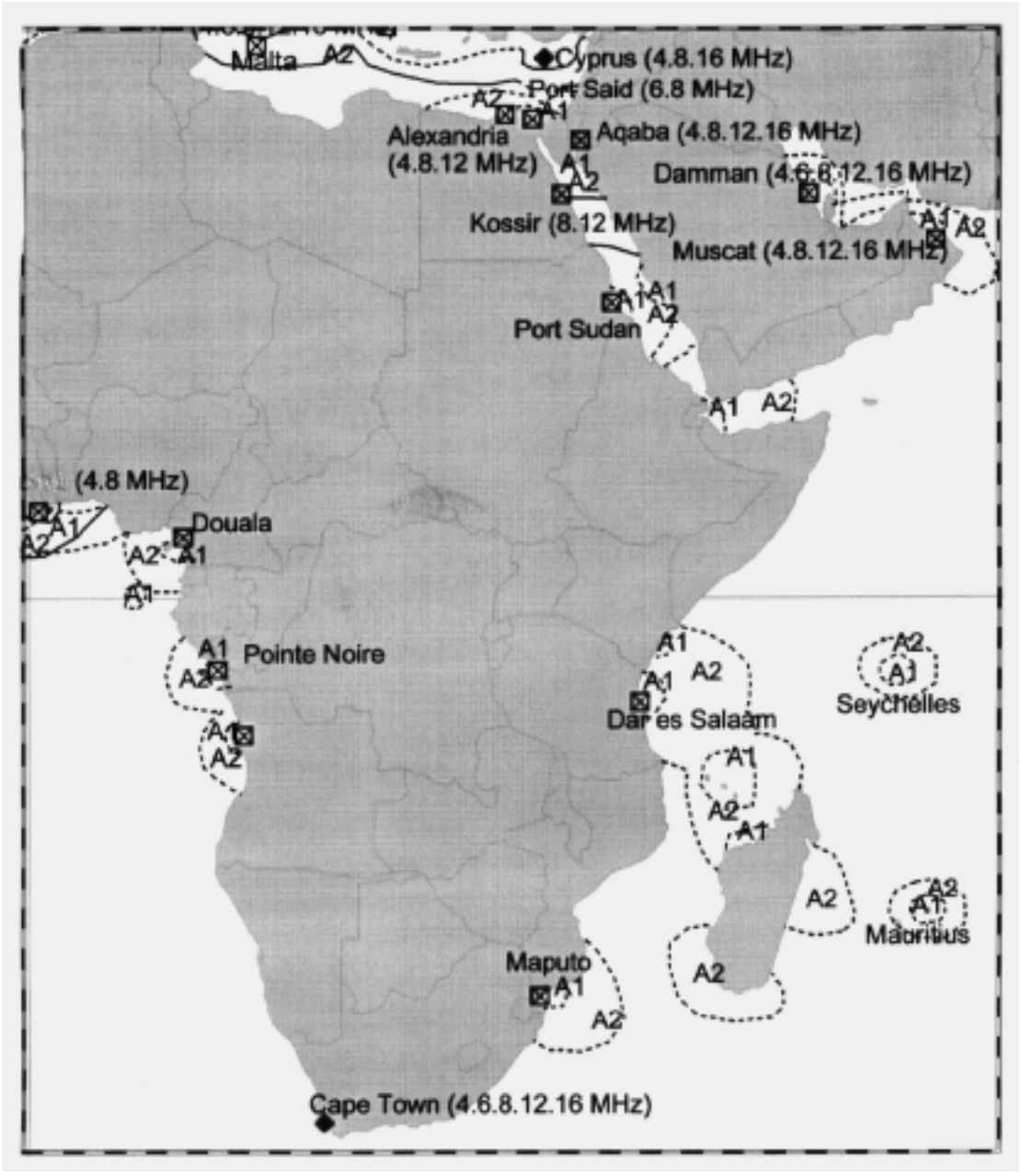
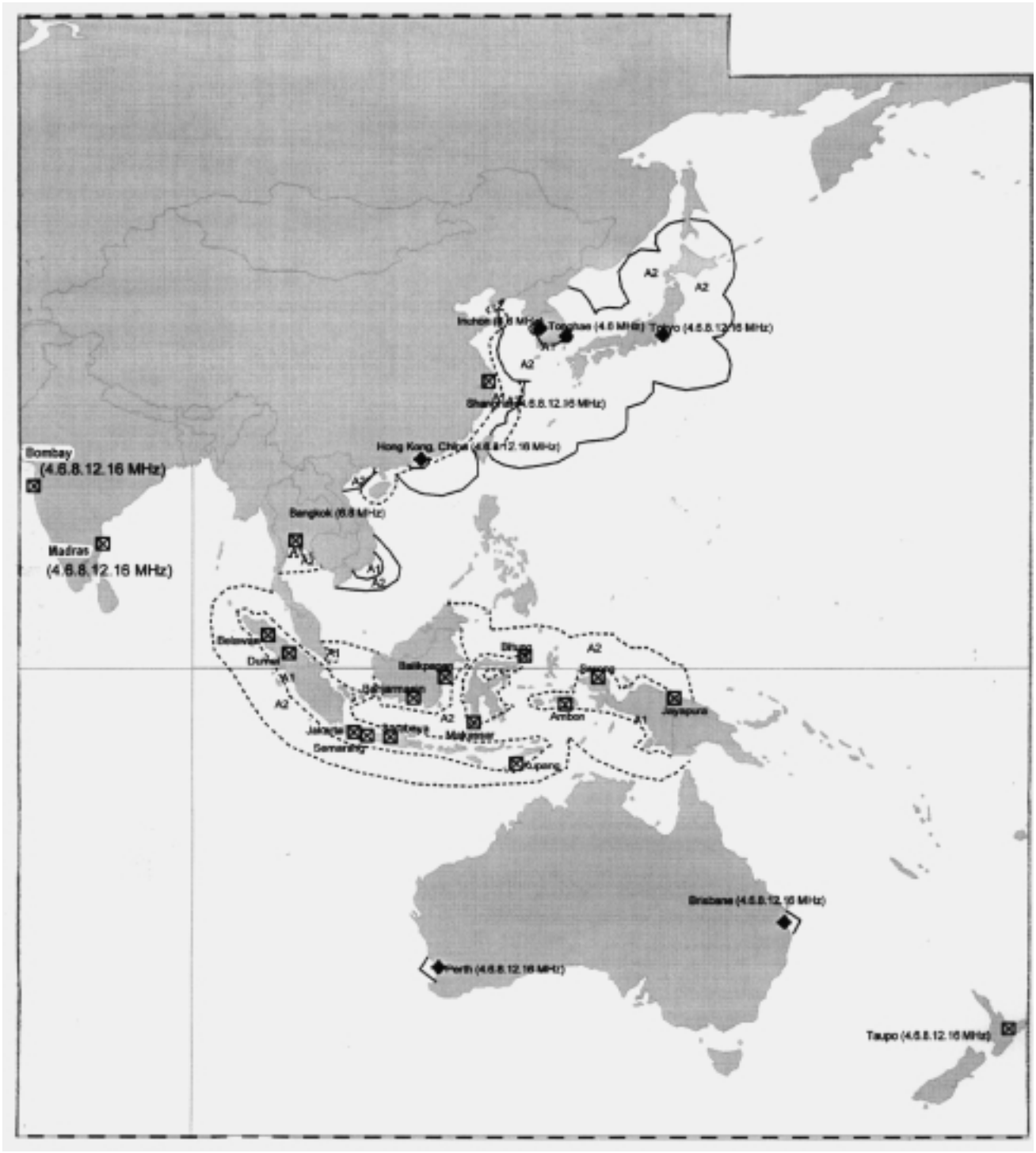


Figure 1-1-2 Approximate locations of operational and planned Sea Areas A1, A2 and the HF DSC coast stations (Africa and West Asia)

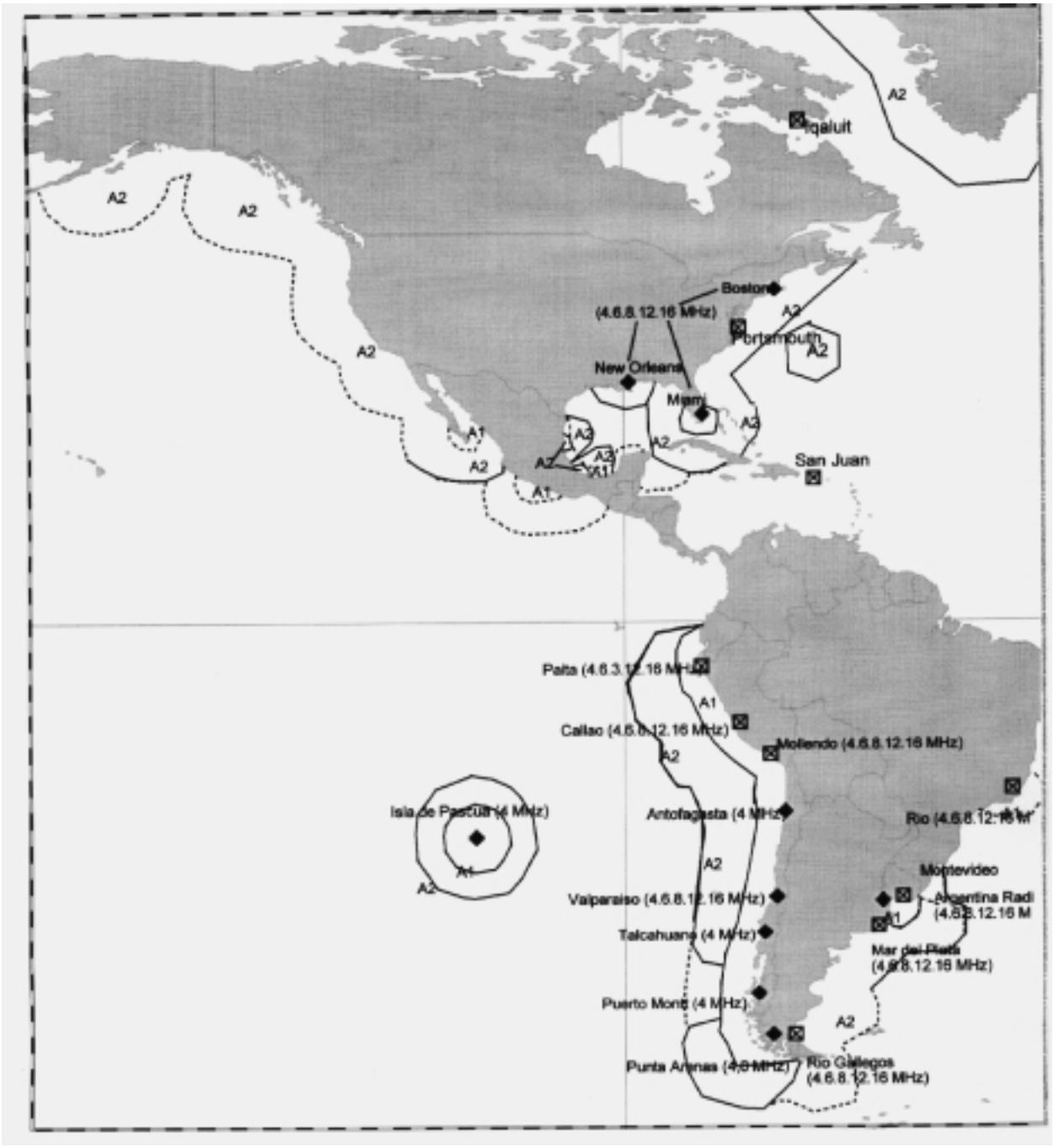
INDICATIVE ONLY AND NOT TO BE USED FOR NAVIGATIONAL PURPOSE



	Operational (trial) Sea Area (A1&A2)	◆	Operational (trial) HF DSC station
....	Planned Sea Area (A1&A2)	⊠	Planned HF DSC station

Figure 1-1-3 Approximate locations of operational and planned Sea Areas A1, A2 and the HF DSC coast stations (East Asia and Oceania)

INDICATIVE ONLY AND NOT TO BE USED FOR NAVIGATIONAL PURPOSE



	Operational (trial) Sea Area (A1&A2)	◆	Operational (trial) HF DSC station
….	Planned Sea Area (A1&A2)	⊠	Planned HF DSC station

Figure 1-1-4 Approximate locations of operational and planned Sea Areas A1, A2 and the HF DSC coast stations (North and South America)

INDICATIVE ONLY AND NOT TO BE USED FOR NAVIGATIONAL PURPOSE

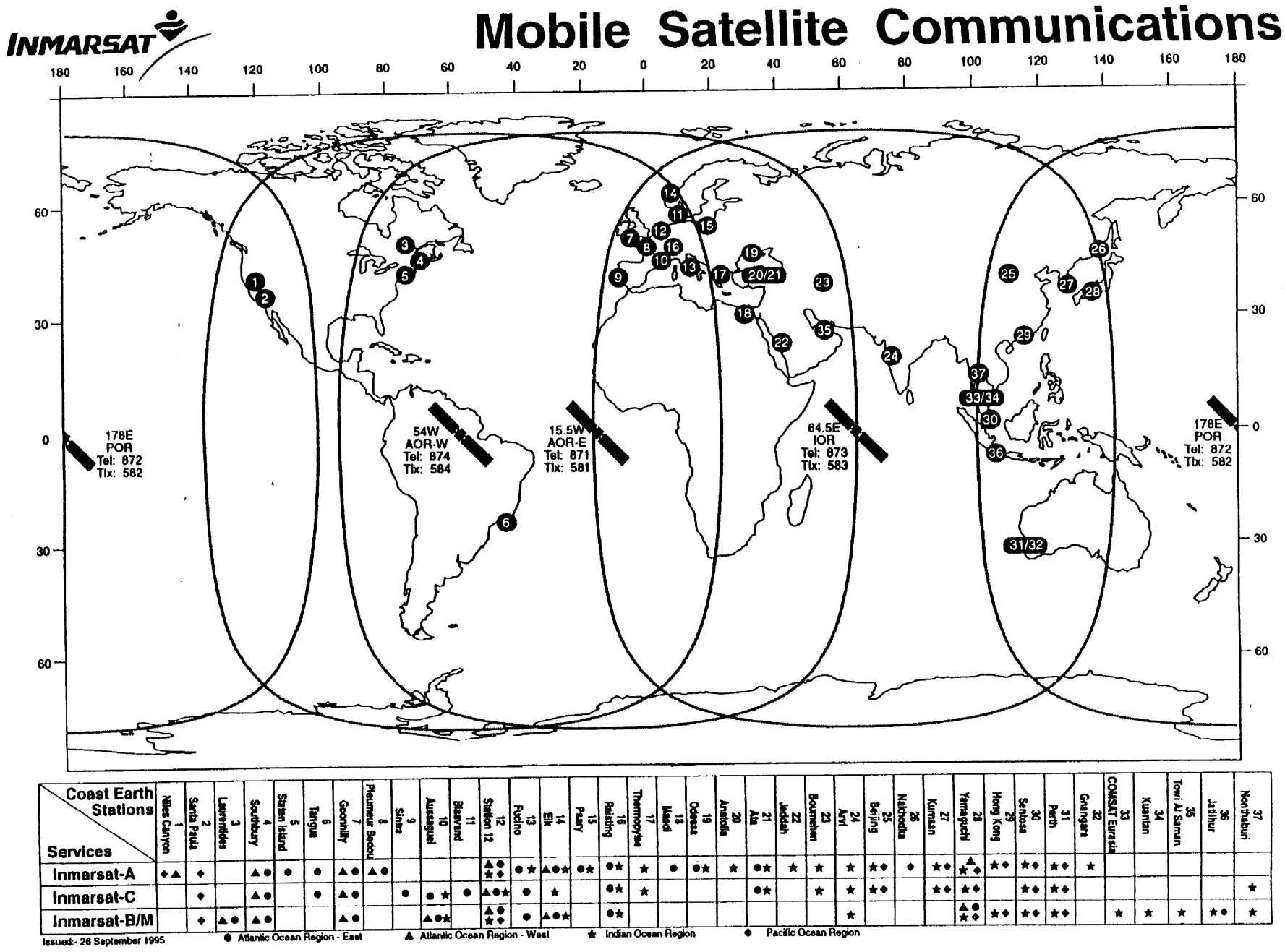


Figure 1-2-1 Locations of INMARSAT Coast Earth Stations (Courtesy INMARSAT)

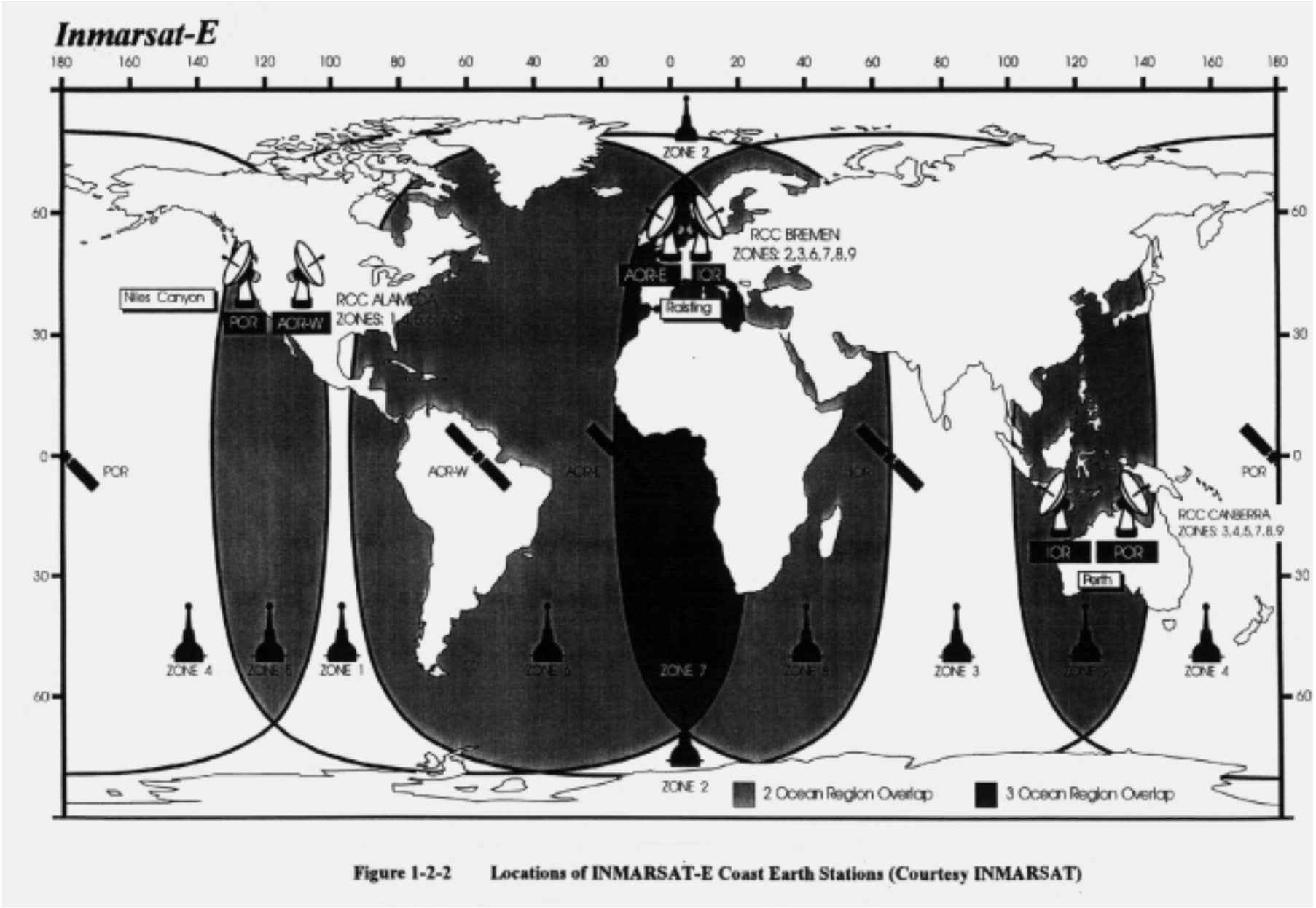


Figure 1-2-2 Locations of INMARSAT-E Coast Earth Stations (Courtesy INMARSAT)

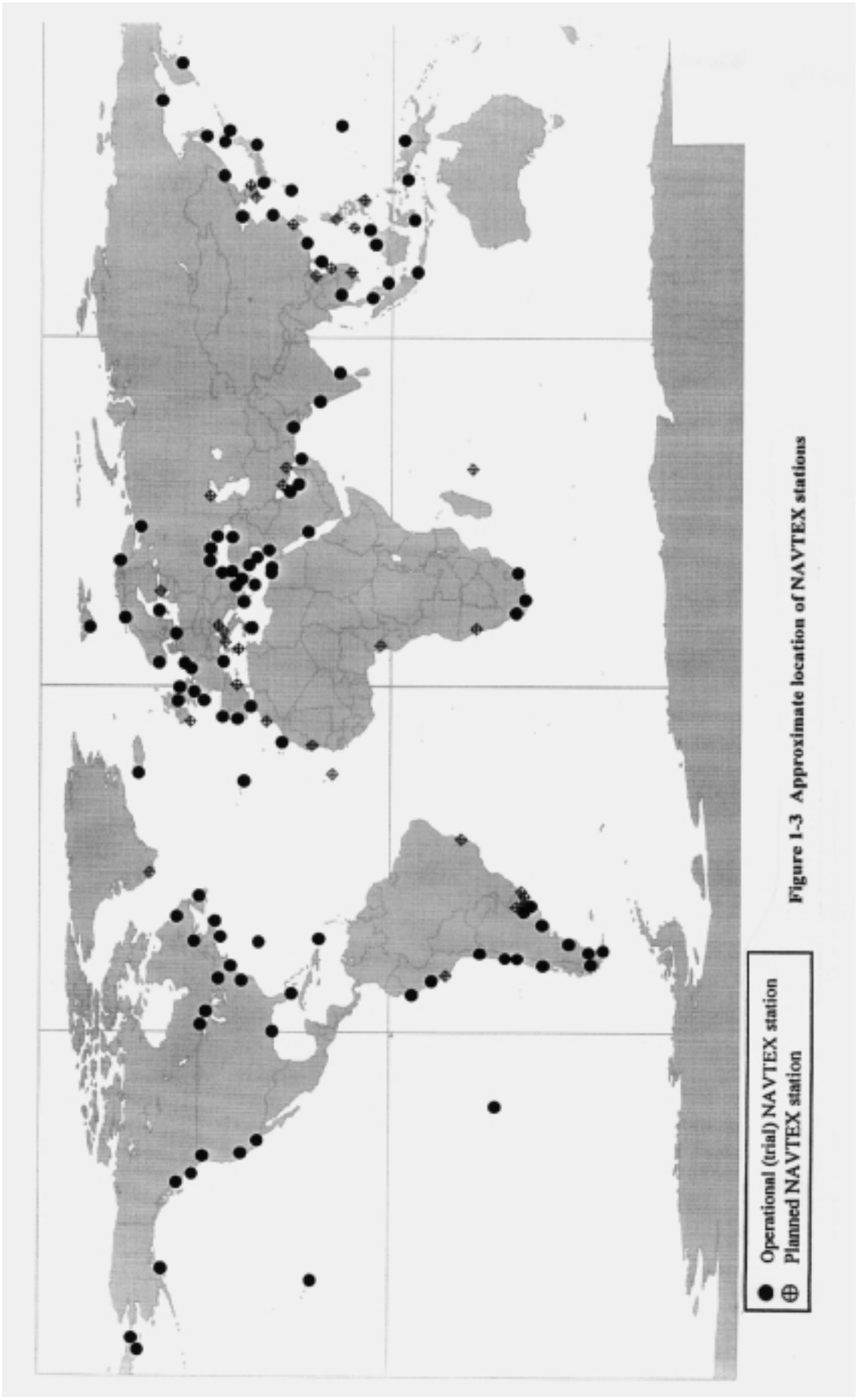


Figure 1-3 Approximate location of NAVTEX stations

Figure 1-4 Status of the International SafetyNET Services

NAV/MET Area	NAVAREA Warnings	METAREA Information	SAR Alerts	Ocean region for scheduled broadcasts[1]
I	●	●	●	AOR-E
II	●	●	●	AOR-E
III	●	●	●	AOR-E/IOR(MET)
IV	●	●	●	AOR-W
V	●	●	●	AOR-E
VI	●	●	●	AOR-W
VII	●	●	●	AOR-E + IOR
VIII	●	●[2]	●	IOR
IX	●	●	●	IOR
X	●	●	●	IOR + POR
XI	●	●	●	IOR + POR
XII	●	●	●	POR + AOR-W
XIII	✷	✷[3]		POR
XIV	●	●	●	POR
XV	●	●	●	AOR-W
XVI	●	●	●	AOR-W

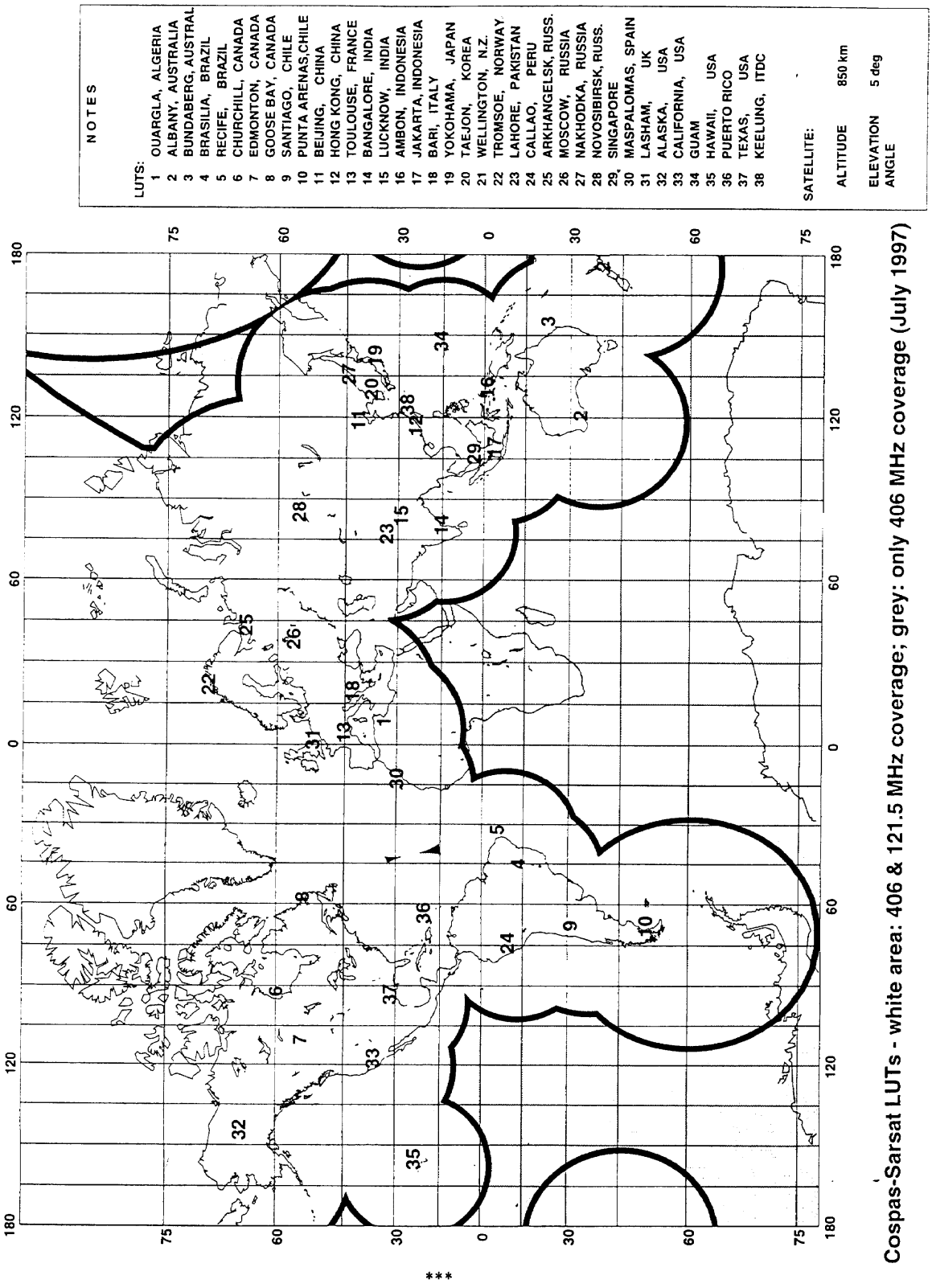
● = Full service available
✷ = Interim Operation

([1]) IMO has decided that routine broadcasts of navigational warnings and meteorological forecasts will be made at scheduled times over a single nominated satellite for each NAVAREA/METAREA. Unscheduled broadcasts of SAR Alert Relays and severe weather warnings will be made over all satellites which serve the area concerned. See Inmarsat Maritime Communications Handbook (Issue 2) for further guidance.

([2]) India provides meteorogical forecasts and warnings for METAREA VIII north of the equator through LES Arvi(IOR). Mauritius/La Reunion provide meteorogical forcasts and warnings for METAREA VIII south of the equator through LES Burum(IOR).

([3]) South of 60 degrees North, full service provided by Japan.

Figure 1-5 Satellite Visibility Area of Cospas-Sarsat LUTs



***

C = Public correspondence
SD = Safety and Distress
PS = Public correspondence & Safety and Distress
"Monitor" stations include remote-controlled stations.

ANNEX 2
LIST OF VHF DSC COAST STATIONS FOR SEA AREAS A1

NAV/MET Area	Country	VHF DSC Coast Station								RCC Associated
		Type	Name	MMSI	Position	Range (NM)	Status of implementation [Date of Operation]	Purpose (PC/SD/PS)	Watch hours on CH70	
I	Belgium	Main	Antwerpen Radio	002050485	51 13N 04 23E	25	Operational	PS	24 hrs	Oostende
		Main	Oostende Radio	002050480	51 11N 02 48E	25				
	Denmark	Main	Lyngby Radio	002191000	-	-	Operational	PS	24 hrs	SOK, Aarhus
		Monitor	Kobenhavn		55 41N 12 36E	29				
			Vejby		56 04N 12 07E	30				
			Roesnaes		55 44N 10 56E	35				
			Anholt		56 42N 11 35E	28				
			Fornaes		56 26N 10 56E	32				
			Vejle		55 40N 09 30E	42				
			Als		54 57N 09 33E	41				
			Karleby		54 52N 11 11E	36				
			Mern		55 03N 11 59E	45				
			Aarsballe		55 08N 14 52E	42				
			Laesoe		57 17N 11 03E	34				
			Frejlev		57 00N 09 49E	44				
		Main	Blaavand Radio	002192000	55 33N 08 06E	33	Operational	PS	24 hrs	
		Monitor	Skagen		57 44N 10 34E	29				
			Hirtshals		57 31N 09 57E	31				
			Hanstholm		57 06N 08 39E	34				
			Bovbjerg		56 31N 08 10E	34				
		Main	Torshavn Radio (Færoes)	002311000	-	-	Operational	PS	24 hrs	Torshavn
		Monitor	Torshavn		62 01N 06 49W	56				
			Fugloy		62 20N 06 19W	68				
			Mykines		62 06N 07 35W	64				

NAV/MET Area	Country	VHF DSC Coast Station								RCC Associated
		Type	Name	MMSI	Position	Range (NM)	Status of implementation [Date of Operation]	Purpose (PC/SD/PS)	Watch hours on CH70	
			Suderoy		61 25N 06 44W	57				
	Estonia	Main	Tallinn[1]	002760100	59 24N 24 40E	20	Operational	SD	24hrs	MRCC Tallinn
		Monitor	Toila	002761000	59 25N 27 31E	32		PS		
			Eisma		59 33N 26 17E	30				
			Aabla		59 35N 25 31E	30.				
			Suurupi		59 27N 24 22E	30				
			Dirhami		59 12N 23 30E	30				
			Kopu		58 55N 22 12E	35.				
			Orissaare		58 33N 23 40E	35				
			Undva		58 29N 21 59E	30				
			Torgu		57 58N 22 04E	28				
			Ruhnu		57 48N 23 14E	28				
			Tostamaa		58 18N 23 59E	30				
	Finland	Main	Turku	002300230	-	-	Operational	SD	24 hrs	MRCC Turku
		Monitor	Kemi		65 49N 24 32E	30.0				MRSC Vaasa 002303000
			Hailuoto		65 02N 24 36E	27.4				
			Kalajoki		64 18N 24 11E	47.0				
			Kokkola		63 50N 23 10E	34.0				
			Raippaluoto		63 22N 21 19E	31.8				
			Kristiinankaupunki		62 16N 21 24E	35.6				
			Pori		61 36N 21 27E	15.9				MRCC Turku 002301000
			Rauma		61 08N 21 33E	28.2				
			Uusikaupunki		60 48N 21 23E	31.8				
			Geta		60 23N 19 51E	37.6				
			Brandö		60 24N 21 03E	25.2				
			Utö		59 47N 21 22E	22.7				
			Järsö		60 01N 20 00E	35.6				

[1] In reserve. The Operational centre of the VHF/MF system will be located in the MRCC Tallinn.

NAV/MET Area	Country	VHF DSC Coast Station								RCC Associated
		Type	Name	MMSI	Position	Range (NM)	Status of implementation [Date of Operation]	Purpose (PC/SD/PS)	Watch hours on CH70	
			Korppoo		60 10N 21 33E	30.3				
			Naantali		60 27N 22 03E	32.5				
			Hanko		59 50N 22 56E	25.9				MRSC Helsinki 002302000
			Porkkala		59 59N 24 26E	30.0				
			Santahamina/Helsinki		60 09N 25 02E	30				
			Sondby		60 16N 25 51E	25.9				
			Kotka		60 29N 26 53E	28.7				
			Virolahti		60 36N 27 50E	32.5				
	France	Main	Gris Nez	002275100	50 52N 01 35E	23	Operational	SD	24 hrs	MRCC Gris Nez
		Monitor	Dunkerque		51 03N 02 21E	22				
			Saint Frieux		50 40N 01 35E	38				
			L'Ailly		49 55N 00 57E	28				
		Main	Jobourg	002275200	49 44N 01 54W	42				MRCC Jobourg
		Monitor	Antifer		49 41N 00 09E	33				
			Ver-sur-Mer		49 20N 00 34W	27				
			Gatteville		49 42N 01 16W	26				
			Granville		48 52N 01 35W	26				
			Roches Douvres		49 06N 02 49W	25				
		Main	Corsen	002275300	48 24N 04 47W	27				MRCC Corsen
		Monitor	Cap Frehel		48 41N 02 19W	28				
			Batz		48 44N 04 01W	27				
			Stiff Ouessant		48 28N 05 03W	33				
			Bodic		48 48N 03 05W	25				
			Pointe du Raz		48 02N 04 43W	24				
	Germany	Main	Bremen Rescue Radio	002111240	53 05N 08 48E	25	Operational	SD	24 hrs	MRCC Bremen
		Monitor	Rügen		54 21N 13 45E	27				
			Arkona		54 34N 13 36E	31				
			DarB		54 24N 12 27E	30				
			Rostock		54 10N 12 06E	33				

NAV/MET Area	Country	VHF DSC Coast Station								RCC Associated
		Type	Name	MMSI	Position	Range (NM)	Status of implementation [Date of Operation]	Purpose (PC/SD/PS)	Watch hours on CH70	
			Kiel		54 18N 10 07E	37				
			Lübeck		54 13N 10 43E	46				
			Flensburg		54 44N 09 30E	29				
			Norddeich		53 34N 07 06E	24				
			Cuxhaven		53 50N 08 39E	24				
			Helgoland		54 11N 07 53E	33				
			Sylt		54 55N 08 18E	28				
			Elderstedt		54 20N 08 47E	24				
			Hamburg		53 33N 09 58E	44				
	Ireland	Main	MRCC Dublin	002500300	-		Operational	N.I.	N.I.	MRCC Dublin
		Monitor	Dublin		53 23N 006 04W	40				
			Wicklow Head		52 58N 006 00W	30				
			Rosslare		52 19N 006 34W	44				
			Mine HeaD		52 00N 007 35W	30				
		Main	MRSC Valentia	002500200	-					MRCC Dublin (MRSC Valentia from Sep 2000)
		Monitor	Cork		51 51N 008 29W	40				
			Bantry		51 38N 010 00W	60				
			Valentia		51 52N 010 21W	54				
			Shannon		52 31N 009 36W	50				
		Main	MRSC Malin Head	002500100	-					MRSC Malin Head
		Monitor	Clifden		53 30N 009 56W	50				
			Belmullet		54 16N 010 03W	25				
			Glen Head		54 44N 008 40W	47				
			Malin Head		55 22N 007 16W	49				
	Latvia	Main	Riga Rescue Radio	002750100	56 58N 24 05E	20	Operational	SD	24 hrs	MRCC Riga
	Netherlands	Main	Netherlands Coast Guard	002442000	52 28N 04 37E	25	Operational	SD	24 hrs	JRCC IJmuiden
		Monitor	West Kappelle		51 31N 03 28E	25				
			Goes		51 30N 03 53E	25				

NAV/MET Area	Country	VHF DSC Coast Station								RCC Associated
		Type	Name	MMSI	Position	Range (NM)	Status of implementation [Date of Operation]	Purpose (PC/SD/PS)	Watch hours on CH70	
			Rotterdam		51 52N 04 26E	25				
			Hook of Holland		51 59N 04 07E	25				
			Scheveningen		52 05N 04 15E	25				
			Huisdinen		52 58N 04 43E	25				
			Schiermonnikoog		53 29N 06 10E	25				
			Wieringerwerf		52 54N 05 03E	25				
			West-Terschelling		53 21N 05 12E	25				
			Continental-Shelf		53 34N 04 12E	25				
			Appingedam		53 20N 06 51E	25				
			Enkhuizen		52 44N 05 11E	25				
			Hilversum		52 11N 05 11E	25				
	Norway	Main	Tjome Radio	002570100	-	-	Operational	PS	24 hrs	MRCC Stavanger
		Monitor	Halden		59 11N 11 26E	53				
			Oslo		59 59N 10 40E	62				
			Drammen		59 40N 10 26E	24				
			Tjome		59 05N 10 25E	28				
			Porsgrunn		59 14N 09 42E	66				
			Risor		58 43N 09 12E	35				
		Main	Farsund Radio	002570200	-	-	Operational	PS	24 hrs	MRCC Stavanger
		Monitor	Arendal		58 17N 08 28E	36				
			Kristiansand		58 04N 07 59E	36				
			Lindesnes		58 01N 07 04E	40				
			Farsund		58 04N 06 45E	29				
			Storefjell		58 09N 06 43E	52				
		Main	Rogaland Radio	002570300	-	-	Operational	PS	24 hrs	MRCC Stavanger
		Monitor	Bjerkreim		58 38N 05 58E	66				
			Stavanger		58 56N 05 43E	40				
			Bokn		59 13N 05 26E	50				
			Haugesund		59 25N 05 20E	47				

NAV/MET Area	Country	VHF DSC Coast Station								RCC Associated
		Type	Name	MMSI	Position	Range (NM)	Status of implementation [Date of Operation]	Purpose (PC/SD/PS)	Watch hours on CH70	
		Main	Bergen Radio	002570400	-	-	Operational	PS	24 hrs	MRCC Stavanger
		Monitor	Stord		59 52N 05 30E	74				
			Sotra		60 19N 05 07E	53				
			Bergen		60 25N 05 22E	65				
			Knarvik		60 35N 05 20E	59				
			Grimo		60 24N 06 40E	69				
			Oseberg		60 30N 02 50E	30				
		Main	Florø Radio	002570500	-	-	Operational	PS	24 hrs	MRCC Stavanger
		Monitor	Gulen		61 02N 05 10E	73				
			Sogndal		61 14N 07 06E	93				
			Kinn		61 34N 04 47E	52				
			Bremanger		61 52N 05 00E	74				
			Raudeberg		62 00N 05 09E	38				
			Sagtennene		61 54N 06 07E	85				
			Snorre		61 27N 02 09E	31				
			Gullfaks		61 11N 02 11E	30				
		Main	Ørlandet Radio	002570600	-	-	Operational	PS	24 hrs	MRCC Stavanger/Bodø
		Monitor	Nerlandshorn		62 21N 05 33E	59				
			Hjorunganes		62 21N 06 07E	19				
			Aksla		62 29N 06 12E	41				
			Gamlemsveten		62 35N 06 19E	80				
			Molde		62 45N 07 08E	59				
			Reinsfjell		62 56N 07 56E	84				
			Kristiansund		63 07N 07 42E	34				
			Littlefonni		63 23N 08 43E	56				
			Forbordsfjell		63 32N 10 54E	66				
			Mosvik		63 46N 10 58E	55				
			Kopparen		63 48N 09 45E	64				

NAV/MET Area	Country	VHF DSC Coast Station								RCC Associated
		Type	Name	MMSI	Position	Range (NM)	Status of implementation [Date of Operation]	Purpose (PC/SD/PS)	Watch hours on CH70	
			Yttervag		64 18N 10 18E	34				
			Namsos		64 27N 11 32E	58				
			Rorvik		64 53N 11 14E	43				
		Main	Bodø Radio	002570700	-	-	Operational	PS	24 hrs	MRCC Bodø
		Monitor	Vega		65 38N 11 54E	75				
			Horva		66 01N 12 49E	57				
			Mo		66 13N 13 45E	71				
			Traenfjord		66 32N 12 49E	53				
			Meloy		66 51N 13 38E	50				
			Rønvikfjell		67 18N 14 27E	41				
			Fornesfjell		67 26N 15 27E	68				
			Værøy		67 40N 12 38E	59				
			Steigen		67 50N 15 00E	77				
			Fredvang		68 06N 13 11E	21				
			Hagskaret		68 10N 13 42E	36				
			Kvalnes		68 21N 13 57E	40				
			Svolvaer		68 24N 15 07E	18				
			Hadsel		68 33N 14 53E	61				
			Vesteraalen		68 57N 15 01E	30				
			Stamnes		68 49N 15 29E	13				
			Andenes		69 17N 16 01E	54				
			Lodingen		68 24N 15 58E	13				
			Harstad		68 48N 16 31E	36				
			Sorollnes		68 44N 16 50E	13				
			Narvik		68 28N 17 10E	48				
			Kistefjell		69 18N 18 08E	85				
			Tromso		69 39N 18 57E	36				
			Tonsnes		69 43N 19 08E	47				
			Hillesoy		69 39N 18 00E	41				

NAV/MET Area	Country	VHF DSC Coast Station								RCC Associated
		Type	Name	MMSI	Position	Range (NM)	Status of implementation [Date of Operation]	Purpose (PC/SD/PS)	Watch hours on CH70	
			Sandov		70 03N 18 32E	57				
			Bjornoya		74 31N 19 01E	40				
		Main	Vardø Radio	002570800	-	-	Operational	PS	24 hrs	MRCC Bodø
		Monitor	Torsvaag		70 15N 19 30E	23				
			Trolltind		70 04N 20 26E	78				
			Skjervoy		70 01N 20 59E	37				
			Helligfjell		70 07N 22 56E	63				
			Fuglen		70 39N 21 58E	55				
			Tyven		70 38N 23 42E	57				
			Havoysund		71 00N 2436E	49				
			Honningsvaag		70 59N 25 54E	56				
			Oksen		70 58N 27 21E	51				
			Mehamn		71 03N 28 07E	49				
			Berlevaag		70 52N 29 05E	40				
			Tana		70 28N 28 13E	65				
			Baatsfjord		70 39N 29 42E	49				
			Vardo		70 20N 31 02E	40				
			Varangefjord		70 05N 29 49E	41				
			Kirkenes		69 45N 30 08E	44				
		Main	Svalbard Radio	002570900	-	-	Operational	PS	24 hrs	MRCC Bodø
		Monitor	Isfjord		78 02N 13 40E	23				
			Longyearbyen		78 15N 15 24E	21				
			Kongsvegpasset		78 45N 13 30E	78				
	Poland	Main	Szczecin /remote controlled	002610110	53 28N 14 35E	-	Operational	PS	24 hrs	RCC Gdynia
		Monitor	Swinoujscie		53 55N 14 15E	20				
			Grzywacz		53 57N 14 30E	35				
			Kolowo		53 20N 14 40E	40				
		Main	Witowo/remote controlled	002610210	54 33N 16 32E	-				
		Monitor	Kolorzeg		53 10N 15 33E	25				

NAV/MET Area	Country	VHF DSC Coast Station								RCC Associated
		Type	Name	MMSI	Position	Range (NM)	Status of implementation [Date of Operation]	Purpose (PC/SD/PS)	Watch hours on CH70	
			Barzowice		54 29N 16 30E	30				
			Rowakol		54 39N 17 13E	35				
		Main	Gdynia/remote controlled	002610310	54 32N 18 32E	-				
		Monitor	Rozewie		54 50N 1820E	25				
			Oksywie		54 32N 18 32E	30				
			Krynica Morska		54 23N 19 27E	20				
	Russian Federation	Main	Saint- Petersburg	002733700	59 53N 30 13E	27	Operational	SD	24 hrs	MRCC St. Petersburg
		Main	Vyborg	002734415	60 42N 28 43E	17.5[2]		PS		
		Main	Kaliningrad	002734417	54 58N 19 59E	26		SD		MRSC Kaliningrad
	Sweden	Main	Göteborg	002653000	-	-	Operational	SD	24 hrs	MRCC Göteborg
		Monitor	Umeå		63 50N 19 49E	59				
			Väddö		59 58N 18 50E	37				
			Svenska Högarna		59 27N 1930E	21				
			Stockholm		59 18N 18 10E	50				
			Skellefteå		64 46N 20 57E	49				
			Seskarö		65 44N 23 44E	24				
			Luleå		65 32N 21 55E	36				
			Mjällom		62 59N 18 23E	48				
			Härnösand		62 36N 17 55E	40				
			Sundsvall		62 24N 17 28E	40				
			Hudiksvall		61 42N 16 51E	60				
			Gävle		60 38N 17 08E	42				
			Öregrund		60 30N 18 24E	30				
			Västerås		59 38N 16 24E	45				
			Södertälje		59 13N 17 37E	35				
			Torö		58 49N 17 51E	31				
			Norrköping		58 40N 16 28E	49				
			Gotska Sandön		58 23N 19 14E	27				

[2] Except the area with radius 1 nm from 60 26N 028 33E.

NAV/MET Area	Country	VHF DSC Coast Station								RCC Associated
		Type	Name	MMSI	Position	Range (NM)	Status of implementation [Date of Operation]	Purpose (PC/SD/PS)	Watch hours on CH70	
			Fårö		57 52N 19 00E	30				
			Visby		57 35N 18 22E	48				
			Hoburgen		56 56N 18 13E	30				
			Västervik		57 43N 16 25E	50				
			Borgholm		56 51N 16 42E	30				
			Ölands södra		56 14N 16 27E	28				
			Karlskrona		56 14N 15 39E	32				
			Kivik		55 40N 14 09E	44				
			Trelleborg		55 29N 13 16E	36				
			Helsingborg		56 02N 12 41E	32				
			Falkenberg		56 50N 12 41E	39				
			Göteborg		57 41N 12 03E	47				
			Hunnebostrand		58 25N 11 25E	34				
			Strömstad		58 55N 11 10E	30				
			Vänersborg		58 19N 12 16E	27				
			Kinnekulle		58 36N 13 24E	48				
			Karlsborg (Vättern)		58 40N 14 34E	38				
	United Kingdom	Main	Falmouth	002320014	50 08N 05 07W	20	Operational	SD	24 hrs	MRCC Falmouth
		Monitor	Lizard		49 49N 05 12W	22				
			Scillies		45 56N 06 18W	21				
			Lands End		50 08N 05 39W	39				
			St Ives		50 13N 05 14W	14				
			Trevose Head		50 33N 05 03W	24				
			Bude		50 49N 04 33W	16				
		Main	Brixham	002320013	Control site only	-				MRSC Brixham
		Monitor	Rame Head		50 19N 04 13W	25				
			East Prawle		50 13N 03 42W	30				
			Dartmouth		50 12N 03 21W	27				

NAV/MET Area	Country	VHF DSC Coast Station								RCC Associated
		Type	Name	MMSI	Position	Range (NM)	Status of implementation [Date of Operation]	Purpose (PC/SD/PS)	Watch hours on CH70	
			Berry Head		50 24N 03 29W	22				
		Main	Portland	002320012	Control site only	-				MRSC Portland
		Monitor	Grove		50 33N 02 25W	28				
			Bincleaves		50 36N 02 27W	10				
			Hengistbury Head		50 43N 01 46W	16				
			Allhallows		50 43N 03 00W	31				
		Main	Solent	002320011	Control site only	-				MRSC Solent
		Monitor	Boniface Down - Tx site		50 36N 01 12W	40				
			Stenbury Down - Rx site		50 37N 01 14W	40				
			Selsey Bill		50 44N 01 48W	12				
			Newhaven		50 47N 00 03W	22				
		Main	Dover- Rx site	002320010	51 08N 01 21E	29				MRCC Dover
		Monitor	West Hougham - Dover Tx site		51 07N 01 15E	34				
			Fairlight		50 52N 00 40E	29				
			Northforeland		51 22N 01 25E	20				
		Main	Thames	002320009	51 52N 01 16E	13				MRCC Thames
		Monitor	Shoeburyness		51 31N 00 46E	12				
			Bradwell		51 44N 00 53E	11				
			Bawdsey		51 52N 01 25E	22				
		Main	Yarmouth	002320008	52 36N 01 42E	11				MRCC Yamouth
		Monitor	Lowestoft		52 29N 01 46E	11				
			Trimingham		52 55N 01 20E	24				
			Langham		52 57N 00 57E	21				
			Hunstanton		52 57N 00 30E	18				
		Main	Humber	002320007	Control site only	-				MRSC Humber
		Monitor	Easington		55 39N 00 06E	16				
			Flamborough		54 08N 00 06W	22				
			Whitby		54 29N 00 36W	13				
			Trusthorpe		52 20N 00 17E	19				

NAV/MET Area	Country	VHF DSC Coast Station								RCC Associated
		Type	Name	MMSI	Position	Range (NM)	Status of implementation [Date of Operation]	Purpose (PC/SD/PS)	Watch hours on CH70	
		Main	Tyne Tees	002320006	55 01N 01 25W	18				MRSC Tyne Tees
		Monitor	Hartlepool		54 42N 01 10W	14				
			Newton		55 31N 01 37W	19				
		Main	Forth	002320005	56 17N 02 35W	16				MRSC Forth
		Monitor	St Abbs		55 54N 02 12W	38				
			Craigkelly		56 04N 03 19W	40				
		Main	Aberdeen	002320004	Control site only	-				MRCC Aberdeen
		Monitor	Gregness		57 08N 02 03W	20				
			Inverbervie		56 51N 02 16W	32				
			Peterhead		57 31N 01 46W	14				
			Windy Head		57 39N 02 14W	40				
			Banff		57 38N 02 31W	30				
			Thrumster		58 24N 03 07W	35				
			Rosemarkie		57 38N 04 05W	39				
			Foyers		57 14N 04 31W	39				
		Main	Pentland	002320002	Control site only	-				MRSC Pentland
		Monitor	Noss Head		58 29N 03 03W	17				
			Dunnet Head		58 40N 03 22W	25				
			Ben Tongue		58 30N 04 24W	45				
			Durness		58 34N 04 44W	21				
			Wideford Hill		58 59N 03 01W	39				
		Main	Shetland	002320001	60 01N 01 08W	21				MRSC Shetland
		Monitor	Compass Head		59 52N 01 16W	27				
			Fitfull Head		59 54N 01 23W	42				
			Collafirth		60 32N 01 23W	41				
			Saxa Vord		60 42N 00 50W	38				
		Main	Stornoway	002320024	Control site only	-				MRSC Stornoway
		Monitor	Butt of Lewis		58 31N 06 16W	13				

NAV/MET Area	Country	VHF DSC Coast Station								RCC Associated
		Type	Name	MMSI	Position	Range (NM)	Status of implementation [Date of Operation]	Purpose (PC/SD/PS)	Watch hours on CH70	
			Forsnaval		58 13N 07 00W	38				
			Sanwick		58 13N 06 21W	19				
			Rodel		57 45N 06 57W	24				
			Clettraval		55 37N 07 26W	31				
			Scoval		57 28N 06 42W	40				
			Barra		57 01N 07 30W	25				
			Melvaig		57 51N 05 47W	43				
		Main	Oban	002320023	56 25N 05 28W	11				MRSC Oban
		Monitor	Skraig		57 23N 06 14W	15				
			Arisaig		56 55N 05 50W	30				
			Glengorm		56 38N 06 08W	42				
			Tiree		56 30N 06 57W	28				
			Torosay		56 27N 05 44W	54				
		Main	Clyde	002320022	Control site only	15				MRCC Clyde
		Monitor	Law Hill		55 42N 04 50W	36				
			Rhu Stafnish		55 22N 05 32W	39				
			Kilchiaran		55 46N 06 27W	32				
			South Knapdale		55 55N 05 28W	57				
		Main	Belfast	002320021	Control site only	-				MRSC Belfast
		Monitor	Orlock Head		54 40N 05 35W	17				
			Slieve Martin		54 06N 06 10W	56				
			Black Mountain		54 35N 06 01W	48				
			West Torr		55 12N 06 05W	36				
			Portrush		55 13N 06 40W	11				
		Main	Liverpool	002320019	53 30N 03 03W	12				MRSC Liverpool
		Monitor	Heswall		53 20N 03 06W	8				
			Blackpool Tower		53 49N 03 03W	31				
			Walney Light		54 03N 03 11W	13				
			Snaefell		54 16N 04 28W	65				

NAV/MET Area	Country	VHF DSC Coast Station								RCC Associated
		Type	Name	MMSI	Position	Range (NM)	Status of implementation [Date of Operation]	Purpose (PC/SD/PS)	Watch hours on CH70	
			Spanish Head		54 04N 04 46W	33				
			Caldbeck		54 44N 03 03W	18				
		Main	Holyhead	002320018	53 19N 04 38W	13				MRSC Holyhead
		Monitor	Rhiw		52 50N 04 38W	46				
			South Stack		53 18N 04 42W	33				
			Great Orme		53 20N 03 51W	38				
		Main	Milford Haven	002320017	51 42N 05 03W	18				MRSC Milford Haven
		Monitor	Tenby		51 42N 04 41W	24				
			St Ann's Head		51 40N 05 11W	30				
			Dinas Head		52 00N 04 54W	38				
			Blaenplwyf		52 22N 04 07W	48				
		Main	Swansea	002320016	Remote Site only	-				MRCC Swansea
		Monitor	Gower		51 32N 04 17W	22				
			Mumbles Hill		51 34N 03 59W	24				
			St Hilary		51 25N 03 24W	32				
			Severn Bridge		51 37N 02 39W	29				
			Combe Martin		51 10N 04 03W	42				
			Ilfracombe		51 13N 04 05W	22				
			Hartland Point		51 01N 04 31W	29				
II	Benin	Main	Cotonou Radio		N.I.	N.I.	Planned[N.I.]	N.I.	N.I.	
	Cameroon	Main	Douala Radio		04 04N 09 41E	N.I.	Planned[N.I.]	N.I.	N.I.	
		Monitor	Kiribi Radio		N.I.	N.I.				
			Buea Radio		N.I.	N.I.				
	Cape Verde	Main	Sao Vicente Radio		N.I.	70	Planned[1995]	N.I.	N.I.	Harbour Master St. Vincente
	Congo	Main	Pointe Noire Radio		N.I.	N.I.	Planned[N.I.]	N.I.	N.I.	
	Côte D'ivoire	Main	Abidjan Radio		N.I.	N.I.	Planned[N.I.]	N.I.	N.I.	
	Democratic Republic of the Congo	Main	Banana Radio		N.I.	N.I.	Planned[N.I.]	N.I.	N.I.	
		Monitor	Boma Radio		N.I.	N.I.				

NAV/MET Area	Country	VHF DSC Coast Station								RCC Associated
		Type	Name	MMSI	Position	Range (NM)	Status of implementation [Date of Operation]	Purpose (PC/SD/PS)	Watch hours on CH70	
	Congo		Botadi Radio		N.I.	N.I.				
	Equatorial Guinea	Main	Malabo Radio		N.I.	N.I.	Planned[N.I.]	N.I.	N.I.	
	France	Main	Etel	002275000	47 40N 03 12W	26	Operational	SD	24 hrs	MRCC Etel
		Monitor	Pen March		47 48N 04 22W	28				
			Groix		47 39N 03 30W	24				
			Belle Ile		47 19N 03 14W	27				
			Kerrouault		47 27N 02 30W	33				
			Armandeche		46 42N 01 55W	21				
			Yeu		46 43N 02 23W	24				
		Main	Soulac	002275010	45 32N 01 06W	24				MRSC Soulac
		Monitor	Chassiron		46 03N 01 25W	22				
			Cap Ferret		44 37N 01 15W	22				
			Contis		43 48N 01 18W	23				
			Hourtin		45 09N 01 10W	23				
			Biarritz		43 32N 01 32W	26				
	Gambia	Main	Banjul Radio		N.I.	N.I.	Planned[N.I.]	N.I.	N.I.	
	Ghana	Main	Tema Radio	006270000	05 37N 00 00W	-	Operational	N.I.	24hrs	Harbour Master's Office Accra
		Monitor	Winneba		05 21N 00 37W	60				
			Aflao		06 07N 01 11W	60				
			Tema		05 38N 00 00	60				
			Cape Coast		05 07N 01 15W	60				
			Half Assini		05 03N 02 53W	60				
			Takoradi		04 54N 01 45W	60				
			Axim		04 52N 02 14W	60				
			Ada Radio		05 47N 00 38W	60				
	Guinea	Main	Kamsar Radio		-	-	Planned[N.I.]	N.I.	N.I.	
		Monitor	Conakry Radio		N.I.	N.I.				
	Guinea Bissau	Main	Bissau Radio		N.I.	N.I.	Planned[N.I.]	N.I.	N.I.	
	Liberia	Main	Monrovia Radio		N.I.	N.I.	Planned[N.I.]	N.I.	N.I.	

NAV/MET Area	Country	VHF DSC Coast Station								RCC Associated
		Type	Name	MMSI	Position	Range (NM)	Status of implementation [Date of Operation]	Purpose (PC/SD/PS)	Watch hours on CH70	
	Mauritania	Main	Nouadhibou Radio		N.I.	N.I.	Planned[N.I.]	N.I.	N.I.	
		Main	Nouakchott Radio		N.I.	N.I.				
	Portugal	Main	Lisboa	TBD	38 41N 09 19W	30	Planned[N.I.]	SD	24 hrs	MRCC Lisbon
		Main	Funchal		32 38N 16 54W	50				MRCC Funchal
		Main	Delgada		37 44N 25 40W	50				MRCC Delgada
	Sao Tome and Principe	Main	Radio Naval		N.I.	N.I.	Planned[N.I.]	N.I.	N.I.	
		Main	Radio Principe		N.I.	N.I.				
	Senegal	Main	Dakar Radio		N.I.	N.I.	Planned[N.I.]	N.I.	N.I.	
	Sierra Leone	Main	Wilberfree Hill Radio		N.I.	N.I.	Planned[N.I.]	N.I.	N.I.	
	Spain	Main	Bilbao	002240996	43 12N 03 02W	30	Planned[1996]	SD	24 hrs	
		Main	Santander		43 25N 03 36W	30	Planned[1997]			
		Main	Gijon	002240997	43 34N 05 42W	30	Operational			
		Main	La Coruña	002240992	43 22N 08 23W	30				
		Monitor	Cabo Priorino		43 28N 08 20W	30				La Coruña
		Main	Finisterre	002240993	42 42N 08 59W	40	Planned[1997]			Finisterre
		Monitor	Monte Beo		43 20N 09 03W	40				
			Monte Xastas		43 02N 09 16W	40				
			Monte Taume		42 36N 09 03W	40				
		Main	Vigo		42 10N 08 41W	30				N.I.
		Main	Cadiz			30				
		Main	Tarifa	002240994	36 01N 05 35W	30	Operational			
		Main	Algeciras			30	Planned[1997]			
		Main	Tenerife	002241007	28 29N 16 14W	30	Operational			
		Main	Las Palmas	002240995	28 09N 15 25W	30				Las Palmas
		Monitor	La Isleta		28 10N 15 25W	30				
	Togo	Main	Cacavelli Radio		N.I.	N.I.	Planned[N.I.]	N.I.	N.I.	
		Monitor	Aneho Radio		N.I.	N.I.				
III	Bulgaria	Main	Varna Radio	002070810	43 15N 27 57E	52	Planned[12.1997]	PS	24 hrs	MRCC Varna
		Monitor	Kaliakara Radio		43 21N 28 28E	27				

NAV/MET Area	Country	VHF DSC Coast Station								RCC Associated
		Type	Name	MMSI	Position	Range (NM)	Status of implementation [Date of Operation]	Purpose (PC/SD/PS)	Watch hours on CH70	
			Emona Radio		42 43N 27 32E	55				
			Papia Radio		42 06N 27 51E	61				
	Croatia	Main	Split Radio	002380100	43 30N 16 28E	70	Operational	PS	24 hrs	MRCC Rijeka
		Monitor	Ucka		45 17N 14 12E	90				
			Kamenjak		44 46N 14 47E	50				
			Sv. Mihovil		44 04N 15 10E	40				
			Labistica		43 34N 16 13E	80				
			Vidova Gora		43 17N 16 37E	50				
			Vis		43 13N 16 07E	70				
			Uljenje		42 54N 17 29E	70				
			Srdj		43 39N 18 07E	50				
	Cyprus	Main	Cyprus Radio	002091000	35 37N 33 20E		Operational	PS	24 hrs	RCC Larnaca
		Monitor	Pissouri		34 39N 32 41E	50				RCC Bpiscopi
			Olympos		34 56N 32 51E	120				
			Kionia		34 55N 33 11E	100				
	Egypt	Main	Alexandria Radio	006221111	31 11N 29 51E	24	TBD	SD	24 hrs	RCC Cairo
		Main	Port Said Radio	006221113	31 31N 30 32E	21			18 hrs (0600-0000)	
	France	Main	Agde	002275410	43 29N 06 54E	31	Operational	SD	24 hrs	MRCC La Garde MRSC Agde
		Monitor	Pic Neoulos		42 29N 02 57E	94				
			Espiguette		43 29N 04 08E	93				
		Main	La Garde	002275400	43 06N 05 59E	23				MRCC La Garde
		Monitor	Planier		43 12N 05 14E	25				
			Coudon		43 10N 06 10E	72				
			Pic de l'Ours		43 28N 06 54E	62				
		Main	Aspretto	002275420	41 55N 08 46E	-				MRCC La Garde MRSC Corse
		Monitor	Ersa		43 58N 09 23E	64				
			Serra Di Pigno		42 52N 09 24E	83				
			Piana		42 14N 08 38E	69				
			Punta		41 57N 08 42E	75				

NAV/MET Area	Country	VHF DSC Coast Station								RCC Associated
		Type	Name	MMSI	Position	Range (NM)	Status of implementation [Date of Operation]	Purpose (PC/SD/PS)	Watch hours on CH70	
			Serragia		41 31N 08 57E	58				
			Conca		41 44N 09 20E	54				
	Greece	Main	Hellas Radio	002371000	38 01N 23 50E	-	Operational	PS	24 hrs	Piraeus Joint RCC 37 58N 23 40E
		Monitor	Gerania		38 00N 23 20E	98				
			Poros/Darditsa		37 30N 23 27E	73				
			Thassos		40 47N 24 43E	90				
			Sfendami		40 25N 22 31E	41				
			Thira		36 25N 25 26E	66				
			Chios		38 23N 26 03E	78				
			Kefallinia		38 08N 20 40E	107				
			Kerkyra		39 45N 19 52E	82				
			Kithira		36 09N 22 59E	52				
			Limnos		39 52N 25 04E	59				
			Sitia (Mare)		35 12N 26 06E	75				
			Mytilini		39 04N 26 21E	84				
			Parnis		38 10N 23 44E	98				
			Petalidi		36 56N 21 52E	83				
			Pilio		39 22N 22 57E	104				
			Rodos		36 16N 27 56E	78				
			Syros		37 27N 24 56E	57				
			Knossos		35 17N 24 53E	87				
			Patmos		37 18N 26 32E	46				
			Moustakos		35 18N 23 37E	84				
			Tsoukalas		40 23N 23 28E	68				
			Faistos		35 00N 25 12E	84				
			Aroi/Patra		38 15N 21 46E	46				
			Astypalea		36 36N 28 26E	59				
			Karpathos		35 28N 27 10E	66				
			Brochas Kritis		35 19N 25 44E	65				

NAV/MET Area	Country	VHF DSC Coast Station								RCC Associated
		Type	Name	MMSI	Position	Range (NM)	Status of implementation [Date of Operation]	Purpose (PC/SD/PS)	Watch hours on CH70	
			Lichada		38 52N 22 53E	60				
			Skiros		38 50N 24 30E	68				
			Andros		37 56N 24 46E	55	Planned [mid 2000]			
			Milos		36 41N 24 23E	78	Planned [end 2000]			
	Italy	Main	Roma	002470001			Planned [N.I.]	PS	24hrs	
		Monitor	Conconello		45 40N 13 47E	38				MRSC Trieste
			Piancavallo		46 05N 12 32E	92				
			Monte Cero		45 15N 11 40E	57				MRSC Venezia
			Ravenna Bassette		44 24N 12 12E	20				MRSC Ravenna
			Forte Garibaldi		43 36N 13 31E	39				MRSC Ancona
			Monte Conero		43 33N 13 26E	66				
			Monte Secco		42 58N 13 52E	38				
			Silvi Paese		42 33N 14 05E	44				
			Porto Cervo		41 08N 09 32E	25				MRSC Cagliari
			Monte Moro		41 06N 09 30E	56				
			Monte Limbara		40 51N 09 10E	100				
			Osilo		44 44N 08 40E	72				
			Campu Spina		39 22N 08 34E	83				
			Monte Rosso		39 13N 09 14E	19				
			Monte Serpeddi		39 22N 09 40E	87				
			Monte Cavo		41 45N 12 42E	83				MRSC Roma
			Torre Chiaruccia		42 01N 11 49E	19				
			Monte Argentario		42 23N 11 10E	67				MRSC Livorno
			Gorgona		43 25N 09 53E	44				
			Monte Nero		43 23N 10 21E	50				
			Zoagli		44 19N 09 18E	37				MRSC Genova
			Castellaccio		44 25N 08 56E	56				
			Monte Bignone		43 52N 07 43E	93				
		Main	Palermo	002470002			Planned [N.I.]	PS	24hrs	

NAV/MET Area	Country	VHF DSC Coast Station								RCC Associated
		Type	Name	MMSI	Position	Range (NM)	Status of implementation [Date of Operation]	Purpose (PC/SD/PS)	Watch hours on CH70	
		Monitor	Monte Calvario		42 04N 14 36E	52				MRSC Ancona
			Abbate Argento		40 04N 17 17E	50				MRSC Bari
			Monteparano		40 26N 17 25E	35				
			Capo Colonna		39 01N 17 09E	37				MRSC ReggioCallabria
			Punta Stilo		38 26N 16 34E	26				
			Capo dell'Armi		37 57N 15 40E	31				
			Ustica		38 42N 13 10E	45				MRSC Palermo
			Monte Erice		38 02N 12 35E	72				
			Pantelleria		36 46N 12 01E	79				
			Lampedusa		35 30N 12 37E	25				
			Caltabellotta		37 34N 13 13E	79				
			Gela		37 04N 14 14E	19				
			Siracusa Belvedere		37 05N 15 12E	41				MRSC Catania
			Augusta Campolato Alto		37 16N 15 12E	31				
			Forte Spuria		38 16N 15 37E	32				
			Cefalu'		38 01N 13 57E	56				MRSC Palermo
			Serra delTuono		40 02N 15 42E	52				MRSC Reggio Calabria
			Capri		40 33N 14 15E	50				MRSC Napoli
			Napoli Posillipo		40 48N 14 11E	36				
	Malta	Monitor	Malta Radio		35 53N 14 21E	35-40	Planned[1998]	SD or PS	24 hrs	
	Romania	Main	Constanta	002640570	44 07N 28 35E	19	Operational	PS	24 hrs	Constanta Hr. Master
	Russian Federation	Main	Novorossiysk	002734411	44 41N 37 47E	26	Operational	SD	24 hrs	MRCC Novorossiysk
		Monitor	Doob		44 36N 37 58E	50				
			Anapa		44 50N 37 21E	50				
			Sochi		43 32N 39 51E	71				
			Taganrog		47 14N 38 56E	19				
			Temriuk		45 19N 37 13E	28				
		Main	Tuapse	002734413	44 06N 39 02E	46				
		Main	Astrakhan (Caspian Sea)	002734419	46 19N 47 58E	22.5				MRSC Astrakhan

NAV/MET Area	Country	VHF DSC Coast Station								RCC Associated
		Type	Name	MMSI	Position	Range (NM)	Status of implementation [Date of Operation]	Purpose (PC/SD/PS)	Watch hours on CH70	
		Main	Mahachkala (Caspian Sea)		42 59N 47 30E	14	Planned			
	Slovenia	Main	Koper	002780200	45 32N 13 59E	86	Operational	SD	24 hrs	Koper
	Spain	Main	Almeria	002241001	36 50N 02 29W	30	Planned[6.1996]	SD	24 hrs	N.I.
		Main	Valencia	002241004	39 27N 00 20W	30				
		Main	Tarragona	002241006	41 06N 01 14W	30	Operational			Tarragona
		Main	Barcelona	002240991	41 20N 02 09W	30				
		Main	Cartagena	002241003	-	-	Planned[1997]			
		Main	Palma Mallorca	002241005	39 34N 02 39W	30	Planned[6.1996]			
	Turkey	Main	Samsun	002712000	-	-	Operational	PS	24 hrs	Ankara
		Monitor	Pazar		41 08N 40 49E	60				
			Hidirnebi		40 58N 39 26E	99				
			Uçpinar		41 19N 36 06E	94				
			Dütmen		41 26N 35 28E	107				
			Inebolu		41 53N 33 43E	85				
			Zonguldak		41 23N 31 49E	67				
		Main	Istanbul	002711000	-	-				
		Monitor	Akçakoca		40 58N 31 12E	66				
			Keltepe		40 38N 30 05E	105				
			Sarköy		40 41N 27 01E	70				
			Camlica		41 01N 29 04E	45				
			Mahyadagi		39 58N 26 38E	85				
			Kayalidag		39 58N 26 38E	79				
			Akdag		38 33N 26 30E	92				
		Main	Antalya	002713000	-	-				
		Monitor	Dilektepe		37 39N 27 09E	93				
			Palamut		36 45N 27 03E	79				
			Yumrutepe		36 15N 29 27E	88				
			Markiz		36 43N 30 29E	80				
			Anamur		36 02N 32 45E	61				

NAV/MET Area	Country	VHF DSC Coast Station								RCC Associated
		Type	Name	MMSI	Position	Range (NM)	Status of implementation [Date of Operation]	Purpose (PC/SD/PS)	Watch hours on CH70	
			Cobandede		36 31N 36 15E	108				
	Ukraine	Main	Mariupol	002723650	47 04N 37 17E	23	Operational	SD	24hrs	MRCC Odessa
IV	Bermuda (United Kingdom)	Main	Bermuda Harbour	003100001	32 23N 64 41W	30	Operational	SD	24hrs	RCC Bermuda
	Canada	Main	Sydney	003160017	46 11 N 59 54W	40	Planned[1998]	PS	24hrs	RCC Halifax
		Monitor	Cape North		47 01 N 60 26W	40				
			Fox Island		45 20 N 61 05W	40				
			Kilkenny Lake		46 13 N 60 10W	40				
			St Columba		46 00 N 60 51W	40				
			Cheticamp		46 35 N 61 56W	40	Planned [2000]			
			Point Escuminac		47 04 N 64 48W	40				
			North Cape		47 03 N 64 00W	40				
			Cape Egmont		46 24 N 64 08W	40				
			Montague		46 12 N 62 40W	40				
		Main	Stephenville	003160018	48 33 N 58 46W	40	Planned [1999]			
		Monitor	Port aux Basques		47 34 N 59 08W	40				
			Pinetree		48 35 N 58 40W	40				
			Ramea Island		47 31N 57 25W	40				
			Point Riche		50 42N 57 25W	40	Planned [2001]			
			Bonne Bay		49 36N 57 57W	40				
			Mount Moriah		48 58N 58 03W	40				
		Main	Cap aux Meules	003160024	47 23N 61 52W	40	Planned [1999]			
		Main	Riviere au Renard	003160025	49 01 N 64 24W	40				
		Monitor	Forillon		48 50N 64 16W	40				
			Heath Point		49 05N 61 42W	40				
			Havre St Pierre		50 16N 63 41W	40				
			Natashquan		50 09N 61 48W	40				
			La Romaine		50 13 N 60 41W	40				
			Harrington Harbour		50 30 N 59 29W	40				

NAV/MET Area	Country	VHF DSC Coast Station								RCC Associated
		Type	Name	MMSI	Position	Range (NM)	Status of implementation [Date of Operation]	Purpose (PC/SD/PS)	Watch hours on CH70	
		Main	Placentia	003160019	47 17N 54 00W	40				
		Monitor	Fortne Head		47 04N 55 51W	40				
			St Lawrence		46 55 N 55 22W	40				
			Arnold's Cove		47 46 N 54 00W	40				
			Freshwater Hill		47 15N 53 58W	40				
			Cuslett		46 58N 54 09W	40				
			Cape Pine		46 37N 53 32W	40				
		Main	Halifax	003160016	-	-				
		Monitor	Ecum Secum		44 58N 62 09W	40				
			Shannon Hill		44 41N 63 37W	40				
			Ketch Harbour		44 28N 63 37W	40				
			Kingsburg		44 17N 64 17W	40				
		Main	Saint John (Fundy)	003160015	45 14N 65 59W	40				
		Monitor	Lockport		43 40N 65 08W	40				
			Yarmouth		43 44 N 66 07W	40				
			Tiverton		44 23N 66 13W	40				
			Grand Manan		44 36N 66 54W	40				
			Red Head		45 14N 65 69W	40				
			Cape Blomidon		45 13N 64 24W	40				
			Scotch Mountain		45 46N 65 47W	40				
		Main	St John's (Robin Hood Bay)	003160020	47 37N 52 40W	40	Planned [2000]			
		Monitor	Victoria		47 47N 53 17W	40				
			Capr Bonavista		48 42N 53 05W	40				
			Lumsden		49 17N 53 35W	40				
		Main	St Anthony	003160021	51 30N 55 50W	40				
		Monitor	Twillingate		49 41N 54 48W	40				
			Coimfort Cove		49 15N 54 53W	40				
			Conche		50 54N 55 53W	40				
			L'Anse aux Meadows		51 34N 55 30W	40				

NAV/MET Area	Country	VHF DSC Coast Station								RCC Associated
		Type	Name	MMSI	Position	Range (NM)	Status of implementation [Date of Operation]	Purpose (PC/SD/PS)	Watch hours on CH70	
			Fox Harbour		52 22N 55 40W	40				
	Jamaica	Main	HMJS Cagway Port Royal	N.I.	-	-	Planned [01. 2000]	SD	24hrs	Jamaica Defence Force
		Monitor	Catherine's Peak		18 03N 76 42W	112				
			Flower Hill		18 59N 77 51W	70				
			Huntley		18 05N 78 15W	92				
	Mexico	Main	Tamnico	003450110	22 13N 97 51W	40	Operational	PS	24 hrs	Zona Naval
		Monitor	Veracruz	003450310	19 09N 96 07W	40				
			Chetumal	003451120	18 30N 88 17W	40				
			Cozumel	003451110	20 25N 86 46W	40				
			Cd.Del Carmen	003450710	18 08N 92 07W	40				
			Progreso	003450910	20 54N 90 12W	40				
			Coatzacoalcos.	003450320	18 10N 94 25W	40				
			La Pesca	003450120	23 03N 98 00W	40	Planned[30.11.2000]			
			Tuxpan	003450330	20 08N 98 03W	40				
			Campeche	003450720	19 25N 90 02W	40				
			Puerto Juarez	003451130	21 02N 87 13W	40				
	United States		TBD				Planned[N.I.]			
	Venezuela		TBD				Planned[1999]			
V	Brazil	Main	Rio Radio		32 57S 43 40W	30	Planned[TBD]	SD	24 hrs	Salvamar Sueste (Rio de Janeiro)
		Main	Santos Radio		23 59S 46 18W	30				
		Main	Vitoria Radio		20 18S 40 20W	30				
		Main	Port Alegre Radio		30 04S 61 10W	30				
	Uruguay	N.I.	Colonia Radio		34 28S 57 51W	N.I.	Planned[N.I.]	N.I.	N.I.	
		N.I.	Montevideo Radio		34 56S 56 10W	N.I.				
		N.I.	Punta del Este Radio		N.I.	N.I.				
		N.I.	La Paloma Radio		34 39S 54 08W	N.I.				
		N.I.	Santa Teresa Radio			N.I.				
VI	Argentina	Main	Argentina Radio	007010111	34 36S 58 28W	35	Operational	PS	24 hrs	RCC Buenos Aires

NAV/MET Area	Country	VHF DSC Coast Station								RCC Associated
		Type	Name	MMSI	Position	Range (NM)	Status of implementation [Date of Operation]	Purpose (PC/SD/PS)	Watch hours on CH70	
		Main	Mar del Plata	007010221	38 03S 57 32W	35		SD		Puerto Belgrano
VII	Angola	Main	Luanda Radio		N.I.	N.I.	Planned[N.I.]	N.I.	N.I.	
	Comoros	Main	Moroni Radio		-	-	Planned[N.I.]	N.I.	N.I.	
		Monitor	Qussoudjou Radio		N.I.	N.I.				
	Madagascar	Main	Toamasina Radio		N.I.	N.I.	Planned[N.I.]	N.I.	N.I.	
		Main	Mahajanga Radio		N.I.	N.I.				
		Main	Toliara Radio		N.I.	N.I.				
	Mozambique	Main	Maputo Radio		N.I.	N.I.	Planned[N.I.]	N.I.	N.I.	
VIII	Kenya	Main	Mombasa Radio		N.I.	N.I.	Planned[N.I.]	N.I.	N.I.	
		Monitor	Malindi Radio		N.I.	N.I.				
			Msambweni Radio		N.I.	N.I.				
	Mauritius	Main	Mauritius Radio		N.I.	N.I.	Operational	N.I.	N.I.	
		Monitor	Albion	006452700	20 13S 57 24E	25		PS	24 hrs	
			Belle Mare		20 11S 57 46E					
			Cap Malheureux		19 59S 57 36E					
			Souillac		20 31S 57 31E					
	Myanmar		TBD				Planned[1995]			
	Seychelles	Main	Seychelles Radio		N.I.	N.I.	Planned[N.I.]	N.I.	N.I.	
	Tanzania	Main	Dar es Salaam Radio		N.I.	N.I.	Planned[N.I.]	N.I.	N.I.	
		Monitor	Zanzibar Radio		N.I.	N.I.				
			Mtwara Radio		N.I.	N.I.				
IX	Djibouti	Main	Djibouti Radio		N.I.	N.I.	Planned[N.I.]	N.I.	N.I.	
		Monitor	Pic du day Radio		N.I.	N.I.				
	Egypt	Main	Kosseir Radio	006221112	26 06N 34 17E	21	TBD	SD	18 hrs (0600-0000)	RCC Cairo
	Iran	Main	Khark (Island)	004225306	29 16N 50 15E	25 to 30	Operational	PS	24 hrs	HQ PSO Tehran
		Main	Khorramshahr	004225309	30 20N 48 23E					
		Main	Lengeh	004225307	26 33N 54 53E					
		Main	Bander Abbas	004225304	27 07N 56 04E					
		Main	Bahonar	004225308	27 18N 57 17E					

NAV/MET Area	Country	VHF DSC Coast Station								RCC Associated
		Type	Name	MMSI	Position	Range (NM)	Status of implementation [Date of Operation]	Purpose (PC/SD/PS)	Watch hours on CH70	
		Main	(B.I.) Khomeini	004225300	30 30N 49 09E					
		Main	Bushehr	004225302	28 58N 50 50E					
		Main	Anzali (Caspian Sea)	004225305	37 25N 49 20E					
		Main	Nowshahr (Caspian Sea)	004225303	36 40N 51 30E					
	Jordan	Main	Aqaba Radio	004381234	29 27N 34 58E	25	Planned[N.I.]	PS	24 hrs	Harbour Master, Aqaba
		Monitor	Aqaba Port Control		29 30N 34 59E	25				
	Oman	Main	Muscat		23 36N 58 30E	25 to 30	Planned[N.I.]	PS	N.I.	HQ Royal Air Force of Sultanate of Oman
	Pakistan	Main	Karachi	004634060	24 52N 67 01E	40	Planned[2.1998]	N.I.	N.I.	
		Main	Ormara	004634056	25 12N 64 38E	40	TBD			
		Main	Gwadar	004634052	25 08N 64 20E	40				
	Saudi Arabia	Main	Damman Radio		26 26N 50 06E	N.I.	Planned[N.I.]	N.I.	N.I.	
		Main	Jeddah Radio		21 23N 39 10E	N.I.				
	Sudan	Main	Jebel Erba Radio		N.I.	N.I.	Planned[N.I.]	N.I.	N.I.	
	United Arab Emirates	Main	Emirates Radio		-	-	Planned[End 1995]	N.I.	N.I.	
		Monitor	Abu Dhabi Radio		24 28N 54 22E	N.I.				
			Fujeirah Radio		25 04N 56 21E	N.I.				
			Jebal Ali Radio		25 02N 55 06E	N.I.				
			Khor Fakkan Radio		25 21N 56 22E	N.I.				
			Ras Al Khaimah Radio		25 47N 55 59E	N.I.				
			Jebal Dhana Radio		24 06N 52 44E	N.I.				
			Umm Al Quwain Radio		25 32N 55 32E	N.I.				
			Zirku Radio		24 53N 53 04E	N.I.				
X	NONE									
XI	China	Main	Dalian Radio	004121300	38 50N 121 31E	25	Planned[End 1998]	PS	24 hrs	Liaoning MRCC
		Main	Fuzhou Radio	004122600	26 02N 119 18E	25				Fujian MRCC
		Main	Guangzhou Radio	004123100	23 08N 113 29E	25				Guangdong MRCC
		Main	Haikou Radio	004123500	20 01N 110 17E	25				Haikou HSA
		Main	Lianyungang Radio	004122300	34 42N 119 18E	25				Lianyungang MRCC

NAV/MET Area	Country	VHF DSC Coast Station								RCC Associated
		Type	Name	MMSI	Position	Range (NM)	Status of implementation [Date of Operation]	Purpose (PC/SD/PS)	Watch hours on CH70	
		Main	Ningbo Radio	004122400	30 01N 121 30E	25				Ningbo HSA
		Main	Qingdao Radio	004122200	36 10N 120 28E	25				Qingdao MRSC
		Main	Quinhuangdao Radio	004121200	39 53N 119 31E	25				Heibei MRCC
		Main	Shanghai Radio	004122100	31 06N 121 32E	25				Shanghai MRCC
		Main	Tianjin Radio	004121100	39 03N 117 25E	25				Tianjin MRCC
		Main	Xiamen Radio	004122700	24 35N 118 06E	25				Xiamen MRSC
		Main	Yantai Radio	004121400	37 32N 121 22E	25				Yantai MRSC
		Main	Zhanjiang Radio	004123300	21 09N 110 21E	25				Zhanjiang RSC
	Guam (United States)	Main	Guam	003669994	13 29N 144 50E	N.I.	Planned[1999]	SD	24 hrs	Honolulu
	Indonesia	N.I.	Ambon		03 41W 128 10E	N.I.	Planned[N.I.]	PS	N.I.	MRSC Ambon
		N.I.	Atapupu		09 01S 124 51E	N.I.				MRSC Kupang
		N.I.	Balikpapan		01 16S 116 48E	N.I.				MRSC Balikpapan
		N.I.	Banabungi		05 30S 122 50E	N.I.				MRSC Ujungpandang
		N.I.	Banjarmasin		03 20S 114 35E	N.I.				MRSC Banjarmasin
		N.I.	Batu Ampar		01 09N 104 04E	N.I.				MRSC Tanjungpinang
		N.I.	Bawean		05 51N 112 39E	N.I.				MRCC Surabaya
		N.I.	Belawan		03 43N 98 40E	N.I.				MRSC Medan
		N.I.	Bengkulu		03 55S 102 16E	N.I.				MRSC Palembang
		N.I.	Benoa		08 44S 115 12E	N.I.				MRSC Denpasar
		N.I.	Biak		01 11S 136 05E	N.I.				MRCC Biak
		N.I.	Bima		08 27S 118 43E	N.I.				MRSC Denpasar
		N.I.	Bintuni		02 07S 133 30E	N.I..				MRSC Sorong
		N.I.	Bitung		01 26N 125 10E	N.I.				MRSC Menado
		N.I.	Celukan Bawang		08 11S 114 49E	N.I.				MRSC Palembang
		N.I.	Cigading		06 30S 105 57E	N.I.				MRCC Jakarta
		N.I.	Cilacap		07 45S 109 02E	N.I.				
		N.I.	Cirebon		06 45S 108 33E	N.I.				
		N.I.	Dabo Singkep		00 30S 104 34E	N.I.				MRSC Pekanbaru
		N.I.	Dilli		08 33S 125 34E	N.I.				MRSC Kupang

NAV/MET Area	Country	VHF DSC Coast Station								RCC Associated
		Type	Name	MMSI	Position	Range (NM)	Status of implementation [Date of Operation]	Purpose (PC/SD/PS)	Watch hours on CH70	
		N.I.	Donggala		00 39S 119 44E	N.I.				MRSC Menado
		N.I.	Dumai		01 41N 101 27E	N.I.				MRSC Pekanbaru
		N.I.	Ende		08 50S 121 38E	N.I.				MRSC Kupang
		N.I.	Fak-Fak		01 57S 131 17E	N.I.				MRSC Sorong
		N.I.	GN. Sitoli		01 19N 97 36E	N.I.				MRSC Medan
		N.I.	Gorontalo		00 29N 123 03E	N.I.				MRSC Menado
		N.I.	Gresik		07 09S 112 39E	N.I.				MRCC Surabaya
		N.I.	Jakarta		06 07S 106 51E	N.I.				MRCC Jakarta
		N.I.	Jambi		01 01S 104 08E	N.I.				MRSC Padang
		N.I.	Jayapura		02 30S 140 43E	N.I.				MRSC Jayapura
		N.I.	Kaimana		03 40S 135 45E	N.I.				MRSC Sorong
		N.I.	Kalabahi		08 03S 124 30E	N.I.				MRSC Denpasar
		N.I.	Kalianget		07 04S 113 58E	N.I.				MRCC Surabaya
		N.I.	Kendari		03 55S 122 25E	N.I.				MRCC Ujunpandang
		N.I.	Kupang		10 09S 123 34E	N.I.				MRSC Kupang
		N.I.	Lahewa		01 24N 97 09E	N.I.				MRCC Ujungpandang
		N.I.	Larantuka		08 20S 122 59E	N.I.				MRSC Kupang
		N.I.	Lembar		08 43S 116 04E	N.I.				MRSC Denpasar
		N.I.	Luwuk		00 56S 122 47E	N.I.				MRSC Menado
		N.I.	Makassar		05 06S 119 25E	N.I.				MRCC Ujungpandang
		N.I.	Manokwari		00 48S 134 00E	N.I.				MRCC Biak
		N.I.	Masalembo		05 34S 114 27E	N.I.				MRCC Ujungpandang
		N.I.	Maumere		08 59S 122 13E	N.I.				MRSC Kupang
		N.I.	Menado		01 20N 129 50E	N.I.				MRSC Menado
		N.I.	Meneng		08 07S 114 23E	N.I.				MRCC Surabaya
		N.I.	Merauke		08 28S 110 23E	N.I.				MRSC Merauke
		N.I.	Padang Bai		08 32S 115 30E	N.I.				MRSC Pedang
		N.I.	Palembang		02 50S 104 46E	N.I.				MRSC Palembang
		N.I.	Panarukan		07 14S 113 56E	N.I.				MRCC Surabaya

NAV/MET Area	Country	VHF DSC Coast Station								RCC Associated
		Type	Name	MMSI	Position	Range (NM)	Status of implementation [Date of Operation]	Purpose (PC/SD/PS)	Watch hours on CH70	
		N.I.	Pangkal Balam		02 10S 106 07E	N.I.				MRSC Tanjungpinang
		N.I.	Panjang		05 28S 105 19E	N.I.				MRSC Palembang
		N.I.	Parigi		00 48N 120 09E	N.I.				MRSC Menado
		N.I.	Pontianak		00 01S 109 18E	N.I.				MRSC Pontianak
		N.I.	Poso		01 22N 120 45E	N.I.				MRSC Menado
		N.I.	Probolinggo		07 23S 113 13E	N.I.				MRCC Surabaya
		N.I.	Pulang Pisau		02 45S 114 15E	N.I.				MRSC Tanjungpinang
		N.I.	Pulau Sambu		01 09N 103 53E	N.I.				
		N.I.	Rengat		00 29S 102 41E	N.I.				
		N.I.	Sabang		05 54N 95 21E	N.I.				MRSC Medang
		N.I.	Samarinda		00 30S 117 09E	N.I.				MRSC Balikpapan
		N.I.	Sampit		02 33S 112 57E	N.I.				MRSC Banjarmasin
		N.I.	Sanana		02 03S 125 59E	N.I.				MRSC Ambon
		N.I.	Selat Panjang		01 01N 102 43E	N.I.				MRSC Tanjungpinang
		N.I.	Semarang		06 56E 110 25E	N.I.				MRCC Surabaya
		N.I.	Serui		01 53S 136 14E	N.I.				MRCC Biak
		N.I.	Siau		02 44N 125 23E	N.I.				MRSC Menado
		N.I.	Sibolga		01 44N 98 46E	N.I.				MRSC Medan
		N.I.	Sintete		01 10N 109 04E	N.I.				MRSC Pontianak
		N.I.	Sorong		00 53S 131 00E	N.I.				MRSC Sorong
		N.I.	Sunda Kelapa		N.I.	N.I.				MRCC Jakarta
		N.I.	Surabaya		07 12S 112 44E	N.I.				MRCC Surabaya
		N.I.	Tahuna		03 36N 125 30E	N.I.				MRSC Menado
		N.I.	Tarakan		03 17N 117 35E	N.I.				MRSC Balikpapan
		N.I.	Tegal		06 51S 109 08E	N.I.				MRCC Jakarta
		N.I.	Teluk Bayur		01 00S 100 21E	N.I.				MRSC Pedang
		N.I.	Teluk Dalam		00 35N 97 49E	N.I.				
		N.I.	Tembilahan		00 19S 103 09E	N.I.				MRSC Tanjungpinang
		N.I.	Ternate		00 47N 127 22E	N.I.				MRSC Ambon

NAV/MET Area	Country	VHF DSC Coast Station								RCC Associated
		Type	Name	MMSI	Position	Range (NM)	Status of implementation [Date of Operation]	Purpose (PC/SD/PS)	Watch hours on CH70	
		N.I.	TG BL Karimun		00 56N 103 26E	N.I.				MRSC Tanjungpinang
		N.I.	TG Pinang		00 55N 104 26E	N.I.				
		N.I.	TG Uban		01 03N 104 13E	N.I.				
		N.I.	Toli-Toli		01 03N 120 48E	N.I.				MRSC Menado
		N.I.	Tual		05 20S 132 40E	N.I.				MRSC Ambon
		N.I.	Olee Lheue		05 33S 95 16E	N.I.				MRSC Menado
		N.I.	Waingapu		09 39S 120 15E	N.I.				MRSC Kupang
	Japan	TBD								
	Malaysia	Monitor	Gunung Jerai		05 47N 100 26E	95	Planned[1999]	PS	24 hrs	MRCC Port Klang
			Gunung Berinchang		04 31N 101 23E	117				
			Ulu Kali		03 26N 101 47E	114				
			Gunung Ledang		02 03N 102 34E	95				
			Tioman		02 48N 104 12E	27				
			Kuala Rompin		02 48N 103 29E	38				
			Kemuning		04 19N 103 28E	57				
			Marang		05 10N 103 11E	55				
			Machang		05 43N 102 17E	70				
			Kuching		01 35N 110 11E	85				
			Bintulu		03 13N 113 05E	48				
			Kota Kinabalu		06 02N 116 12E	75				
			Labuan		05 17N 115 15E	22				
			Bukit Kayu Malam		01 58N 111 26E	49	Planned[2001]			
			Matu		02 40N 111 30E	22				
			Mukah		02 54N 112 05E	26				
			Batu Niah		03 48N 113 45E	24				
			Miri		04 22N 113 58E	35				
			Kudat		06 54N 116 50E	37				
			Sandakan		05 51N 118 06E	44				
			Lahad Datu		04 56N 118 10E	71				

NAV/MET Area	Country	VHF DSC Coast Station								RCC Associated
		Type	Name	MMSI	Position	Range (NM)	Status of implementation [Date of Operation]	Purpose (PC/SD/PS)	Watch hours on CH70	
			Tawau		04 20N 117 58E	72				
	Philippines	Main	Manila		14 35N 120 57E	25	Planned[1999]	SD	24 hrs	Manila
		Monitor	Batangas		13 45N 121 03E					
			Iloilo		10 42N 122 35E					
			San Fernando		16 36N 120 18E					
			Aparri		18 22N 121 38E					
			Legaspi		13 09N 123 44E					
			San Jose		12 20N 121 05E					
			Lucena		13 54N 12138E					
			Roxas		11 36N 122 42E					
			Real		14 40N 120 37E					
			Davao		07 08N 125 40E					
			Puerto Princesa		09 44N 118 44E					
			Surigao		09 47N 125 30E					
			Cebu		10 16N 123 53E					
			Zamboanga		06 59N 122 01E					
			Tacloban		11 15N 125 00E					
			Gen. Santos		06 05N 125 09E					
			Cagayan de Oro		08 30N 124 40E					
			Cotabato							
	Republic of Korea	Main	Inchon National Maritime Police Agency	004401001	37 45N 126 36E	23	Operational	SD	24 hrs	Inchon RCC
		Main	Busan National Maritime Police Agency		35 07N 129 05E	N.I.	Planned[1997]			Busan RCC
		Main	Donghae National Maritime Police Agency	004401002	37 31N 129 07E	35	Operational			Donghae RCC
		Main	Mokpo National Maritime Police Agency		34 47N 126 24E	N.I.	Planned[1997]			Mokpo RCC
		Main	Cheju National Maritime Police Agency		33 31N 126 32E	N.I.				Cheju RCC
	Singapore	Main	Singapore Port Operations Control	005630002	01 16N 103 51E	25	Operational	SD	24 hrs	Singapore Port Operations Control Centre

NAV/MET Area	Country	VHF DSC Coast Station								RCC Associated
		Type	Name	MMSI	Position	Range (NM)	Status of implementation [Date of Operation]	Purpose (PC/SD/PS)	Watch hours on CH70	
	Thailand	Main	Bangkok Radio	005671000	13 09N 100 55E	27	Planned[1999]	PS	24 hrs	Bangkok RCC
		Monitor	Prachuab Radio				TBD			
			Surat Radio							
		Main	Songkhla Radio							
		Main	Phuket Radio							
	Vietnam	Main	Ho Chi Minh-Ville Radio	005741993	10 47N 106 40E	23	Operational	PS	24 hrs	Saigon port Authority
		Main	Haiphong Radio	005741996	20 44N 106 44E	23				Haiphong port Authority
		Main	Danang Radio	005741999	16 05N 108 13E	23	Planned[N.I.]			Danang port Authority
		Main	Nhatrang Radio	005742002	12 15N 109 12E	23				Nhatrang port Authority
		Main	Vungtau Radio	005742005	10 19N 107 04E	23				Vungtau port Authority
	Associate Member Hong Kong, China	Main	Hong Kong Maritime Rescue Radio Tai Mo Shan	004773500	22 24N 114 07E	50	Operational	SD	24 hrs	Hong Kong MRCC
			Victoria Peak (Alternative)		22 16N 114 08E					
XII	Canada	Main	Vancouver	003160010	-	-	Planned [1998]	PS	24hrs	RCC Victoria
		Monitor	Mount Parke		48 50N 123 18W	40				
			Bowen		49 21N 123 23W	40				
			Helmcken		48 24N 123 34W	40				
			Watts Point		49 39N 123 13W	40	Planned [2001]			
		Main	Tofino	003160012	-	-	Planned [1998]			
		Monitor	Holberg		50 38N 128 08W	40				
			Eliza Dome		49 52N 127 07W	40				
			Mount Ozzard		48 58N 125 30W	40				
		Main	Prince Rupert	003160013	54 18N 130 25W	40	Planned [2000]			
		Monitor	Dundas		54 31N 130 55W	40				
			Rose Inlet		52 13N 131 13W	40				
			Klemtu		52 35N 128 34W	40				
			Mount Gil		53 16N 129 12W	40				
			Naden Harbour		53 57N 132 57W	40				

NAV/MET Area	Country	VHF DSC Coast Station								RCC Associated
		Type	Name	MMSI	Position	Range (NM)	Status of implementation [Date of Operation]	Purpose (PC/SD/PS)	Watch hours on CH70	
			Cumshewa		53 10N 132 00W	40				
		Main	Comox	003160014	49 45N 124 57W	40				
		Monitor	Port Hardy		50 37N 126 55W	40				
			Discovery		50 19N 125 22W	40				
			Texada		49 42N 124 26W	40				
	Ecuador	Main	Guayaquil	007354750	02 11S 79 53W	30	Operational	N.I.	24 hrs	Guayaquil Coast Guard
		Monitor	Esmeraldas (Remote Controlled)	007354752	00 57N 70 39W	30				
			Bahia (Remote Controlled)	007354753	00 35S 80 25W	30				
			Manta (Remote Controlled)	007354754	00 57S 80 43W	30				
			Salinas (Remote Controlled)	007354755	02 12S 80 52W	30				
			Puerto Bolivar (Remote Controlled)	007354756	03 16S 80 00W	30				
		Main	Ayora	007354757	00 49S 90 20W	30				
		Monitor	Baquerizo Moreno (Remote Controlled)	007354758	00 54S 89 37W	30				
	Mexico	Main	Mazatran	003450810	23 12N 106 26W	40	Operational	PS	24 hrs	Zona Naval
		Monitor	Ensenada	003450210	31 25N 116 37W	40				
			Guaymas	003450610	27 58N 11050W	40				
			La Paz	003450410	24 04N 110 20W	40				
			Manzanillo	003451410	18 15N 104 13W	40				
			Acapulco	003451810	16 51N 99 54W	40				
			Salina Cruz	003452010	16 16N 95 11W	40				
			Lazaro Cardenas	003451610	17 04N 102 10W	40	Planned[30.12.1999]			
			Punta Final	003450220	29 45N 114 17W	40	Planned[30.12.1999]			
			Guerrero Negro	003450230	27 58N 114 12W	40	Planned[30.11.2000]			
			San Carlos	003450430	24 55N 112 04W	40	Planned[30.10.2000]			
			Loreto	003450440	26 00N 111 22W	40	Planned[30.09.1999]			
			Los Cabos	003450450	23 52N 109 54W	40	Planned[30.07.1999]			
			Puerto Penasco	003450620	31 18N 113 32W	40	Planned[30.08.1999]			
			Topolobampo	003450820	25 36N 109 03W	40	Planned[30.09.1999]			
			San Blas	003451010	20 53N 105 06W	40	Planned[30.10.2000]			

NAV/MET Area	Country	VHF DSC Coast Station								RCC Associated
		Type	Name	MMSI	Position	Range (NM)	Status of implementation [Date of Operation]	Purpose (PC/SD/PS)	Watch hours on CH70	
			Puerto Vallarta	003451210	19 57N 105 07W	40	Planned[30.10.1999]			
			Ixtapa	003451820	16 56N 102 38W	40	Planned[30.10.2000]			
			Puerto Angel	003452020	15 39N 96 31W	40	Planned[30.11.2000]			
			Puerto Escondido	003452030	15 51N 97 05W	40				
			Puerto Madero	003452210	14 16N 92 26W	40	Planned[30.11.1999]			
	United States	TBD					Planned[N.I.]			
XIII	Russian Federation	Main	Vladivostok	007250010	43 07N 131 55E	55	Operational	SD	24 hrs	MRCC Vladivostok
		Monitor	Nakhodka		42 51N 132 51E	45				
			Tumannaya (Posiet)		42 34N 131 11E	70				
		Main	Magadan	00234416	59 33N 150 43E	19				MRSC Petropavlovsk-Kamchatskiy
		Main	Murmansk	002734420	68 58N 33 01E	18				MRCC Murmansk
		Main	Arkhangelsk	002734414	64 32N 40 32E	25.6				MRSC Arkhangelsk
		Main	Vanino		49 05N 140 20E	25	Planned[2000]			MRSC Kholmsk
		Main	Yuzhno-Sakhalinsk	002733733	-	-	Under Trial			
		Monitor	Korsakov		46 45N 142 27E	42				
			Nevelsk		46 38N 141 51E	40				
		Main	Kholmsk		47 03N 142 03E	30	Planned[2000]			
		Main	Petropavlovsk-Kamchatskiy		52 59N 158 39E	30				MRSC Petropavlovsk-Kamchatskiy
XIV	NONE									
XV	Chile	Main	Arica	007250010	18 29S 70 19W	60	Operational	SD	24 hrs	MRCC Iquique
		Main	Iquique	007250020	20 21S 70 25W	90				
		Main	Tocopilla	007250030	22 06S 70 12W	18	Planned			
		Main	Mejillones	007250040	23 06S 70 13W	18				
		Main	Antofagasta	007250050	23 40S 70 25W	60	Operational			
		Main	Taltal	007250060	25 24S 70 29W	18	Planned			MRCC Valparaiso
		Main	Chanaral	007250070	26 21S 70 38W	18				
		Main	Caldera	007250080	27 04S 70 42W	18				

NAV/MET Area	Country	VHF DSC Coast Station								RCC Associated
		Type	Name	MMSI	Position	Range (NM)	Status of implementation [Date of Operation]	Purpose (PC/SD/PS)	Watch hours on CH70	
		Main	Huasco	007250090	28 28S 71 15W	18				
		Main	Isla de Pascua	007250100	27 11S 109 25W	60	Operational			
		Main	Coquimbo	007250110	29 56S 71 13W	70				
		Main	Los Vilos	007250120	31 45S 71 31W	18	Planned			
		Main	Quintero	007250125	32 46S 71 31W	18	Operational			
		Main	Juan Fernandez	007250130	33 37S 78 50W	18	Planned			
		Main	Valparaiso	007251860	33 01S 71 39W	80	Operational	PS		
		Main	San Antonio	007250140	33 34S 71 37W	40		SD		
		Main	Constitucion	007250150	35 20S 72 35W	18	Planned			MRCC Talcahuano
		Main	Talcahuano	007250170	36 42S 73 06W	40	Operational			
		Main	Coronel	007250180	37 01S 73 09W	18	Planned			
		Main	Lebu	007250190	37 38S 73 40W	18				
		Main	Isla Mocha	007250200	38 23S 73 53W	18				
		Main	Corral	007250210	39 53S 73 25W	18				
		Main	Valdivia	007250220	39 48S 73 15W	15				
		Main	Puerto Montt	007250230	41 29S 72 57W	40	Operational			MRCC Puerto Montt
		Main	Corona	007250235	41 47S 73 53W	30	Planned			
		Main	Ancud	007250240	41 25S 73 50W	15				
		Main	Castro	007250250	42 29S 73 46W	15				
		Main	Chaiten	007250260	42 55S 72 43W	18				
		Main	Quellon	007250270	43 07S 73 38W	15				
		Main	Melinka	007250280	43 54S 73 45W	15				
		Main	Isla Guafo	007250290	43 34S 74 50W	40				
		Main	Puerto Aguirre	007250294	45 10S 73 32W	18				
		Main	Chacabuco	007250298	45 28S 73 49W	18				
		Main	Aysen	007250300	45 24S 72 42W	15	Operational			
		Main	Raper	007250310	46 49S 75 37W	30	Planned			MRCC Punta Arenas
		Main	San Pedro	007250320	47 43S 74 53W	25				
		Main	Puerto Eden	007250330	49 08S 74 26W	10				

NAV/MET Area	Country	VHF DSC Coast Station								RCC Associated
		Type	Name	MMSI	Position	Range (NM)	Status of implementation [Date of Operation]	Purpose (PC/SD/PS)	Watch hours on CH70	
		Main	Puerto Natales	007250340	51 45S 72 32W	15				
		Main	Evangelistas	007250350	52 24S 75 06W	30				
		Main	Fairway	007250360	52 44S 73 47W	25				
		Main	Bahia Felix	007250370	52 58S 74 04W	22				
		Main	Punta Arenas	007250380	53 09S 70 57W	75	Operational			
		Main	Punta Delgada	007250390	52 28S 69 33W	18				
		Main	Dungenes	007250400	52 24S 68 26W	22	Planned			
		Main	Espiritu Santo	007250410	52 40S 68 37W	30				
		Main	Puerto Williams	007250420	54 56S 67 37W	15				
		Main	Wollaston	007250430	55 37S 68 18W	25				
		Main	Cabo de Homos	007250435	55 58S 57 13W	25				
		Main	Diego Ramirez	007250440	56 31S 68 43W	35				
		Main	Bahia Fildes (Antarctica)	007250450	62 13S 58 49W	20				
		Main	Base A.Prat (Antarctica)	007250460	62 29S 59 38W	20				
		Main	Bahia Paraiso	007250470	64 49S 62 51W	20				
XVI	Peru	Main	Paita	007600121	05 05S 81 07W	40	Operational	SD	24 hrs	MRSC Paita
		Main	Callao	007600125	12 03S 77 09W	40		SD	24 hrs	MRCC Callao
		Main	Mollendo	007600129	17 01S 72 01W	40	Planned[12.1999]	SD	24 hrs	MRSC Mollendo

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PC = Public correspondence
SD = Safety and Distress
PS = Public correspondence & Safety and Distress
"**Monitor**"stations include remote-controlled stations.

ANNEX 3
LIST OF MF DSC COAST STATIONS FOR SEA AREAS A2

NAV/MET Area	Country	MF DSC Coast Station								RCC Associated
		Type	Name	MMSI	Position	Range (NM)	Status of implementation [Date of operation]	Purpose (PC/SD/PS)	Watch hours on 2187.5kHz	
I	Belgium	Main	Oostende Radio	002050480	51 11N 02 48E	115	Operational	PS	24 hrs	Oostende
	Denmark	Main	Blaavand Radio	002192000	55 33N 08 06E	153	Operational	PS	24 hrs	SOK, Aarhus
		Monitor	Skagen		57 44N 10 34E	148				
		Main	Torshavn Radio(Færoes)	002311000	62 00N 06 47W	225				MRCC Torshavan
	Estonia	Main	Tallinn*	002760100	59 24N 24 40E	150	Operational	SD	24 hrs	MRCC Tallinn
		Main	Kuressaare*	002760120	58 15N 22 29E	150				
		Main	Kärdla*	002760130	59 00N 22 45E	150				
		Main	Narva-Joesuu*	002760160	59 28N 28 02E	150				
		Monitor	Undva	002761000	58 29N 21 59E	150				
	Finland	Main	Turku	002300230	-	-	Operational	SD	24 hrs	MRCC Turku
		Monitor	CRS Sondby RX		60 16N 25 51E	185				MRSC Helsinki 002302000
			Helsinki TX		60 09N 25 09E	185				
			Mariehamn TX		60 07N 19 57E	185				MRCC Turku 002301000
			Mariehamn RX		63 18N 21 10E	185				
			Hailuoto		65 02N 24 32E	185				MRSC Vaasa 002303000
			Raippaluoto TX		63 19N 21 08E	185				
			Raippaluoto RX		63 18N 21 10E	185				
	France	Main	Ouessant(transmission)	002275300	48 28N 05 03W	300	Operational	SD	24 hrs	MRCC Corsen
		Main	Corsen (reception)		48 24N 04 24W					
	Greenland (Denmark)	Main	Aasiaat	003313000	69 15N 53 31W	280	Operational	SD	24 hrs	MRCC Grønnedal
		Monitor	Upernavik		72 47N 56 10W	280				
			Sisimiut		66 55N 53 40W	270				
		Main	Nuuk	003312000	64 04N 52 01W	250				
		Monitor	Paamiut		62 00N 49 43W	230				
		Main	Qaqortoq	003311000	60 41N 46 36W	220				
		Monitor	Ikerasassuaq		60 04N 43 10W	220				
		Main	Ammassilik	003314000	65 36N 37 38W	280				

* Main MF stations in Estonia is reserved.

NAV/MET Area	Country	MF DSC Coast Station								RCC Associated
		Type	Name	MMSI	Position	Range (NM)	Status of implementation [Date of operation]	Purpose (PC/SD/PS)	Watch hours on 2187.5kHz	
	Iceland	Main	Reykjavik Radio	002510100	64 05N 21 51W	216	Operational	N.I.	N.I.	MRCC Keflavik
		Main	Isafjordur Radio	N.I.	66 05N 23 02W	227				
		Main	Siglufjordur Radio	N.I.	66 11N 18 57W	216				
		Main	Neskaupstadur Radio	N.I.	65 09N 13 42W	194				
		Main	Hornafjordur Radio	N.I.	64 15N 15 13W	194				
		Main	Vestmannaejar Radio	N.I.	63 26N 20 16W	194				
	Ireland	Main	Malin Head Radio	002500100	55 21N 07 20W	150	Operational	SD	24 hrs	MRCC Shannon Airport
		Main	Valentia Radio	002500200	51 55N 10 20W	150				
	Latvia	Main	Riga Rescue Radio	002750100	56 58N 24 05E	150	Operational	SD	24 hrs	MRCC Riga
	Netherlands	Main	Netherlands CoastGuard(Tx)	002442000	52 06N 04 15E	240	Operational	SD	24 hrs	Coast Guard Centre IJmuiden
		Monitor	Appingedam (Rx)		53 20N 06 51E	150				
			Hook of Holland (Rx)		51 59N 04 06E	150				
	Norway	Main	Tjome Radio	002570100	59 26N 10 37E	200	Operational	PS	24 hrs	RCC Stavanger
		Main	Farsund Radio	002570200	58 04N 06 45E	200				
		Main	Rogaland Radio	002570300	58 39N 05 36E	200				
		Main	Bergen Radio	002570400	60 42N 04 52E	200				
		Main	Floro Radio	002570500	61 35N 05 00E	200				
		Main	Ørlandet Radio	002570600	63 41N 09 36E	200				RCC Stavanger/Bodø
		Monitor	Aalesund		62 28N 06 12E	200				
		Main	Bodø Radio	002570700	67 16N 14 23E	200				RCC Bodø
		Monitor	Sandnessjøen		66 01N 12 37E	200				
			Andenes		69 18N 16 04E	200				
			Jan Mayen		70 57N 08 40W	200				
			Bjørnøya		74 31N 19 01E	200				
		Main	Vardø Radio	002570800	70 22N 31 06E	200				
		Monitor	Tromso		69 39N 18 57E	200				
			Hammerfest		0 40N 23 40E	200				
			Berlevaag		70 52N 29 04E	200				
		Main	Svalbard Radio	002570900	78 02N 13 40E	200				
	Poland	Main	Witowo-Radio	002610210	54 33N 16 32E	N.I.	Operational	PS	N.I.	Polratok-Gdynia Polratok-Swinoujscie
		Main	Szczecin Radio		53 28N 14 35E	150	Planned[N.I.]			

NAV/MET Area	Country	MF DSC Coast Station								RCC Associated
		Type	Name	MMSI	Position	Range (NM)	Status of implementation [Date of operation]	Purpose (PC/SD/PS)	Watch hours on 2187.5kHz	
		Monitor	Barzowice (TX only)		54 32N 16 32E	150				
			Szczecin/Zelechowo (TX only)		53 28N 14 34E	150				
			Miedzyzdroje a-Grzywacz (RX only)		N.I.	N.I.				
			Jaroslawiec (RX only)		N.I.	N.I.				
			Trzeszczyn (RX only)		N.I.	N.I.				
	Russian Federation	Main	Kaliningrad		54 42N 20 30E	150	Planned [2000]	SD	24 hrs	MRSC Kaliningrad
		Main	St-Petersburg	002733700	59 34N 30 13E	120				MRCC St-Petersburg
	Sweden	Main	Göteborg	002653000	57 28N 11 56E	210	Operational	SD	24 hrs	MRCC Göteborg
		Main/ Monitor	Stockholm	002652000	59 16N 18 42E	210		PS		
		Monitor	Bjuröklubb	002653000	64 28N 21 36E	250		SD		
			Hoburg (RX only)		56 56N 18 13E	210				
	United Kingdom	Main	Aberdeen	002320004	57 38N 02 14W	150	Operational	SD	24 hrs	Aberdeen MRCC
		Main	Tyne-Tees	002320006	55 20N 00 34W	150				Tyne/Tees MRSC
		Main	Humber Head	002320007	54 17N 00 05W	150				Humber MRSC
		Main	Stornoway	002320024	58 13N 06 20W	150				Stornoway MRSC
		Main	Holyhead	002320018	53 18N 04 38W	150				Holyhead MRSC
		Main	Falmouth	002320014	50 08N 05 02W	150				Falmouth MRCC
		Main	Tiree	002320022	56 31N 06 48W	150				Clyde MRCC
		Main	Milford Haven	002320017	51 41N 05 10W	150				Milford Haven MRSC
		Main	Lerwick	002320001	60 09N 01 09W	150				Shetland MRSC
II	Benin	Main	Cotonou Radio		N.I.	N.I.	Planned[N.I.]	N.I.	N.I.	
	Cape Verde	Main	Sao Vicente Radio		N.I.	100	Planned[1996]	N.I.	N.I.	
	Cameroon	Main	Douala Radio		N.I.	N.I.	Planned[N.I.]	N.I.	N.I.	
	Congo	Main	Pointe Noire Radio		N.I.	N.I.	Planned[N.I.]	N.I.	N.I.	
	Côte D'ivoire	Main	Abidjan Radio		N.I.	N.I.	Planned[N.I.]	N.I.	N.I.	
	Democratic Republic of the Congo	Main	Banana Radio		N.I.	N.I.	Planned[N.I.]	PS	N.I.	
	France	Main	Ouessant(transmission)		48 28N 05 03W	300	Operational	SD	24 hrs	MRCC Corsen

NAV/MET Area	Country	MF DSC Coast Station								RCC Associated
		Type	Name	MMSI	Position	Range (NM)	Status of implementation [Date of operation]	Purpose (PC/SD/PS)	Watch hours on 2187.5kHz	
			Corsen (reception)	002275300	48 24N 04 24W					
	Ghana	Main	Tema Radio		05 37N 00 00W	100	Planned[N.I.]	N.I.	N.I.	Harbour Master's Office, Accra
	Guinea	Main	Kamsar Radio		N.I.	N.I.	Planned[N.I.]	N.I.	N.I.	
	Guinea Bissau	Main	Bissau Radio		N.I.	N.I.	Planned[N.I.]	N.I.	N.I.	
	Liberia	Main	Monrovia Radio		N.I.	N.I.	Planned[N.I.]	N.I.	N.I.	
	Mauritania	Main	Nouadhibou Radio		N.I.	N.I.	Planned[N.I.]	N.I.	N.I.	
	Portugal	Main	MRCC Lisboa	002630100	38 41N 09 19W	200	Planned[N.I.]	SD	24 hrs	MRCC Lisboa RCC Lisboa
		Monitor	Apulia Radio	002630200	41 28N 08 45W	200				
			Sagres Radio	002630400	37 00N 08 56W	200				
		Main	MRCC Delgada	002040100	37 44N 25 40W	200				MRCC Delgada RCC Lages
		Monitor	Horta Radio	002040200	38 38N 28 32W	200				
			Delgada Radio	002040300	37 44N 25 40W	200				
		Main	MRSC Funchal	002550100	32 38N 16 54W	200				MRSC Funchal RCC Lisboa
		Monitor	Porto Santo Radio	002550200	33 04N 16 21W	200				
	Senegal	Main	Dakar Radio		N.I.	N.I.	Planned[N.I.]	N.I.	N.I.	
	Sierra Leone	Main	Wilberfree Hill Radio		N.I.	N.I.	Planned[N.I.]	N.I.	N.I.	
	Spain	Main	Bilbao	002240996	43 21N 03 02W	150	Operational	SD	24 hrs	
		Main	Gijon	002240997	43 34N 05 42W	150				
		Main	Las Palmas	002240995	28 08N 15 25W	150				
		Main	Tenerife	002241007	28 29N 16 14W	150				
		Main	Finisterre	001640973	43 48N 08 59W	150				
		Main	Tarifa	002240994	36 01N 05 35W	150				
III	Bulgaria	Main	Varna Radio	002070810	43 04N 27 46E	200	Operational	PS	24 hrs	MRCC Varna
	Cyprus	Main	Cyprus Radio	002091000	35 07N 33 20E	200	Operational	PS	24 hrs	RCC Larnaca RCC Episkopt
	Egypt	Main	Alexandria Radio	006221111	31 11N 29 51E	350	TBD	SD	24 hrs	RCC Cairo
		Main	Port Said Radio	006221113	31 19N 32 18E	350			18 hrs (0600-0000)	
	France	Main	Porqurolles (transmission)	002275400	42 59N 06 12E	250	Operational	SD	24 hrs	MRCC La Garde

NAV/MET Area	Country	MF DSC Coast Station								RCC Associated
		Type	Name	MMSI	Position	Range (NM)	Status of implementation [Date of operation]	Purpose (PC/SD/PS)	Watch hours on 2187.5kHz	
		Main	La Garde (reception)		43 06N 05 59E					
	Greece	Main	Limnos Radio (1)		39 52N 25 04E	200	Planned[End 2000]	PS	24 hrs	Piraeus Joint RCC 37 58N 23 40E
		Main	Iraklion Radio (1)		35 20N 25 07E	200				
		Main	Kerkyra Radio (1)		39 37N 19 55E	200				
		Main	Piraeus Joint RCC (2)	237673000 237673100	37 58N 23 40E	130	Operational	SD		
		Main	Kerkyra (2)	237673190	39 38N 19 55E	130				
		Main	Patra (2)	237673140	38 14N 21 44E	130				
		Main	Pylos (2)	237673230	36 54N 21 41E	130				
		Main	Iraklion (2)	237673180	35 20N 25 08E	130				
		Main	Rodos (2)	237673150	36 27N 28 14E	130				
		Main	Thessaloniki (2)	237673210	40 38N 22 56E	130				
		Main	Mytilini (2)	237673220	39 06N 26 35E	130				
		Main	Aspropyrgos Radio (2)	002391000	38 02N 23 35E	130				
	Italy	Main	Roma	002470001			Planned [N.I.]	PS	24 hrs	
		Monitor	Trieste (M.Radio)		45 36N 13 46E	150				MRSC Trieste
			Ancona (F.Mirto)		43 36N 13 28E	150				MRSC Ancona
			Cagliari (M Rosso)		39 13N 09 14E	150				MRSC Cagliari
			Civitavecchia		42 01N 11 49E	150				MRSC Roma
			Genova (Castellaccio)		44 25N 08 56E	150				MRSC Genova
		Main	Palermo	002470002						
		Monitor	Palermo (P.Raisi)		38 11N 13 06E	150				MRSC Palermo
			Mazara delVallo		37 39N 12 36E	150				
			Augusta		37 14N 15 14E	150				MRSC Catania
			Monteparano		40 26N 17 25E	150				MRSC Bari

(1) Greece intends to establish A2 Sea area by these three stations. However, at the moment and until, at least, the establishment of the A2 Sea area, just for reasons of additional safety only but without this to be considered as an establishment of an A2 Sea area, Hellenic Coast Guard keeps 24 hour watch on MF DSC distress frequency (2187.5 kHz), using its own stations, indicated by the footnote (2).

(2) DSC MF stations, owned by Helenic Coast Guard

NAV/MET Area	Country	MF DSC Coast Station								RCC Associated
		Type	Name	MMSI	Position	Range (NM)	Status of implementation [Date of operation]	Purpose (PC/SD/PS)	Watch hours on 2187.5kHz	
	Malta	Monitor	Malta Radio		35 49N 14 32E	320	Planned[1998]	SD or PS	24 hrs	
	Romania	Main	Constanta	002640570	44 07N 28 35E	100	Operational	PS	24 hrs	Constanta Hr. Master
	Russian Federation	Main	Novorossiysk	002734411	44 36N 37 58E	173	Operational	SD	24 hrs	MRCC Novorossiysk
		Monitor	Taganrog		47 14N 38 56E	70				
			Temriuk		45 19N 37 13E	70				
	Spain	Main	Barcelona	002240994	41 16N 01 54E	150	Operational	SD	24 hrs	
		Main	Valencia	008241002	39 27N 00 20W	150	Planned[1996]	SD	24 hrs	
		Main	Cabo de La Nao	002401005	38 43N 00 09E	150				
		Main	Almeria	001241001	34 50N 08 25W	150				Tarifa
	Turkey	Main	Antalya	002713000	35 53N 30 42E	146	Planned[12.1998]	PS	24 hrs	Ankara
		Main	Canakkale	002714000	40 08N 26 24E	146				
		Main	Iskenderun	002715000	36 37N 36 07E	146				
		Main	Istanbul	002711000	40 59N 28 49E	146	Operational			
		Main	Izmir	002716000	38 21N 26 35E	146	Planned[12.1998]			
		Main	Mersin	002717000	36 49N 34 36E	146				
		Main	Samsum	002712000	41 17N 36 20E	146				
		Main	Trabzon	002718000	41 00N 39 43E	146				
		Main	Zonguldak	002719000	41 27N 31 48E	146				
IV	Bermuda(UK)	Main	Bermuda Harbour Radio	003100001	32 23N 64 41W	200	Operational	SD	24hrs	RCC Bermuda
	Canada	TBD								
	Greenland (Denmark)	Main	Aasiaat	003313000	69 15N 53 31W	280	Operational	SD	24hrs	MRCC Grønnedal
		Monitor	Upemavik		72 47N 56 10W	280				
			Sisimiut		66 55N 53 40W	270				
		Main	Nuuk	003312000	64 04N 52 01W	250				
		Monitor	Paamiut		62 00N 49 43W	230				
		Main	Qaqortoq	003311000	60 41N 46 36W	220				

NAV/MET Area	Country	MF DSC Coast Station								RCC Associated
		Type	Name	MMSI	Position	Range (NM)	Status of implementation [Date of operation]	Purpose (PC/SD/PS)	Watch hours on 2187.5kHz	
		Monitor	Ikerasassuaq		60 04N 43 10W	220				
		Main	Ammassilik	003314000	65 36N 37 38W	280				
	Jamaica	N.I.					Planned[N.I.]			
	Mexico	Main	Tampico	003450110	22 13N 97 51W	150	Operational	PS	24 hrs	Zona Naval
		Monitor	Veracruz	003450310	19 09N 96 07W	150	Planned[30.03.2000]			
			Cd. Del Carmen	003450710	18 08N 92 07W	150	Planned[30.04.2000]			
			Progreso	003450910	20 54N 90 12W	150	Planned[30.05.2000]			
			Cozumel	003451110	20 25N 86 46W	150	Planned[30.11.2000]			
	United States	Main	Woods Hole	003669902	41 31N 70 40W		Planned[2000]	SD	24 hrs	Boston
		Monitor	Brant Point		41 18N 70 05W					
		Main	Cape May	003669903	38 57N 74 53W					Portsmouth
		Main	Cape Hatteras	003669906	35 14N 75 32W					
		Main	Charleston	003669907	32 47N 79 57W					Miami
		Monitor	Sullivans Island		32 46N 79 50W					
		Main	New Orleans	003669908	29 53N 89 57W					New Orleans
		Monitor	Grand Isle		29 15N 89 58W					
		Main	Mobile	003669914	30 39N 88 03W					
		Monitor	Santa Rosa		30 19N 87 15W					
		Main	Galveston	003669915	29 20N 94 46W					
		Monitor	Freeport		28 56N 95 18W					
		Main	Corpus Christi	003669916	27 48N 97 24W					
		Monitor	Port Isabel		26 04N 97 10W					
		Main	St. Petersburg	003669917	27 46N 82 38W					Miami
		Monitor	Venice		27 06N 82 22W					
			Chokoloskee		25 50N 81 23W					
			Mullet Key		27 38N 82 44W					

NAV/MET Area	Country	MF DSC Coast Station								RCC Associated
		Type	Name	MMSI	Position	Range (NM)	Status of implementation [Date of operation]	Purpose (PC/SD/PS)	Watch hours on 2187.5kHz	
		Main	Key West	003669918	24 33N 81 48W					
		Monitor	Marathon		24 42N 81 05W					
		Main	Miami	003669919	25 54N 80 16W					
		Monitor	Islamorada		27 57N 80 37W					
			Ft. Pierce		27 26N 80 20W					
		Main	Fort Macon	003669920	34 41N 76 41W					Portsmouth
		Main	Southwest	003669921	44 17N 68 19W					Boston
		Main	Mayport	003669925	30 23N 81 19W					Miami
		Main	Boston	003669927	42 22N 71 03W					Boston
		Main	South Portland	003669928	43 39N 70 15W					
		Main	Sandy Hook	003669929	40 28N 74 01W					
		Main	New York	003669930	40 41N 74 01W					
		Main	New Haven	003669931	41 16N 72 54W					
		Main	Chincoteague	003669932	37 56N 75 23W					Portsmouth
		Main	Hampton Roads	003669933	36 53N 76 21W					
		Main	Portland	003669934	43 40N 70 15W					Boston
		Main	Moriches	003669936	40 47N 72 45W					
		Monitor	Shinnecock		40 51N 72 30W					
		Main	Boston	003669991	41 39N 70 30W		Operational			
		Main	Portsmouth	003669995	36 44N 76 01W					Portsmouth
		Main	Miami	003669997	25 37N 80 23W					Miami
		Main	San Juan	003669992	18 28N 66 07W		Planned[2000]			San Juan
		Main	New Orleans	003669998	29 53N 89 57W					New Orleans
	Venezuela		N.I.				Planned[1999]			
V	Uruguay	Main	Montevideo Radio		34 52S 56 19W	N.I.	Planned[N.I.]	N.I.	N.I.	Port of Montevideo
		Main	La Paloma Radio		34 39S 54 08W	N.I.				

NAV/MET Area	Country	MF DSC Coast Station								RCC Associated
		Type	Name	MMSI	Position	Range (NM)	Status of implementation [Date of operation]	Purpose (PC/SD/PS)	Watch hours on 2187.5kHz	
VI	Argentina	Main	Argentina Radio	007010111	34 36S 58 28W	200	Operational	PS	24 hrs	Buenos Aires
		Main	Buenos Aires Radio	007010001	34 27S 58 37W	150	Planned[N.I.]	N.I.	24 hrs	
		Main	Recalada Río de la Plata Radio	007010002	35 10S 56 19W	150				
		Main	Mar del Plata Radio	007010221	38 03S 57 32W	150	Operational	SD		Puerto Belgrano
		Main	Bahía Blanca Radio	007010005	38 43S 62 06W	150	Planned[N.I.]	N.I.		
		Main	Patagones Radio	007010006	40 48S 62 59W	150				
		Main	Rawson Radio	007010007	43 20S 65 03W	150				
		Main	Comodoro Rivadavia Radio	007010008	45 51S 67 25W	150				
		Main	Puerto Deseado Radio	007010009	47 46S 65 54W	150				
		Main	Río Gallegos Radio	007010010	51 37S 69 03W	150				Ushuaia
		Main	Ushuaia Radio	007010011	54 48S 68 18W	150				
		Main	I.Orcadas Radio	N.I.	60 45S 44 44W	150				
VII	Angola	Main	Luanda Radio		N.I.	N.I.	Planned[N.I.]	N.I.	N.I.	
	Comoros	Main	Moroni Radio		N.I.	N.I.	Planned[N.I.]	N.I.	N.I.	
	Madagascar	Main	Toamasina Radio		N.I.	N.I.	Planned[N.I.]	N.I.	N.I.	
		Main	Mahajanga Radio		N.I.	N.I.				
		Main	Toliara Radio		N.I.	N.I.				
	Mozambique	Main	Maputo Radio		N.I.	N.I.	Planned[N.I.]	N.I.	N.I.	
	South Africa		N.I.		N.I.	N.I.	Planned[N.I.]	N.I.	N.I.	
VIII	Kenya	Main	Mombasa Radio		N.I.	N.I.	Planned[N.I.]	N.I.	N.I.	
	Mauritius	Main	Cassis	006452700	20 10S 57 28E	150	Operatinoal	SD	24 hrs	
	Myanmar	TBD								
	Seychelles	Main	Seychelles Radio		N.I.	N.I.	Planned[N.I.]	N.I.	N.I.	
	Tanzania	Main	Dar es Salaam Radio		N.I.	N.I.	Planned[N.I.]	N.I.	N.I.	
IX	Djibouti	Main	Djibouti Radio		N.I.	N.I.	Planned[N.I.]	N.I.	N.I.	
	Egypt	Main	Kosseir Radio	006221112	26 07N 34 17E	350	TBD	SD	18 hrs (0600-0000)	RCC Cairo

NAV/MET Area	Country	MF DSC Coast Station								RCC Associated
		Type	Name	MMSI	Position	Range (NM)	Status of implementation [Date of operation]	Purpose (PC/SD/PS)	Watch hours on 2187.5kHz	
	Jordan	Main	Aqaba Radio	004381234	29 33N 34 59E	350	Planned[N.I.]	PS	24 hrs	
	Oman	Main	Muscat Radio		23 36N 58 30E	100	Planned[N.I.]	PS	N.I.	HQ Royal Air Force of Sultanate of Oman
	Saudi Arabia	Main	Damman Radio		26 26N 50 06E	N.I.	Planned[N.I.]	N.I.	N.I.	
		Main	Jeddah Radio		21 23N 39 10E	N.I.				
	Sudan	Main	Port Sudan Radio		N.I.	N.I.	Planned[N.I.]	N.I.	N.I.	
	United Arab Emirates	N.I.	N.I.		N.I.	N.I.	Planned[End 1995]	N.I.	N.I.	
X	Australia**	Main	Perth Radio	005030331	31 48S 115 53E	100	Operational	SD	24 hrs	RCC Australia
		Main	Brisbane Radio	005030330	27 04S 153 03E	100	Operational	SD	24 hrs	
XI	China	Main	Basuo Radio	004123600	19 06N 108 37E	100	Planned[End 1995]	PS	24 hrs	Basuo HSA
		Main	Beihai Radio	004123400	21 29N 109 04E	100				Beihai HSA
		Main	Dalian Radio	004121300	38 50N 121 31E	100				Liaoning MRCC
		Main	Fuzhou Radio	004122600	26 01N 119 18E	100				Fuian MRCC
		Main	Guangzhou Radio	004123100	23 08N 113 29E	100				Guangdong MRCC
		Main	Lianyungang Radio	004122300	34 42N 119 18E	100				Lianyungang MRCC
		Main	Ningbo Radio	004122400	30 01N 121 30E	100				Ningbo HSA
		Main	Qingdao Radio	004122200	36 10N 120 28E	100				Qingdao MRSC
		Main	Sanya Radio	004123700	18 14N 109 30E	100				Sanya HSA
		Main	Shantou Radio	004123200	23 21N 116 40E	100				Shantou MRSC
		Main	Tianjin Radio	004121100	39 03N 117 25E	100				Tianjin MRCC
		Main	Xiamen Radio	004122700	24 35N 118 06E	100				Xiamen MRSC
		Main	Wenzhou Radio	004122500	28 02N 120 39E	100				Wenzhou HSA
		Main	Yantai Radio	004121400	37 32N 121 22E	100				Yantai MRSC
		Main	Zhanjiang Radio	004123300	21 09N 110 21E	100				Zhanjiang RSC
	Guam (United States)	Main	Guam	003669994	13 29N 144 50E		Planned[2000]	SD	24 hrs	Honolulu
	Indonesia	N.I.	Ambon		03 41S 128 10E	N.I.	Planned[N.I.]	PS	N.I.	MRSC Ambon

NAV/MET Area	Country	MF DSC Coast Station								RCC Associated
		Type	Name	MMSI	Position	Range (NM)	Status of implementation [Date of operation]	Purpose (PC/SD/PS)	Watch hours on 2187.5kHz	
		N.I.	Atapupu		09 01S 124 51E	N.I.				MRSC Kupan
		N.I.	Balikpapan		01 16S 116 48E	N.I.				MRSC Balikpapan
		N.I.	Banabungi		05 30S 122 50E	N.I.				MRSC Ujungpandang
		N.I.	Banjarmasin		03 20S 114 35E	N.I.				MRSC Banjarmasin
		N.I.	Batu Ampar		01 09N 104 04E	N.I.				MRSC Tanjungpinang
		N.I.	Bawean		05 51N 112 39E	N.I.				MRCC Surabaya
		N.I.	Belawan		03 43N 98 40E	N.I.				MRSC Medan
		N.I.	Bengkulu		03 55N 102 16E	N.I.				MRSC Palembang
		N.I.	Benoa		08 44S 115 12E	N.I.				MRSC Denpasar
		N.I.	Biak		01 11S 136 05E	N.I.				MRCC Biak
		N.I.	Bima		08 27S 118 43E	N.I.				MRSC Denpasar
		N.I.	Bintuni		02 07S 133 30E	N.I.				MRSC Sorong
		N.I.	Bitung		01 26N 125 10E	N.I.				MRSC Menado
		N.I.	Celukan Bawang		08 11S 114 49E	N.I.				MRSC Palembang
		N.I.	Cigading		06 30S 105 57E	N.I.				MRCC Jakarta
		N.I.	Cilacap		07 45S 109 02E	N.I.				
		N.I.	Cirebon		06 45S 108 33E	N.I.				
		N.I.	Dabo Singkep		00 30S 104 34E	N.I.				MRSC Pekanbaru
		N.I.	Dilli		08 33S 125 34E	N.I.				MRSC Kupang
		N.I.	Donggala		00 39S 119 44E	N.I.				MRSC Menado
		N.I.	Dumai		01 41N 101 27E	N.I.				MRSC Pekanbaru
		N.I.	Ende		08 50S 121 38E	N.I.				MRSC Kupang
		N.I.	Fak-Fak		01 57S 131 17E	N.I.				MRSC Sorong
		N.I.	GN. Sitoli		01 19N 97 36E	N.I.				MRSC Medan
		N.I.	Gorontalo		00 29N 123 03E	N.I.				MRSC Menado
		N.I.	Gresik		01 09S 112 39E	N.I.				MRCC Surabaya

NAV/MET Area	Country	MF DSC Coast Station								RCC Associated
		Type	Name	MMSI	Position	Range (NM)	Status of implementation [Date of operation]	Purpose (PC/SD/PS)	Watch hours on 2187.5kHz	
		N.I.	Jakarta		06 07S 106 51E	N.I.				MRCC Jakarta
		N.I.	Jambi		01 01S 104 08E	N.I.				MRSC Padang
		N.I.	Jayapura		02 30S 140 43E	N.I.	Planned[N.I.]	PS	N.I.	MRSC Jayapura
		N.I.	Kaimana		03 40S 135 45E	N.I.				MRSC Sorong
		N.I.	Kalabahi		08 03S 124 30E	N.I.				MRSC Denpasar
		N.I.	Kalianget		07 04S 113 58E	N.I.				MRCC Surabaya
		N.I.	Kendari		03 55S 122 25E	N.I.				MRCC Ujungpandang
		N.I.	Kupang		10 09S 123 34E	N.I.				MRSC Kupang
		N.I.	Lahewa		01 24N 97 09E	N.I.				MRCC Ujungpandang
		N.I.	Larantuka		08 20S 122 59E	N.I.				MRSC Kupang
		N.I.	Lembar		08 43S 116 04E	N.I.				MRSC Denpasar
		N.I.	Luwuk		00 56S 122 47E	N.I.				MRSC Menado
		N.I.	Makassar		05 06S 119 25E	N.I.				MRCC Ujungpandang
		N.I.	Manokwari		00 48S 134 00E	N.I.				MRSC Biak
		N.I.	Masalembo		05 34S 114 27E	N.I.				MRCC Ujungpandang
		N.I.	Maumere		08 59S 122 13E	N.I.				MRSC Kupang
		N.I.	Menado		01 20N 129 50E	N.I.				MRSC Menado
		N.I.	Meneng		08 07S 114 23E	N.I.				MRCC Surabaya
		N.I.	Merauke		08 28S 110 23E	N.I.				MRSC Merauke
		N.I.	Padang Bai		08 32S 115 30E	N.I.				MRSC Padang
		N.I.	Palembang		02 50S 104 46E	N.I.				MRSC Palembang
		N.I.	Panarukan		07 14S 113 56E	N.I.				MRCC Surabaya
		N.I.	Pangkal Balam		02 10S 106 07E	N.I.				MRSC Tanjungpinang
		N.I.	Panjang		05 28S 105 19E	N.I.				MRSC Palembang
		N.I.	Parigi		00 48S 120 09E	N.I.	Planned[N.I.]	PS	N.I.	MRSC Menado
		N.I.	Pontiaanak		00 01S 109 18E	N.I.				MRSC Pontianak

NAV/MET Area	Country	MF DSC Coast Station								RCC Associated
		Type	Name	MMSI	Position	Range (NM)	Status of implementation [Date of operation]	Purpose (PC/SD/PS)	Watch hours on 2187.5kHz	
		N.I.	Poso		01 22S 120 45E	N.I.				MRSC Menado
		N.I.	Probolinggo		07 23S 113 13E	N.I.				MRCC Surabaya
		N.I.	Pulang Pisau		02 45S 114 15E	N.I.				MRSC Tanjungpinang
		N.I.	Pulau Sambu		01 09S 103 53E	N.I.				
		N.I.	Rengat		00 28S 102 41E	N.I.				
		N.I.	Sabang		05 54N 95 21E	N.I.				MRSC Medan
		N.I.	Samarinda		00 30S 117 09E	N.I.				MRSC Balikpapan
		N.I.	Sampit		02 33S 112 57E	N.I.				MRSC Banjarmasin
		N.I.	Sanana		02 03S 125 59E	N.I.				MRSC Ambon
		N.I.	Selat Panjang		01 01N 102 43E	N.I.				MRSC Tanjungpinang
		N.I.	Semarang		06 56N 110 25E	N.I.				MRCC Surabaya
		N.I.	Serui		01 53S 136 14E	N.I.				MRCC Biak
		N.I.	Siau		02 44N 125 23E	N.I.				MRSC Menado
		N.I.	Sibolga		01 44N 98 46E	N.I.				MRSC Medan
		N.I.	Sintete		01 10N 109 04E	N.I.				MRSC Pontianak
		N.I.	Sorong		00 53S 131 00E	N.I.				MRSC Sorong
		N.I.	Sunda Kelapa		N.I.	N.I.				MRCC Jakarta
		N.I.	Surabaya		07 12S 112 44E	N.I.				MRCC Surabaya
		N.I.	Tahuna		03 36N 125 30E	N.I.				MRSC Menado
		N.I.	Tarakan		03 17N 117 35E	N.I.				MRSC Balikpapan
		N.I.	Tegal		06 51S 109 08E	N.I.				MRCC Jakarta
		N.I.	Teluk Bayur		01 00S 100 21E	N.I.				MRSC Padang
		N.I.	Teluk Dalam		00 35N 97 49E	N.I.				MRSC Padang
		N.I.	Tembilahan		00 19S 103 09E	N.I.				MRSC Tanjungpinang
		N.I.	Ternate		00 47N 127 22E	N.I.				MRSC Ambon
		N.I.	TG BL Karimun		00 56N 103 26E	N.I.				MRSC Tanjungpinang

NAV/MET Area	Country	MF DSC Coast Station								RCC Associated
		Type	Name	MMSI	Position	Range (NM)	Status of implementation [Date of operation]	Purpose (PC/SD/PS)	Watch hours on 2187.5kHz	
		N.I.	TG. Pinang		00 55N 104 26E	N.I.				MRSC Tanjungpinang
		N.I.	TG. Uban		01 03N 104 13E	N.I.				MRSC Tanjungpinang
		N.I.	Toli-Toli		01 03N 120 48E	N.I.				MRSC Menado
		N.I.	Tual		05 20S 132 40E	N.I.				MRSC Ambon
		N.I.	Olee Lheue		05 34S 95 17E	N.I.				MRSC Menado
		N.I.	Waingapu		09 40S 120 15E	N.I.				MRSC Kupang
	Japan	Main	Otaru Sea Patrol Radio	004310101	-	-	Operational	SD	24 hrs	Otaru RCC
		Monitor	Shakotan		43 20N 140 32E	150				
			Hakodateyama		41 45N 140 43E	150				
		Main	Kushiro Sea Patrol Radio	004310102	-	-				
		Monitor	Tokotan		43 00N 144 53E	150				
			Souyamisaki		45 31N 141 56E	150				
			Nemuro		43 21N 145 35E	100				
			Monbetsu		44 21N 143 22E	150				
		Main	Shiogama Sea Patrol Radio	004310201	-	-				Shiogama RCC
		Monitor	Komagamine		38 18N 141 32E	150				
			Same		40 29N 141 37E	150				
			Kamaishi		39 16N 141 54E	150				
			Nyudozaki		40 00N 139 42E	150				
		Main	Yokohama Sea Patrol Radio	004310301	-	-				Yokohama RCC
		Monitor	Chikura		34 56N 139 56E	150				
			Choshi		35 44N 140 52E	150				
			Shimoda		34 40N 138 57E	150				
		Main	Nagoya Sea Patrol Radio	004310401	-	-				Nagoya RCC
		Monitor	Asamagatake		34 27N 136 49E	150				
		Main	Tanabe Sea Patrol Radio	004310502	33 43N 135 24E	150				Kobe RCC

NAV/MET Area	Country	MF DSC Coast Station					Status of implementation [Date of operation]	Purpose (PC/SD/PS)	Watch hours on 2187.5kHz	RCC Associated
		Type	Name	MMSI	Position	Range (NM)				
		Main	Kochi Sea Patrol Radio	004310503	-	-				
		Monitor	Tosayama		33 36N 133 32E	150				
		Main	Kobe Sea Patrol Radio	004310501	-	-				
		Monitor	Senzan		34 22N 134 50E	60				
		Main	Hiroshima Sea Patrol Radio	004310601	-	-				Hiroshima RCC
		Monitor	Noro		34 15N 132 40E	60				
		Main	Moji Sea Patrol Radio	004310701	-	-				Kitakyushu RCC
		Monitor	Yukawayama		33 52N 130 33E	150				
			Wakayama		33 11N 131 44E	60				
			Mokkoku		34 08N 129 12E	150				
		Main	Sasebo Sea Patrol Radio	004310702	-	-				
		Monitor	Ishimoriyama		33 14N 129 44E	150				
		Main	Maizuru Sea Patrol Radio	004310801	-	-				Maizuru RCC
		Monitor	Sorayama		35 33N 135 25E	150				
			Nawa		35 31N 133 32E	150				
		Main	Niigata Sea Patrol Radio	004310901	-	-				Niigata RCC
		Monitor	Nekogatake		37 28N 137 08E	150				
			Shidaihama		38 00N 139 17E	150				
		Main	Kagoshima Sea Patrol Radio	004311001	-	-				Kagoshima RCC
		Monitor	Yoko-o		31 19N 130 49E	150				
			Aburatsu		31 35N 131 25E	150				
			Naze		28 23N 129 30E	100				
		Main	Naha Sea Patrol Radio	004311101	26 09N 127 46E	150				Naha RCC
		Main	Ishigaki Sea Patrol Radio	004311102	-	-				
		Monitor	Miyara		24 21N 124 12E	150				
	Malaysia	Monitor	Kuantan		04 06N 103 23E	300	Planned[1999]	PS	24 hrs	MRCC Port Klang

NAV/MET Area	Country	MF DSC Coast Station								RCC Associated
		Type	Name	MMSI	Position	Range (NM)	Status of implementation [Date of operation]	Purpose (PC/SD/PS)	Watch hours on 2187.5kHz	
			Kuching		01 49N 109 46E	300				
			Kota Kinabalu		05 57N 116 02E	300				
			Sandakan		05 40N 118 07E	300	Planned[2001]			
			Penang		05 23N 100 19E	300				
	Philippines	Main	Manila		14 35N 120 57E	150	Planned[1999]	SD	24 hrs	Manila and 12 stations
		Monitor	Batangas		13 45N 121 03E					
			Iloilo		10 42N 122 35E					
			San Fernando		16 36N 120 18E					
			Aparri		18 22N 121 38E					
			Legaspi		13 09N 123 44E					
			San Jose		12 20N 121 05E					
			Davao		07 08N 125 40E					
			Puerto Princesa		09 44N 118 44E					
			Surigao		09 47N 125 30E					
			Cebu		10 16N 123 53E					
			Zamboanga		06 59N 122 01E					
			Gen. Santos		06 05N 125 09E					
	Korea, Republic of	Main	Inchon National Maritime Police Agency	004401001	37 45N 126 36E	120	Operational	SD	24 hrs	Inchon RCC
		Main	Busan National Maritime Police Agency		35 07N 129 05E	120	Planned[10.1997]			Busan RCC
		Main	Donghae National Maritime Police Agency	004401002	37 31N 129 07E	120	Operational			Donghae RCC
		Main	Mokpo National Maritime Police Agency		34 47N 126 24E	120	Planned[10.1997]			Mokpo RCC
		Main	Cheju National Maritime Police Agency		33 31N 126 32E	120				Cheju RCC
	Singapore	Main	Singapore Port Operations Control	005630002	01 16N 103 51E	200	Operational	SD	24 hrs	Singapore Port Operations Control Centre
	Thailand	Main	Bangkok Radio	005671000	13 23N 100 38E	162	Planned[1999]	PS	24 hrs	Bangkok RCC
		Main	Songkhla Radio	NI	07 10N 100 37E	162	Planned			Sub RCC Songkhla
	Vietnam	Main	Ho Chi Minh-Ville Radio	005741994	10 47N 106 40E	100	Operational	PS	24 hrs	Saigon port Authority
		Main	Haiphong Radio	005741997	20 44N 106 44E	100				Haiphong port Authority
		Main	Danang Radio	005741998	16 05N 108 13E	100	Planned[N.I.]			Danang port Authority

NAV/MET Area	Country	MF DSC Coast Station								RCC Associated
		Type	Name	MMSI	Position	Range (NM)	Status of implementation [Date of operation]	Purpose (PC/SD/PS)	Watch hours on 2187.5kHz	
		Main	Nhatrang Radio	005742001	12 15N 109 12E	100				Nhatrang port Authority
		Main	Vungtau Radio	005742004	10 19N 107 04E	100				Vungtau port Authority
	Associate Member of IMO Hong Kong, China	Main	Hong Kong Maritime Rescue Radio, Cape D'aguilar	004773500	22 12N 114 15E	200	Operational	SD	24 hrs	Hong Kong MRCC
		Main	Mt. Butler		22 16N 114 12E	200				
XII	Canada	TBD								
	Mexico	Main	Mazatlan	003450810	23 12N 106 26W	150	Operational	PS	24 hrr	Zona Naval
		Monitor	Acapulco	003451810	16 51N 099 54W	150	Planned[30.03.2000]			
			Ensenada	003450210	31 25N 116 37W	150	Planned[30.06.2000]			
			Manzanillo	003451410	18 15N 104 13W	150	Planned[30.07.2000]			
			La Paz	003450410	24 04N 110 20W	150	Planned[30.08.2000]			
			Guaymas	003450610	27 58N 110 50W	150	Planned[30.04.2000]			
			Guaymas	003452010	16 16N 095 11W	150	Planned[30.10.2000]			
	United States	Main	Port Angeles	003669904	48 08N 123 24W		Planned[2000]	SD	24 hrs	Seattle
		Monitor	Quillayute		47 54N 124 38W					
		Main	Honolulu	003669905	21 18N 157 52W					Honolulu
		Monitor	Lualuaei		21 16N 158 09W					
		Main	Humboldt Bay	003669909	40 46N 124 03W					Alameda
		Monitor	Point Arena		38 57N 123 44W					
		Main	Monterey	003669910	36 40N 121 55W					
		Monitor	Point Pinos		36 38N 121 56W					
		Main	North Bend	003669911	43 25N 124 14W					Seattle
		Monitor	Cape Arago		43 20N 124 22W					
		Main	Long Beach	003669912	33 47N 118 13W					Alameda
		Monitor	Point Conception		34 27N 120 28W					
		Main	San Diego	003669913	32 44N 117 10W					
		Monitor	San Clemente		32 53N 118 27W					
		Main	Juneau	003669922	58 18N 134 25W					Juneau
		Monitor	Lena Point		58 23N 134 45W					
			Yakutat		59 33N 139 44W					
		Main	Ketchikan	003669923	55 54N 131 50W					
		Monitor	Pt. Higgins		55 54N 131 50W					
		Main	Valdez	003669924	61 08N 145 21W					
		Monitor	Cape Hinchinbrook		60 14N 146 38W					
			Cape Yakataga		60 04N 142 25W					

NAV/MET Area	Country	MF DSC Coast Station								RCC Associated
		Type	Name	MMSI	Position	Range (NM)	Status of implementation [Date of operation]	Purpose (PC/SD/PS)	Watch hours on 2187.5kHz	
		Main	San Francisco	003669926	37 38N 122 23W					Alameda
		Main	Astoria	003669935	46 12N 123 57W					Seattle
		Monitor	Ft. Stevens		46 12N 123 57W					
		Main	San Francisco	003669990	37 56N 122 44W		Operational			Alameda
		Main	Kodiak	003669899	57 46N 152 34W					Juneau
		Main	Honolulu	003669993	21 26N 158 09W					Honolulu
XIII	Russian Federation	Main	Vladivostok (Cape of Kamenskiy)	002734412	42 45N 133 02E	150[3]	Operational	SD	24 hrs	MRCC Vladivostok
		Main	Vanino		49 05N 140 20E	150	Planned[2000]			MRSC Kholmsk
		Main	Nevelsk		46 38N 141 51E	150				
		Main	Petropavlovsk-Kamachatskiy		53 00N 158 40E	150				MRSC Petropavlovsk-Kamachatskiy
		Main	Magadan		59 40N 151 01E	150				
		Main	Arkhangelsk	002734414	64 21N 40 37E	150				MRSC Arkhangelsk
		Main	Murmansk	002734420	68 52N 33 05E	170[4]	Operational	PS		MRCC Murmansk
XIV	Fiji	Main	Suva	005201100	18 08S 17 83E	200	Operational	SD	24 hrs	RCC Wellington RCC Funafuti RCC Nadi Nat. Surv. Centre-Samoa Mar. Div.-Tarawa RCC Canberra
XV	Chile	Main	Arica	007250010	18 29S 70 19W	180	Operational	SD	24 hrs	MRCC Iquique
		Main	Iquique	007250020	20 21S 70 25W	180				
		Main	Antofagasta	007250050	23 40S 70 25W	180				
		Main	Caldera	007250080	27 04S 70 42W	180	Planned			MRCC Valparaiso
		Main	Isla de Pascua	007250100	27 11S 109 25W	180	Operational			
		Main	Coquimbo	007250110	29 56S 71 13W	180				
		Main	Juan Fernandez	007250130	33 37S 78 50W	180	Planned			
		Main	Valparaiso	007251860	33 01S 71 39W	250	Operational	PS		
		Main	San Antonio	007250140	33 34S 71 37W	180		SD		
		Main	Talcahuano	007250170	36 42S 73 06W	180				MRCC Talcahuano
		Main	Valdivia	007250220	39 48S 73 15W	120	Planned			
		Main	Puerto Montt	007250230	41 47S 73 53W	180				MRCC Puerto Montt
		Main	Castro	007250250	42 29S 73 46W	120				
		Main	Isla Guafo	007250290	43 34S 74 50W	180				

[3] radius 150nm from 42 45N 133 02E starting with Korian coast to 42 33N 136 25E, then straightforward to Cape of Olarovskiy.
[4] Except the area beneath latitude 69N.

NAV/MET Area	Country	MF DSC Coast Station								RCC Associated
		Type	Name	MMSI	Position	Range (NM)	Status of implementation [Date of operation]	Purpose (PC/SD/PS)	Watch hours on 2187.5kHz	
		Main	Aysen	007250300	45 24S 72 42W	80	Operational			
		Main	Raper	007250310	46 49S 75 37W	180	Planned			MRCC Punta Arenas
		Main	San Pedro	007250320	47 43S 74 53W	180				
		Main	Puerto Eden	007250330	49 38S 74 26W	80				
		Main	Puerto Natales	007250340	51 45S 72 32W	120				
		Main	Evangelistas	007250350	52 24S 75 06W	180				
		Main	Bahia Felix	007250370	52 58S 74 04W	120				
		Main	Punta Arenas	007250380	53 10S 70 54W	180	Operational			
		Main	Punta Delgada	007250390	52 28S 69 33W	120				
		Main	Dungenes	007250400	52 24S 68 26W	180	Planned			
		Main	Puerto Williams	007250420	54 56S 67 37W	120				
		Main	Wollaston	007250430	55 37S 68 18W	180				
		Main	Diego Ramirez	007250440	56 31S 68 43W	180				
		Main	Bahia Fildes(Antarctica)	007250450	62 13S 58 49W	180				
		Main	Base A.Prat(Antarctica)	007250460	62 29S 59 32W	180				
XVI	Peru	Main	Paita	007600121	05 05S 81 07W	200	Operational	SD	24 hrs	Paita
		Main	Callao	007600125	12 03S 77 09W	200				Callao
		Main	Mollendo	007500129	17 01S 72 01W	200	Planned[12.1997]			Mollendo

** Australia has not declared A2 areas formally, however it maintains the watchkeeping on MF DSC at coast stations mentioned.

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PC - Public Correspondence
SD - Safety and Distress
PS - Public Correspondence & Safety and Distress

ANNEX 4
LIST OF HF DSC COAST STATIONS FOR SEA AREAS A3 AND A4

NAV/MET Area	Country	HF DSC Coast Station							RCC Associated
		Name	MMSI	Position	Status of implementation [Date of operation]	Purpose (PC/SD/PS)	Frequency Band*	Watch hours	
I	Denmark	Lyngby Radio	002191000	55 50N 11 25E	Operational	SD	4,6,8,12,16 MHz	24 hrs	SOK, Aarhus
	Iceland	Reykjavik Radio		64 05N 21 51W	Planned[N.I.]	N.I.	4,6,8,12,16 MHz	N.I.	
	Poland	Szczecin Radio		53 28N 14 35E	Planned[N.I.]	N.I.	8,12,16 MHz	24 hrs	Polratok Gdynia Polratok Swinoujscie
II	Cape Verde	Sao Vicente Radio		N.I.	Planned[N.I.]	N.I.	N.I.	N.I.	
	Congo	Pointe Noire Radio		N.I.	Planned[N.I.]	N.I.	N.I.	N.I.	
	Côte Divoire	Abidjan Radio		N.I.	Planned[N.I.]	N.I.	N.I.	N.I.	
	Ghana	Tema Radio		05 37N 00 00W	Planned[N.I.]	N.I.	4,8 MHz	N.I.	Harbour Master Accra
	Liberia	Monrovia Radio		N.I.	Planned[N.I.]	N.I.	N.I.	N.I.	
	Portugal	Delgada	002040100	37 44N 25 40W	Planned[N.I.]	SD	4,6,8 MHz	24 hrs	MRCC Delgada
		Horta Radio	002040200	38 38N 28 32W					RCC Lages
	Senegal	Dakar Radio		N.I.	Planned[N.I.]	N.I.	N.I.	N.I.	
	Sierra Leone	Wiberfree Hill Radio		N.I.	Planned[N.I.]	N.I.	N.I.	N.I.	
	Spain	Gijon	002240997	43 34N 05 42W	Operational	SD	N.I.	24 hrs	
		Finisterre	002240993	42 42N 03 59W					
		Las Palmas	002240995	22 29N 15 25W					
III	Cyprus	Cyprus Radio	002091000	35 03N 33 17E	Operational	PS	4,8,16 MHz	24 hrs	RCC Larnaca RCC Episkopi
	Egypt	Alex. Radio	006221111	31 12N 29 52E	TBD	SD		24 hrs	RCC Cairo
		Port Said Radio	006221113	31 19N 32 18E				18 hrs (0600-0000)	
	Greece	Athinai Radio		37 36N 21 29E(Tx) 37 59N 21 18E(Rx)	Planned [End 2000]	PS	4,6,8,12,16 MHz	24 hrs	Piraeus Joint RCC 37 58N 23 40E
		Piraeus Joint RCC[1]	237673000 237673100	37 58N 23 40E	Operational	SD			
		Aspropyrgos Radio[1]	002391000	38 02N 23 35E					

([1]) At the moment and until, at least, the HF installation of the Athinai Radio becomes fully operational, and just for reasons of additional safety only, Hellenic Coast Guard keeps 24 hours watch on all HF DSC frequencies, using Piraeus Joint RCC station.

NAV/MET Area	Country	HF DSC Coast Station							RCC Associated
		Name	MMSI	Position	Status of implementation [Date of operation]	Purpose (PC/SD/PS)	Frequency Band*	Watch hours	
	Italy	TBD							
	Malta	Malta Radio		35 49N 14 32E	Planned[1998]	PC			
	Spain	Barcelona	002240991	41 20N 02 09E	Operational	SD		24 hrs	
	Turkey	Istanbul	002711000	40 59N 28 49E	Operational	PS	4,6,8,12,16 MHz	24 hrs	Ankara
IV	Canada	Iqaluit	003160023	63 44N 68 33W	Planned [2.1999]	PS	4,6,8,12,16 MHz	24 hrs	RCC Trenton
		Resolute (Remote Receive only)		74 45N 94 58W					
	Mexico	XDA	003450010	19 46N 98 42W	Planned [30.03.2000]	PS	4,6,8,12,16 MHz	24 hrs	Sria. De Marina Edo. Mayor Tel: 624-63-76,Fax624-63-65
	United States	Boston	003669991	41 42N 70 30W	Operational	SD	4,6,8,12,16 MHz	24 hrs	Boston
		Portsmouth	003669996	36 44N 76 01W					Portsmouth
		Miami	003669997	25 37N 80 23W					Miami
		San Juan	003669992	18 28N 66 07W	Planned[9.1997]				San Juan
		New Orleans	003669994	29 53N 89 57W	Operational				New Orleans
V	Uruguay	Montevideo		N.I.	Planned[N.I.]	N.I.	N.I.	N.I.	Montevideo
VI	Argentina	Argentina Radio	007010111	34 36S 58 28W	Operational	PS	4,6,8,12,16 MHz	24 hrs	RCC Buenos Aires
		Mar del Plata	007010003	38 03S 57 15W	Planned[N.I.]	N.I.		N.I.	Puerto Belgrano
		Rio Gallegos	007010010	51 37S 65 03W	Planned[N.I.]	N.I.	4,6,8,12,16 MHz	N.I.	Ushuaia
VII	Angola	Luanda Radio		N.I.	Planned[N.I.]	N.I.	N.I.		
	Mauritius	Mauritius Radio		N.I.	Planned[N.I.]	N.I.	N.I.		
	Mozambique	Maputo Radio		N.I.	Planned[N.I.]	N.I.	N.I.		
	South Africa	Cape Town Radio	006010001	33 40S 18 43N	Operational	SD	4,6,8,12,16 MHz	24 hrs	MRCC Cape Town
VIII	India	Bombay Radio		N.I.	Planned[N.I.]	N.I.	4,6,8,12,16 MHz	N.I.	Bombay
		Madras Radio							Cochin
	Myanmar	TBD							
	Seychelles	Seychelles Radio		N.I.	Planned[N.I.]	N.I.	N.I.		

NAV/MET Area	Country	HF DSC Coast Station							RCC Associated
		Name	MMSI	Position	Status of implementation [Date of operation]	Purpose (PC/SD/PS)	Frequency Band*	Watch hours	
	Tanzania	Dar es Salaam Radio		N.I.	Planned[N.I.]	N.I.	N.I.		
IX	Egypt	Kosseir Radio	006221112	26 07N 34 17E	TBD	SD		18 hrs (0600-0000)	RCC Cairo
	Jordan	Aqaba Radio		29 33N 34 59E	Planned[N.I.]	PS	4,8,12,16 MHz	N.I.	
	Oman	Muscat Radio		23 36N 58 30E	Planned[N.I.]	PS	4 MHz	0400-0500 UTC 1500-1700 UTC	HQ Royal Air Force of Sultanate of Oman
							8 MHz	0500-0700 UTC 1300-1500 UTC	
							12 MHz	0700-0900 UTC 1100-1300 UTC	
							16 MHz	0900-1100 UTC	
	Saudi Arabia	Damman Radio		26 26N 50 06E	Planned[N.I.]	N.I.	4,6,8,12,16MHz	N.I.	
	Sudan	Port Sudan Radio		N.I.	Planned[N.I.]	N.I.	N.I.	N.I.	
	United Arab Emirates	N.I.		N.I.	Planned[End of 1995]	N.I.	4,6,8,12,16MHz	N.I.	
X	Australia	Perth Radio	005030331	31 48S 115 53E	Operational	SD	4,6,8,12,16MHz	24 hrs	RCC Australia
		Brisbane	005030330	27 04S 153 03E					
XI	China	Shanghai Radio	004122100	31 06N 121 32E	Planned[End 1998]	PS	4,6,8,12,16 MHz	24 hrs	Shanghai MRCC
	Indonesia	Ambon		N.I	Planned[N.I.]	PS	N.I.	N.I.	RCC III
		Balikpapan							RCC II
		Bahjarmasin							RCC II
		Belawan							RCC I
		Bitung							RCC III
		Dumai							RCC I
		Jakarta							RCC I
		Jayapura							RCC IV
		Kupang							RCC III
		Makassar							RCC III

NAV/MET Area	Country	HF DSC Coast Station							RCC Associated
		Name	MMSI	Position	Status of implementation [Date of operation]	Purpose (PC/SD/PS)	Frequency Band*	Watch hours	
		Semarang							RCC II
		Sorong							RCC IV
		Surabaya							RCC II
	Japan	Tokyo Sea Patrol Radio	004310001	35 40N 139 45E	Operational	SD	4,6,8,12,16 MHz	24 hrs	Otaru MRCC Shiogama MRCC Yokohama MRCC Nagoya MRCC Kobe MRCC Hiroshima MRCC Kitakyushu MRCC Maizuru MRCC Niigata MRCC Kagoshima MRCC Naha MRCC
	Philippines	Manila			Planned [1999]	SD	4,6,8,12,16 MHz	24 hrs	Manila
	Korea, Republic of	Inchon National Maritime Police Agency	004401001	37 45N 126 36E	Operational	PS	4,6 MHz	24 hrs	Inchon RCC
		Busan National Maritime Police Agency		35 07N 129 05E	Planned[10.1997]				Busan RCC
		Donghae National Maritime Police Agency	004401002	37 31N 129 07E	Operational				Donghae RCC
		Mokpo National Maritime Police Agency		34 47N 126 24E	Planned[10.1997]				Mokpo RCC
		Cheju National Maritime Police Agency		33 31N 126 32E	Planned[10.1997]				Cheju RCC
	Thailand	Bangkok Radio	005671000	13 23N 100 38E	Planned[1999]	PS	6,8 MHz	24 hrs	Bangkok RCC
	Vietnam	Ho Chi Minh Ville Radio	005741994	10 47N 106 40E	Operational	PS	6 MHz	24 hrs	Saigon Port Authority
		Haiphong Radio	005741997	20 44N 106 44E			8 MHz		Haiphong Port Authority
		Danang Radio	005741998	16 05N 108 13E	Planned[N.I.]		4 MHz		Danang Port Authority
	Associate Member of IMO Hong Kong, China	Hong Kong Maritime Rescue Radio	004773500	22 12N 114 15E	Operational	SD	4,6,8,12,16 MHz	24 hrs	Hong Kong MRCC
XII	United States	San Francisco	003669990	37 56N 122 44E	Operational	SD	4,6,8,12,16 MHz	24 hrs	Alameda
		Kodiak	003669899	57 46N 152 34E					
		Honolulu	003669993	21 26N 158 09E					

NAV/MET Area	Country	HF DSC Coast Station							RCC Associated
		Name	MMSI	Position	Status of implementation [Date of operation]	Purpose (PC/SD/PS)	Frequency Band*	Watch hours	
	Mexico	XDA	003450010	19 46N 98 42W	Planned[30.03.2000]	PS	4,6,8,12,16 MHz	24 hrs	Sria. De Marina Edo. Mayor Tel: 624-63-76,Fax624-63-65
XIII	NONE								
XIV	Fiji	RCC Suva	005201100	18 08S 178 26E	Operational	SD	4,6,8,12,16 MHz	24 hrs	RCC Funafuti RCC Tonga RCC Nadi Nat. Surv. Centre-Samoa Mar. Div.-Tarawa RCC Canberra
	New Zealand	Taupo Maritime Radio		N.I.	Planned[1996]	SD	4,6,8,12,16 MHz	24 hrs.	Lower hutt
XV	Chile	Antofagasta	007250050	23 40S 70 25W	Operational	SD	4 MHz	24 hrs	MRCC Iquique
		Isla de Pascua	007250100	27 11S 109 25W			4 MHz		MRCC Valparaiso
		Valparaiso	007251860	33 01S 71 39W		PS	4,6,8,12,16 MHz		
		Talcahuano	007250170	36 42S 73 06W		SD	4 MHz		MRCC Talcahuano
		Puerto Montt	007250230	41 47S 73 53W			4 MHz		MRCC Puerto Montt
		Punta Arenas	007250400	53 10S 70 54W			4, 8 MHz		MRCC Punta Arenas
XVI	NONE								

* The following frequencies are allocated for HF DSC distress and safety communication by the Radio Regulations.(Article N38)

4 MHz = 4207.5 kHz 6 MHz = 6312 kHz 8 MHz = 8414.5 kHz 12 MHz = 12577 kHz 16 MHz = 16804.5 kHz

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OR-E = Atlantic Ocean Region, East
AOR-W = Atlantic Ocean Region, West
IOR = Indian Ocean Region
POR = Pacific Ocean Region

ANNEX 5
LIST OF INMARSAT COAST EARTH STATIONS

NAV/MET Area	Country	Location	Ocean area	Service provided(Status of implementation[Date of operation])				RCC Associated
				INMARSAT-A	INMARSAT-B	INMARSAT-C	INMARSAT-E	
I	Denmark	Blavand	AOR-E			Operational		Aarthus
	Germany	Raisting	AOR-E	Operational	Operational	Operational	Operational	MRCC Bremen
			IOR	Operational	Operational	Operational	Operational	
			AOR-W	Operational	Operational			
			POR	Operational	Operational			
	Netherlands	Station 12 (Burum)	IOR	Operational	Operational	Operational		Coast Guard Centre Ijmuiden
			AOR-E	Operational	Operational	Operational		
			AOR-W	Operational	Operational	Operational		
			POR[(1)]	Operational				
	Norway	Eik	IOR	Operational	Operational	Operational		RCC Stavanger
			AOR-E	Operational	Operational	Operational		
			AOR-W	Operational	Operational	Operational		
	Poland	Psary	IOR	Operational				Gdynia
			AOR-E	Operational				
	United Kingdom	Goonhilly	AOR-E	Operational	Operational	Operational	Operational	Falmouth
			AOR-W	Operational	Operational	Operational	Operational	
			IOR	Operational	Operational	Operational		
			POR	Operational	Operational	Operational		
II	France	Pleumeur-Bodou	AOR-E	Operational				MRCC Etel
			AOR-W	Operational				
			POR	Operational				
			IOR	Operational				
		Aussaguel	AOR-E		Operational	Operational		

([1]) Through Yamaguchi CES(Japan).

NAV/MET Area	Country	Location	Ocean area	Service provided(Status of implementation[Date of operation])				RCC Associated
				INMARSAT-A	INMARSAT-B	INMARSAT-C	INMARSAT-E	
			IOR		Operational	Operational		
	Portugal	Sintra	AOR-E			Operational		MRCC Lisbon
III	Greece	Thermopylae	IOR	Operational	Operational	Operational		Piraeus Joint RCC
			AOR-E	Operational	Operational	Operational		
	Italy	Fucino	AOR-E	Operational	Operational	Operational		MRCC Roma
			IOR	Operational	Operational	Operational		
	Turkey	Ata	IOR	Operational		Operational		
			AOR-E	Operational		Operational		
	Ukraine	Odessa	IOR	Operational				
			AOR-E	Operational				
IV	Canada	Laurentides	AOR-E		Operational			Halifax
			AOR-W		Operational			
	United States	Southbury	AOR-E	Operational	Operational	Operational		Portsmouth
			AOR-W	Operational	Operational	Operational		
		Staten Island	AOR-E	Operational				
V	Brazil	Tangua	AOR-E	Operational		Operational		Salvamar-Su Este ; Rio de Janeiro
VI	NONE							
VII	NONE							
VIII	India	Arvi	IOR	Operational	Operational	Operational		
IX	Egypt	Maadi	AOR-E	Operational				RCC Cairo
	Iran	Boumehen	IOR	Operational		Operational		
	Kuwait	Umm-Al-Aish	AOR-E	Operation Discontinued				
	Pakistan	TBD	IOR	TBD	TBD	TBD	TBD	TBD
	Saudi Arabia	Jeddah	IOR	Operational				Jeddah
	Unite Arab Emirates	Towi Al Sawan	IOR		Operational			
X	Australia	Perth	POR	Operational	Operational	Operational	Operational	RCC Australia

NAV/MET Area	Country	Location	Ocean area	Service provided(Status of implementation[Date of operation])				RCC Associated
				INMARSAT-A	INMARSAT-B	INMARSAT-C	INMARSAT-E	
			IOR	Operational	Operational	Operational	Operational	
XI	China	Beijing	POR	Operational	Planned[1997]	Operational		China MRCC
			IOR	Operational	Planned[1997]	Operational		
	Indonesia	Jatiluhur	IOR		Operational			
	Japan	Yamaguchi	POR	Operational	Operational	Operational		Otaru MRCC Shiogama MRCC Yokohama MRCC Nagoya MRCC Kobe MRCC Hiroshima MRCC Kitakyushu MRCC Maizuru MRCC Niigata MRCC Kagoshima MRCC Naha MRCC
			IOR	Operational	Operational	Operational		
	Malaysia	Kuantan	IOR	Operational	Operational			MRCC Port Klang
	Republic of Korea	Kumsan	POR	Operational		Operational		Inchon MRCC
			IOR	Operational		Operational		
	Singapore	Sentosa	POR	Operational	Operational	Operational		Singapore Port Operations Control Centre
			IOR	Operational	Operational	Operational		
	Thailand	Planned [TBD]						
	Associate Member of IMO Hong Kong, China	Cape D'Aguilar	POR	Operational	Operational			MRCC Hong Kong
			IOR	Operational	Operational			
XII	United States	Santa Paula	POR	Operational	Operational	Operational		Alameda
		Niles Canyon	POR	Operational			Operational	
			AOR-W	Operational			Operational	Portsmouth
XIII	Russian Federation	Nakhodka	POR	Operational				Vladivostok
XIV	None							
XV	None							
XVI	None							

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ANNEX 6
LIST OF RESCUE CO-ORDINATION CENTRES USING SHIP EARTH STATIONS

NAV/MET Area	Country	RCC		SES DETAIL			Status of implementation [Date of implementation]
		Name	Position	ID	Type	Ocean Region Accessed	
I	Estonia	Tallinn	N.I.	N.I.	Inmarsat-C	N.I.	Planned
	Germany	MRCC Bremen	53 04N 08 48E	492621021	Inmarsat-C	AOR-E	Operational
	Ireland	Eiln	N.I.	N.I.	N.I.	N.I.	Planned[N.I.]
	Finland	RCC Turku	60 26N 22 14E		Inmarsat-B	AOR-E	Planned[1996]
	Latvia	MRCC Riga	Riga	1420154	Inmarsat-A	AOR-E	Operational
	Sweden	MRCC Goteborg	57 28N 11 56E	Voice 326590010 Fax 326590011 data 326590012 HSD391011650 Tlx 326590013	Inmarsat-B	AOR-E, AOR-W, IOR	Operational
				426590010	Inmarsat-C	AOR-E, AOR-W, IOR	
	United Kingdom	MRCC Falmouth	Falmouth	1441532	Inmarsat-A	AOR-E	Operational
				423200159	Inmarsat-C	AOR-W	
				423200158	Inmarsat-C	AOR-E	
II	Portugal	MRCC Lisbon	Lisbon	N.I.	N.I.	N.I.	Planned[N.I.]
III	Bulgaria	Varna	N.I.	N.I.	N.I.	N.I.	Planned[N.I.]
	Croatia	Split	43 30N 16 28E	N.I.	N.I.	N.I.	Planned[N.I.]
	Estonia	Tallinn	N.I.	N.I.	N.I.	N.I.	Planned[N.I.]
	Greece	Piraeus Joint RCC	37 58N 23 40E	1133207	Inmarsat-A	AOR-E/ IOR	Operational
				423767310	Inmarsat-C	AOR-E/ IOR	
	Italy	TBD					
	Israel	Isres-1	N.I.	N.I.	N.I.	N.I.	Planned[N.I.]
		Isres-2	N.I.	N.I.	N.I.	N.I.	Planned[N.I.]
	Turkey	Ankara	N.I.	N.I.	N.I.	N.I.	Planned[1998]
IV	Bermuda (United Kingdom)	RCC Bermuda	32 23N 64 41W	431010110	Inmarsat-C	AOR-E	Operational
	France	MRCC Fort de France	14 36N 61 04W	422799024	Inmarsat-C	AOR-E, AOR-W	Operational
	Jamaica	Jamaica Defence Force Coast Guard HMJS Cagway, Port Royal	17 58N 76 47W		Inmarsat-A	AOR-E	Planned [12. 2000]
		JDFCG Discovery Bay	18 26N 77 25W		Inmarsat-C		
		JDFCG Pedro Cay	17 03N 77 46W		Inmarsat-C		

NAV/MET Area	Country	RCC		SES DETAIL			Status of implementation [Date of implementation]
		Name	Position	ID	Type	Ocean Region Accessed	
V	NONE						
VI	Argentina	MRCC Puerto Belgrano	38 53S 62 06E	497222227	Inmarsat-C	AOR-E, AOR-W	Operational
VII	NONE						
VIII	NONE						
IX	Egypt	Suez Canal Authority	Ismailia Radio	1622570	Inmarsat-A	AOR-E	Operational
X	Australia	RCC Australia	35 15S 149 05E	450300458	Inmarsat-C	POR	Operational
XI	China	Beijing	N.I.	N.I.	N.I.	N.I.	Operational
	Japan	TBD	N.I.	N.I.	N.I.	N.I.	Planned [N.I.]
	Philippines	Manila	N.I.	N.I.	Inmarsat-B	POR	Planned [1999]
	Associate Member of IMO Hong Kong, China	Hong Kong MRCC	Hong Kong	447735010	Inmarsat-C	POR	Operational
XII	NONE						
XIII	NONE						
XIV	NONE						
XV	NONE						
XVI	NONE						

* * *

ANNEX 7
NAVTEX SERVICE
INTERNATIONAL 518 kHz NAVTEX

NAV/MET Area	Country	NAVTEX Coast Station	Position	Range(NM)	B1 Character	Transmission times(UTC)	Language	Status of implementation [Date of operation]
I	Belgium	Oostende	51 11N 02 48E	150	M	0200,0600,1000,1400,1800,2200	English	Operational (Dover Strait broadcast for UK)
				55	T	0310,0710,1110,1510,1910,2310		Operational
	Denmark (Greenland-East Coast)	Reykjavik	64 05N 21 51W	550	X	0350,0750,1150,1550,1950,2350	English	On trial
	Estonia	Tallinn	59 30N 24 30E	250	U	0030,0430,0830,1230,1630,2030	English	Operational
	Iceland	Reykjavik Radio	64 05N 21 51W	550	R	0250,0650,1050,1450,1850,2250	English	Operational
	Ireland	Valencia	51 27N 09 49W	400	W	0340,0740,1140,1540,1940,2340	English	Operatiorial
		Malin Head	55 22N 07 21W	400	Q	0240,0640,1040,1440,1840,2240		
	France	Niton	50 35N 01 18W	270	K	0140,0540,0940,1340,1740,2140	English	Operational
	Netherlands	Netherlands Coast Guard	52 06N 04 15E	110	P	0230,0630,1030,1430,1830,2230	English	Operational
	Norway	Bodø Radio	67 16N 14 23E	450	B	0010,0410,0810,1210,1610,2010	English	Operational
		Rogaland Radio	58 48N 05 34E	450	L	0150,0550,0950,1350,1750,2150		
		Vardoe Radio	70 22N 31 06E	450	V	0330,0730,1130,1530,1930,2330		
		Svalbard Radio	78 04N 13 38E	450	A	0000,0400,0800,1200,1600,2000		
		Ølandet	63 40N 09 33E	450	N	0210,0610,1010,1410,1810,2210		
	Sweden	Stockholm Radio/ Bjuröklubb	64 28N 21 36E	300	H	0110,0510,0910,1310,1710,2110	English	Operational
		Stockholm Radio/ Gislövshammar	55 29N 14 19E	300	J	0130,0530,0930,1330,1730,2130		
		Grimeton	57 06N 12 23E	300	D	0030,0430,0830,1230,1630,2030		
	United Kingdom	Cullercoats	55 02N 01 26W	270	G	0100,0500,0900,1300,1700,2100	English	Operational
		Portpatrick	54 51N 05 07W	270	O	0220,0620,1020,1420,1820,2220		
		Niton	50 35N 01 18W	270	S	0300,0700,1100,1500,1900,2300		
II	Cameroon	Douala	N.I.	N.I.	Not yet allocated		N.I.	Planned[N.I.]
	Cape Verde	Sao Vicente Radio	N.I.	N.I.	Not yet allocated		N.I.	Planned[N.I.]
	France	Cross Corsen	48 28N 05 03E	300	A	0000,0400,0800,1200,1600,2000	English	Operational
	Mauritania	Nouadhibou Radio	N.I.	N.I.	Not yet allocated		N.I.	Planned[N.I.]
	Morocco	Casablanca Radio	33 36N 07 38W	180	M	0200,0600,1000,1400,1800,2200	English	Planned[N.I.]
	Portugal	Horta Radio	38 32N 28 38W	640	F	0050,0450,0850,1250,1650,2050	English	Operational
		Monsanto Radio	38 44N 09 11W	530	R	0250,0650,1050,1450,1850,2250		
		Madeira (Porto Santo)	N.I.	N.I.	P	0230,0630,1030,1430,1830,2230		Planned

NAV/MET Area	Country	NAVTEX Coast Station	Position	Range(NM)	B1 Character	Transmission times(UTC)	Language	Status of implementation [Date of operation]
	Spain	Coruña	43 21N 08 27W	400	D	0030,0430,0830,1230,1630,2030	English & Spanish (trial)	Operational
		Tarifa	36 01N 05 34W	400	G	0100,0500,0900,1300,1700,2100		
		Las Palmas	28 10N 15 25W	400	I	0120,0520,0920,1320,1720,2120		
III	Bulgaria	Varna	43 04N 27 46E	350	J	0130,0530(weather forecast), 0930, 1330,1730(weather forecast), 2130	English	Operational
	Croatia	Split (Hvar Is)	43 30N 16 29E	85	Q	0240,0640,1040,1440,1840,2240	English	Operational
	Cyprus	Cypradio	35 03N 33 17E	200	M	0200,0600,1000,1400,1800,2200	English	Operational
	Egypt	Alexandria	31 12N 29 52E	350	N	0210,0610,1010,1410,1810,2210	English	
	France	Cross La Garde	43 06N 05 59E	250	W	0340,0740,1340,1540,1940,2340	English	Operational
	Greece	Iraklion	35 20N 25 07E	280	H	0ll0,0510,0910,1310,1710,2110	English & Greek	Operational
		Kerkyra	39 37N 19 55E	280	K	0140,0540,0940,1340,1740,2140		
		Limnos	39 52N 25 04E	280	L	0150,0550,0950,1350,1750,2150		
	Israel	Haifa	32 49N 35 00E	200	P	0020,0420,0820,1220,1620,2020	English	Operational
	Italy	Roma	41 37N 12 29E	320	R	0250,0650,1050,1450,1850,2250	English & Italian	Planned[N.I.]
		Augusta	37 14N 15 14E	320	S	0300,0700,1100,1500,1900,2300		
		Cagliari	39 13N 09 14E	320	T	0310,0710,1110,1510,1910,2310		
		Trieste	45 40N 13 46E	320	U	0320,0720,1120,1520,1920,2320		
	Malta	Malta	35 49N 14 32E	400	O	0220,0620,1020,1420,1820,2220	English	Operational
	Russian Federation	Novorossiysk	44 42N 37 44E	300	A	0300,0700,1100,1500,1900, 2300	English	Operational
	Spain	Cabo de la Nao	38 43N 00 09E	300	X	0350,0750,1150,1550,1950,2350	English & Spanish	Operational
	Turkey	Istanbul	41 04N 28 57E	300	D	0030,0430,0830,1230,1630,2030	English	Operational
		Samsun	41 17N 36 20E	300	E	0040,0440,0840,1240,1640,2040		
		Antalya	36 53N 30 42E	300	F	0050,0450,0850,1250,1650,2050		
		Izmir	38 22N 26 36E	300	I	0120,0520,0920,1320,1720,2120		
	Ukraine	Mariupol	47 06N 37 33E	280	B	0100,0500(weather forecast), 0900(ice report), 1300, 1700 (weather forecast), 2100	English	Operational
		Odessa	46 29N 30 44E	280	C	0230,0630,1030(weather forecast), 1430, 1830(weather forecast, ice report), 2230		
IV	Bermuda (UK)	Bermuda	32 23N 64 41W	280	B	0010,0410,0810,1210,1610,2010	English	Operational
	Canada	Riviere-au-Renard	50 11N 66 07W	300	C	0020,0420,0820,1220,1620,2020	English	Operational
					D	0035,0435,0835,1235,1635,2035		
		Wiarton	44 20N 81 10W	300	H	0110,0510,0910,1310,1710,2110		
		St. Johns	47 30N 52 40W	300	O	0220,0620,1020,1420,1820,2220		
		Thunder Bay	48 25N 89 20W	300	P	0230,0630,1030,1430,1830,2230		
		Sydney, Nova Scotia	46 10N 60 00W	300	Q	0240,0640,1040,1440,1840,2240		
					J	0255,0655,1055,1455,1855,2255		

NAV/MET Area	Country	NAVTEX Coast Station	Position	Range(NM)	B1 Character	Transmission times(UTC)	Language	Status of implementation [Date of operation]
		Yarmouth	43 45N 66 10W	300	U	0320,0720,1120,1520,1920,2320		
					V	0335,0735,1135,1535,1935,2335		
		Labrador	53 42N 57 01W	300	X	0350,0750,1150,1550,1950,2350		
		Iqaluit	63 43N 68 33W	N.I.	T	0310,0710,1110,1510,1910,2310		Trial (Summer only)
	Curaçao (Netherlands)	Curaçao	12 10N 68 52W	400	H	0110,0510,0910,1310,1710,2110	English	Operational
	Denmark (Greenland-West Coast)	Kook Island (Nuuk)	64 04N 52 01W	400	W	0340,0740,1140,1540,1940,2340	English	Trial
	Mexico	Veracruz	19 09N 96 07W	250	N.I.		English	Planned [N.I.]
		Cozumel	20 16N 86 44W	250				Planned [N.I.]
	United States	Miami	25 37N 80 23W	240	A	0000,0400,0800,1200,1600,2000	English	Operational
		Boston	41 43N 70 30W	200	F	0445,0845,1245,1645,2045,0045		
		New Orleans	29 53N 89 57W	200	G	0300,0700,1100,1500,1900,2300		
		Portsmouth	36 43N 76 00W	280	N	0130,0530,0930,1330,1730,2130		
		Isabella	18 28N 67 04W	200	R	0200,0600,1000,1400,1800,2200		
		Savannah	32 08N 81 42W	200	E	0040,0440,0840,1240,1640,2040		
	Venezuela	N.I.						Planned [1999]
V	NONE							
VI	Argentina	Ushaia	54 48S 68 18W	280	M	0200, 1000, 18000600, 1400, 2200	SpanishEnglish	Operational
		Rio Gallegos	51 37S 65 03W	280	N	0210, 1010, 18100610, 1410, 2210	SpanishEnglish	
		Comodoro Rivadavia	45 51S 67 25W	280	O	0220, 1020, 18200620, 1420, 2220	SpanishEnglish	
		Bahia Blanca	38 43S 62 06W	280	P	0230, 1030,18300630, 1430, 2230	SpanishEnglish	
		Mar del Plata	38 03S 57 32 W	280	Q	0240, 1040, 18400640, 1440, 2240	SpanishEnglish	
		Buenos Aires	34 36S 58 22W	560	R	0250, 1050, 18500650, 1450, 2250	SpanishEnglish	
	Uruguay	La Paloma	34 40N 54 09W	280	F	0050,0450,0850,1250,1650,2050	English & Spanish	Planned
VII	Namibia	Walvis Bay	23 03S 14 37E	378	B	0010,0410,0810,1210,1610,2010	English	Operational
	South Africa	Cape Town	33 40S 18 43E	500	C	0020,0420,0820,1220,1620,2020	English	Operational
		Port Elizabeth	34 02S 25 33E	500	I	0120,0520,0920,1320,1720,2120		
		Durban	30 00S 31 30E	500	O	0220,0620,1020,1420,1820,2220		
VIII	India	Bombay	19 05N 72 50E	N.I.	G	0100,0500,0900,1300,1700,2100	English	Operational
		Madras	13 08N 80 10E	N.I.	P	0230,0630,1030,1430,1830,2230		
		Andaman Islands(Port Blair)	NI	NI	NI	NI		Planned
	Mauritius	Mauritius Radio, Cassis	20 10S 57 28 E	400	C	0020,0420,0820,1220,1620,2020	English	Operational
IX	Bahrain	Hamala	26 09N 50 28E	300	B	0010,0410,0810,1210,1610,2010	English	Operational
	Egypt	Serapeum (Ismailia)	30 28N 32 22E	200	X	0350,0750,1150,1550,1950,2350	English	Operational
		Kosseir	26 06N 34 17E	400	L	0330,0730,1130,1530,1930,2330		

NAV/MET Area	Country	NAVTEX Coast Station	Position	Range(NM)	B1 Character	Transmission times(UTC)	Language	Status of implementation [Date of operation]
	Iran	Bushehr	28 59N 50 50E	300	A	0000,0400,0800,1200,1600,2000	English	Operational
		Bandar Abbas	27 07N 56 04E	300	F	0050,0450,0850,1250,1650,2050		
	Saudi Arabia	Jeddah	21 23N 39 10E	390	H	0705,1305,1905	English	Operational
	Oman	Muscat	23 36N 58 30E	270	M	0200,0600,1000,1400,1800,2200	English	Operational
	Pakistan	Karachi	24 51 N 67 03E	400	P	0230,0630,1030,1430,1830,2230	English	Operational
X	NONE [1]							
XI	China	Sanya	18 14N 109 30E	250	M	0200,0600,1000,1400,2200	English & Chinese	Operational
		Guangzhou	23 08N 113 32E	250	N	0210,0610,1010,1410,2210		
		Fuzhou	26 01N 119 18E	250	O	0220,0620,1020,1420,2220		
		Shanghai	31 08N 121 33E	250	Q	0240,0640,1040,1440,2240		
		Dalian	38 52N 121 31E	250	R	0250,0650,1050,1450,2250		
	Indonesia	Jayapura	02 31S 140 43E	300	A	0000,0400,0800,1200,1600,2000	English	Operational
		Ambon	03 42S 128 12E	300	B	0010,0410,0810,1210,1610,2010		
		Makassar	05 06S 119 26E	300	D	0030,0430,0830,1230,1830,2030		
		Jakarta	06 06S 106 54E	300	E	0040,0440,0840,1240,1640,2040		
	Japan	Otaru	43 19N 140 27E	400	J	0130,0530,0930,1330,1730,2130	English	Operational
		Kushiro	42 57N 144 36E	400	K	0140,0540,0940,1340,1740,2140		
		Yokohama	35 14N 139 55E	400	I	0120,0520,0920,1320,1720,2120		
		Moji	34 01N 130 56E	400	H	0110,0510,0910,1310,1710,2110		
		Naha	26 05N 127 40E	400	G	0100,0500,0900,1300,1700,2100		
	Malaysia	Penang	05 26N 100 24E	350	U	0320,0720,1120,1520,1920,2320	English	Operational
		Miri	04 28N 114 01E	350	T	0310,0710,1110,1510,1910,2310		
		Sandakan	05 54N 118 00E	350	S	0300,0700,1100,1500,1900,2300		
	Philippines	Manila	14 35N 121 03E	320	J	0130,0530,0930,1330,1730,2130	English	Planned [1999]
		Puerto Princesa	09 44N 118 43E	320	I	0120,0520,0920,1320,1720,2120		
		Davao	07 04N 125 36E	320	K	0140,0540,0940,1340,1740,2140		
	Korea, Republic of	Chukpyon	37 03N 129 26E	200	V	0330,0730,1130,1530,1930,2330	English	Operational
		Pyonsan	35 36N 126 29E	200	W	0340,0740,1340,1540,1940,2340		
	Singapore	Singapore	01 25N 103 52E	400	C	0020,0420,0820,1220,1620,2020	English	Operational
	Thailand	Bangkok Radio	13 43N 100 34E	200	F	0050,0450,0850,1250	English	Operational
	United States	Guam	13 29N 144 50E	100	V	0100,0500,0900,1300,1700,2100	English	Operational
	Vietnam	Ho Chi Minh City	10 47N 106 40E	400	X	0350,0750,1150,1550,1950,2350	English	Operational
		Haiphong	20 44N 106 44E	400	W	0230,0630,1030,1430,1830,2230		
		Danang	16 05N 108 13E		P	0340,0740,1140,1540,1940,2340		Trial [July 2000]
	Associate Member of IMO Hong Kong, China	Hong Kong	22 13N 114 15E	N.I.	L	0150,0550,0950,1350,1750,2150	English	Operational

([1]) Australia is only providing coastal warnings through the International SafetyNET Service (AUSCOAST). See annex 8.

NAV/MET Area	Country	NAVTEX Coast Station	Position	Range(NM)	B1 Character	Transmission times(UTC)	Language	Status of implementation [Date of operation]
XII	Canada	Prince Rupert	54 20N 130 20W	300	D	0030,0430,0830,1230,1630,2030	English	Operational
		Tofino	48 55N 125 35W	300	H	0110,0510,0910,1310,1710,2110		
	Mexico	La Paz	24 08N 110 17W	250	N.I.		English	Planned[N.I.]
		Manzanillo	19 05N 104 18W	250				
		Salina Cruz	16 09N 095 12W	250				
	United States	San Francisco	37 55N 122 44W	350	C	0400,0800,1200,1600,2000,2400	English	Operational
		Kodiak	57 46N 152 34W	200	J	0300,0700,1100,1500,1900,2300		
		Honolulu	21 22N 158 09W	350	O	0040,0440,0840,1240,1640,2040		
		Cambria	35 31N 121 03W	350	Q	0445,0845,1245,1645,2045,0045		
		Astoria	46 10N 123 49W	216	W	0130,0530,0930,1330,1730,2130		
		Adak	51 54N 176 39W	-	X			Suspended
XIII	Russian Federation	Kholmsk	47 02N 142 03E	300	B	0010,0410,0810,1210,1610,2010	English	Operational
		Murmansk	68 46N 032 58E	300	C	0020,0420,0820,1220,1620,2020		
		Arkhangelsk	64 33N 040 32E	300	F	0050,0450,0850,1250,1650,2050		
		Petropavlovsk - Kamchatskiy	53 00N 158 40E	300	C	0020,0420,0820,1220,1620,2020		Planned
		Yanrangay	NI	NI	NI	NI		
		Tuksi						
		Dickson						
		Anderma						
Caspian Sea		Astrakhan	46 18N 047 58E	250	W	0340,0740,1140,1540,1940,2340		Planned [2000]
XIV	NONE							
XV	Chile	Antofagasta	23 40S 70 25W	300	A	0400,1200,2000	English	Operational
					H	0000,0800,1600	Spanish	
		Valparaiso	32 48S 71 29W	300	B	0410,1210,2010	English	
					I	0010,0810,1610	Spanish	
		Talcahuano	36 42S 73 06W	300	C	0420,1220,2020	English	
					J	0020,0820,1620	Spanish	
		Puerto Montt	41 30S 72 58W	300	D	0430,1230,2030	English	
					K	0030,0830,1630	Spanish	
		Punta Arenas	53 09S 70 58W	300	E	0440,1240,2040	English	
					L	0040,0840,1640	Spanish	
		Isla de Pascua	27 09S 109 25W	300	F	0450,1250,2050	English	
					G	0050,0850,1650	Spanish	
XVI	Peru	Paita	05 05S 81 07W	200	S	0300,0700,1100,1500,1900,2300	English & Spanish	Operational
		Callao	12 03S 77 09W	200	U	0320,0720,1120,1520,1920,2320		
		Mollendo	17 01S 72 01W	200	W	0340,0740,1140,1540,1940,2340		Trial [Aug 2000]

490 kHz NAVTEX

NAV/MET Area	Country	NAVTEX Coast Station	Position	Range(NM)	B1 Character	Transmission times(UTC)	Language	Status of implementation [Date of operation]
I	Iceland	Reykjavik Radio	64 05N 21 51W	550	R	0318,0718,1118,1518,1918,2318	Icelandic	Operational
	United Kingdom	Cullercoats	55 02N 01 26W	N.I.	U	0320,0720,1120,1520,1920,2320	English	Planned
		Portpatrick	54 51N 05 07W		C	0020,0420,0820,1220,1620,2020		
		Niton	50 35N 01 18W		I	0120,0520,0920,1320,1720,2120		
II	France	CROSS Corsen	N.I.	N.I.	E	0040,0440,0840,1240,1640,2040	French	Planned [2000]
	Portugal	Monsanto	38 44N 09 11W	530	G	0100,0500,0900,1300,1700,2100	Portuguese	Planned
		Horta	38 32N 28 38W	640	J	0130,0530,0900,1330,1730,2130		
		Madeira (Porto Santo)	N.I.	N.I.	M	0200,0600,1000,1400,1800,2200		
III	France	CROSS La Garde	N.I.	N.I.	S	0300,0700,1100,1500,1900,2300	French	Planned [2000]
XI	Japan	Otaru	43 19N 140 27E	400	J	0051,0451,0851,1251,1651,2051	Japanese (1)	Operational
		Kushiro	42 57N 144 36E	400	K	0108,0508,0908,1308,1708,2108		
		Yokohama	35 14N 139 55E	400	I	0034,0434,0834,1234,1634,2034		
		Moji	34 01N 130 56E	400	H	0017,0417,0817,1217,1617,2017		
		Naha	26 05N 127 40E	400	G	0000,0400,0800,1200,1600,2000		
	Korea, Republic of	Chukpyon	37 03N 129 26E	200	J	0130,0530,09.30,1330,1730,2130	Korean	Operational
		Pyonsan	35 36N 126 29E	200	K	0140,0540,0940,1340,1740,2140		
	Vietnam	Haiphong	20 44N 106 44E	400	W	0230,0630,1030,1430,1830,2230	Vietnamese	Operational

4 MHz NAVTEX

NAV/MET Area	Country	NAVTEX Coast Station	Position	Range(NM)	B1 Charactor	Transmission times(UTC)	Language	Status of implementation [Date of operation]
III, IX	Egypt	Serapeum(Ismailia)	30 28N 32 22E	N.I.	X	0750, 1150	English	Operational
IV	Mexico	Veracruz	19 09N 96 07W	250	N.I.		Spanish	Planned[N.I.]
		Cozumel	20 16N 86 44W	250				
V	Brazil	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	Planned[Aug.1993]
XI	Vietnam	Haiphong	20 44N 106 44E	N.I.	W	0230,0630,1030,1430,1830,2230	English	Operational
XII	Mexico	La Paz	24 08N 110 17W	250	N.I.		Spanish	Planned[N.I.]
		Manzanillo	19 05N 104 18W	250				
		Salina Cruz	16 09N 095 12W	250				

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(1) Transmit on 424 kHz (Note; 424 kHz is a local frequency, not a GMDSS frequency allocated for national broadcasts.)

NAV = NAVIGATIONAL WARNINGS
MET = METEOROLOGICAL INFORMATION
SAR = SEARCH AND RESCUE ALERTS
* = NAVAREA CO-ORDINATOR, RESPONSIBLE FOR THE AREA.
** = THE ISSUING MEMBER NOMINATED BY WMO FOR METAREA SERVICES, RESPONSIBLE FOR THE AREA.

ANNEX 8
THE INTERNATIONAL SAFETYNET SERVICE

NAV/MET Area	Type of MSI	Country	CES	Ocean area	Area covered	Broadcast schedule (UTC)	Status of implementation [Date of operation]
I	NAV	United Kingdom*	Goonhilly	AOR-E		1730 + as appropriate	Operational
	MET	United Kingdom**	Goonhilly	AOR-E		0930, 2130	Operational
	SAR	United Kingdom	Goonhilly	AOR-E/W		As occasion demands	Operational
		Norway	EIK	IOR		As occasion demands	Operational
		Germany	Raisting	AOR-E & IOR		As occasion demands	Operational
		Netherlands	Station 12	AOR-E/W & IOR		As occasion demands	Planned[N.I.]
II	NAV	France*	Aussaguel	AOR-E	AREA II	1630	Operational
	MET	France** /United Kingdom	Aussaguel/Goonhilly	AOR-E & AOR-W	AREA II	0900, 2100	Operational
	SAR	France / United Kingdom	Aussaguel/Goonhilly	AOR-E & AOR-W	AREA II	As occasion demands	Operational
		Cape Verde	N.I.	N.I.		As occasion demands	Operational
III	NAV	Spain*	Goonhilly	AOR-E		1200, 2400 + on receipt	Operational
	MET	Greece**	Thermopylae	IOR	AREA III	0930, 2130	Operational
	SAR	Greece	Thermopylae	AOR-E &IOR	Greek SAR region	As occasion demands	Operational
IV	NAV	United States*	Southbury	AOR-W		1000, 2200	Operational
	MET	United States**	Southbury	AOR-W		0430, 1030, 1630, 2230	Operational
	SAR	United States	Southbury	AOR-W		As occasion demands	Operational
V	NAV	Brazil*	Tangua	AOR-E		0400, 1230	Operational
	MET	Brazil**	Tangua	AOR-E		0130, 0730, 1330, 1930	Operational
	SAR	Brazil	Tangua	AOR-E		As occasion demands	Operational
VI	NAV	Argentina*	Southbury	AOR-W	AREA VI	0200, 1400	Operational
	MET	Argentina**	Southbury	AOR-W	AREA VI	0230, 1730	Operational
	SAR	Argentina	Southbury	AOR-W	AREA VI	As occasion demands	Operational

NAV/MET Area	Type of MSI	Country	CES	Ocean area	Area covered	Broadcast schedule (UTC)	Status of implementation [Date of operation]
VII	NAV	South Africa*	Station 12	AOR-E/IOR		0940, 1940	Operational
		Mayotte (France)	Aussaguel	IOR		0330, 1530	Operational
		Kerguelen (France)	Aussaguel	IOR		0140, 1340	Operational
	MET	South Africa**	Goonhilly/Perth	AOR-E/IOR		0940, 1940	Operational
	SAR	South Africa	Goonhilly/Perth	AOR-E/IOR		As occasion demands	Operational
VIII	NAV	India*	Arvi	IOR	NAVAREA VIII	1000	Under trial [1997]
		La Reunion (France)	Aussaguel	IOR		0040, 1240	Operational
	MET	India**	Arvi	IOR	North of equator in AREA VIII	0900, 1800	Operational
		Mauritious	Perth	IOR	South of equator in AREA VIII	0830, 1630	Operational
	SAR	India	Arvi	IOR		N.I.	Planned [1997]
IX	NAV	Pakistan	Perth	IOR	NAVAREA IX	0800	Operational
	MET	Pakistan**	Perth	IOR		0500, 1700	Planned[N.I.]
		Australia (Saudi Arabia)	Perth	IOR		0845	Interim service(1)
	SAR	Pakistan	Perth	IOR	Pakistan SAR Region	As occasion demands	Operational
X	NAV	Australia*	Perth	IOR/POR		0700, 1900 + on receipt	Operational
	MET	Australia**	Perth	IOR	Western and Casey West. See figure 8-1	1030, 2330	Operational
				POR	All areas except Casey West. See figure 8-1	0550, 1100, 1850, 2300	Operational
	SAR	Australia	Perth	IOR/POR		As occasion demands	Operational
	COASTAL WARNINGS(2)	Australia	Perth	IOR/POR	See figure 8-2 for B1 charactor	0700, 1900 + on receipt	Operational
XI	NAV	Japan*	Yamaguchi	POR/IOR	All area in AREA XI	0005, 0805, 1205	Operational
	MET	Japan**	Singapore	POR	POR area in AREA XI	0230, 0830, 1430, 2030	Operational
		China**	Beijing	IOR	IOR area in Area XI	0330, 1530	Operational
	SAR	Indonesia	Perth	POR/IOR		As occasion demands	Operational
		Japan	Yamaguchi	POR/IOR	North of 17°N, West of 165°E	As occasion demands	Operational

(1) Interim service will be provided until the issuing Member nominated by WMO is able to provide a full service.
(2) Australia is providing coastal warnings through the International SafetyNET Service (AUSCOAST) instead of International NAVTEX Services.

NAV/MET Area	Type of MSI	Country	CES	Ocean area	Area covered	Broadcast schedule (UTC)	Status of implementation [Date of operation]
	SAR	Malaysia	Singapore	POR/IOR		As occasion demands	Operational
	SAR/NAV/MET	Singapore	Singapore	POR/IOR		As occasion demands	Operational
		Associate Member of IMO Hong Kong	Perth	POR/IOR		As occasion demands	Operational
XII	NAV	United States*	Santa Paula/ Southbury	POR/AOR-W		1030, 2230	Operational
	MET	United States**	Santa Paula/ Southbury	POR/AOR-W		0545, 1145, 1745, 2345	Operational
	SAR	United States	Santa Paula/ Southbury	POR/AOR-W	U.S.SAR Region	As occasion demands	Operational
XIII	NAV	Russian Federation*	Perth	POR	All area in AREAXIII	0930, 2130	Interim Operation
		Japan	Perth	POR	South of 60°N in AREA XIII	0930, 2130	Operational
	MET	Russian Federation**	Perth	POR	North of 60°N in AREA XIII	0930, 2130	Interim Operation
		Japan	Perth	POR	South of 60°N in AREA XIII	0230, 0830, 1430, 2030	Operational[(3)]
XIV	NAV	New Zealand*	Perth	POR	Area covered by (20°S 160°E) (20°S 120°W) (55°S 160°E) (55°S 120°W)	On receipt + every 12 hrs.	Operational
	MET	New Zealand**	Perth	POR		0930, 2130 0100, 1300 (NZ coast only) 0330, 1530 (warnings only)	Operational
	SAR	New Zealand	Perth	POR		As occasion demands	Operational
		Tonga	TBD	TBD		As occasion demands	Planned[N.I.]
XV	NAV	Chile*	Southbury	AOR-W	AREA XV	0210, 1410, 2210	Operational
	MET	Chile**	Southbury	AOR-W	AREA XV	1845	Operational
	SAR	Chile	Southbury	AOR-W	Chilean SAR Region	As occasion demands	Operational
XVI	NAV	Peru*	Southbury	AOR-W	AREA XVI	0519, 1119, 1719, 2319	Operational
	MET	United States**	Southbury	AOR-W	AREA XVI	0515, 1115, 1715, 2315	Operational
	SAR	Peru	Southbury	AOR-W	Area covered by 03°24'S, 18°21'S, 120°W and coast line	As occasion demands	Operational

(3) Same servie to METAREA XI.

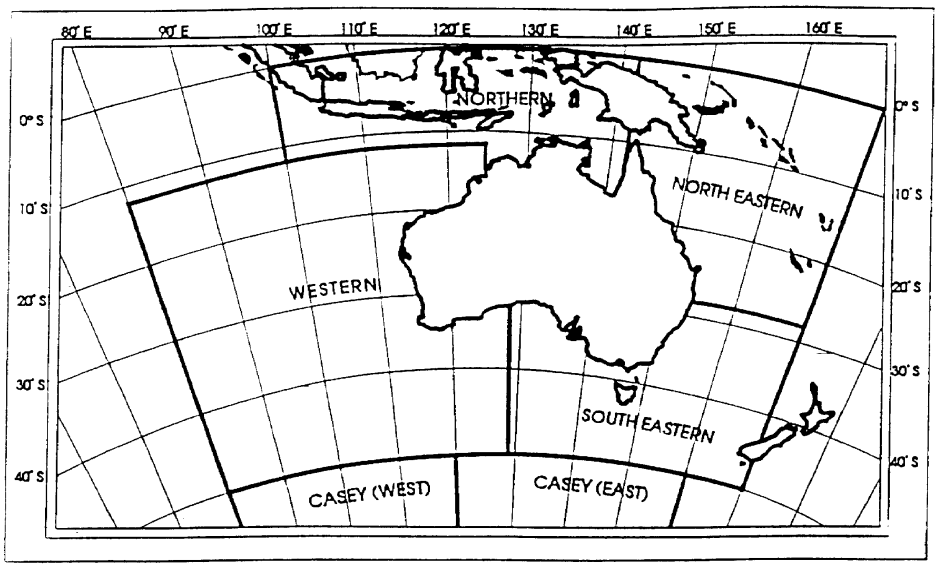


Figure 8-1 Areas for weather forecasts in Australia

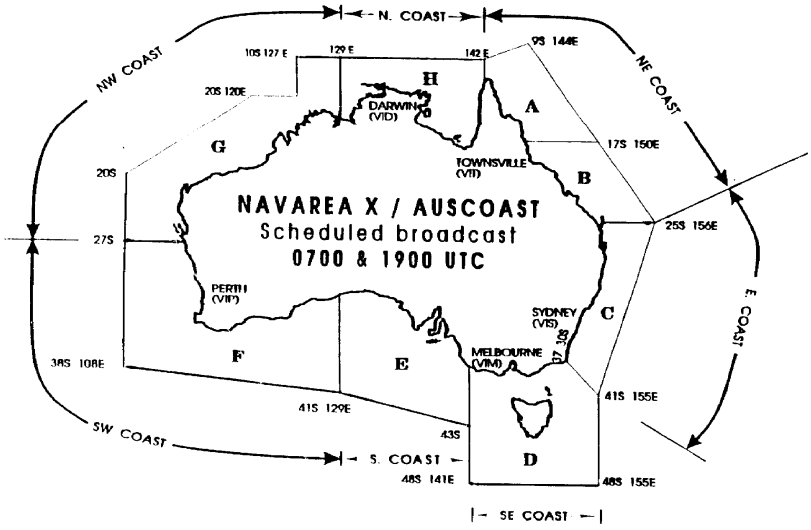


Figure 8-2 Areas for coastal navigational warnings on SafetyNET in Australia
(Pacific Ocean Region satellite)

(Indian & Pacific Ocean Region Satellite)

APPENDICES

TABLE OF INTERNATIONALLY CO-ORDINATED BROADCAST SCHEDULES

These appendices provide the latest information on broadcast schedules which were available at the time of printing. For the most up to date information, reference should be made to documentation of the International Maritime Organization (IMO) and lists of Radio Signals published by national hydrographic offices.

Information on known broadcast schedules is tabulated as follows:

Appendix 1 - NAVAREA Warning Schedules

Appendix 2 - METAREA Schedules

Appendix 3 - Broadcast Schedules of each Satellite Region

Registered Information Providers should attempt to release messages for scheduled broadcast no earlier than the advertised time of the schedule and no later than 15 minutes after that time.

APPENDIX 1

NAVAREA WARNING SCHEDULES

NAVAREA	CO-ORDINATOR	TIMES (UTC)	SATELLITE
I	United Kingdom	1730 + as appropriate	AOR(E)
II	France	1630	AOR(E)
III	Spain	1200 2400 + on receipt	AOR(E)
IV	United States	1000 2200	AOR(W)
V	Brazil	0400 1200	AOR(E)
VI	Argentina	0200 1400	AOR(W)
VII	South Africa	0940 1940	IOR & AOR(E)
VIII	India	1000*	IOR
IX	Pakistan	0800	IOR
X	Australia	0700 1900 + on receipt	POR & IOR
XI	Japan	0005 0805 1205	POR & IOR
XII	United States	1030 2230	POR & AOR(W)
XIII	Russian Federation	0930 2130	POR
XIV	New Zealand	on receipt + every 12 hours	POR
XV	Chile	0215 1430 2210	AOR(W)
XVI	Peru	0519 1119 1719 2319	AOR(W)

* trial operation

APPENDIX 2

METAREA SCHEDULES

METAREA	ISSUING COUNTRY	TIMES (UTC)	SATELLITE
I	United Kingdom	0930 2130	AOR(E)
II	France	0900 2100	AOR(E),(W)
III	Greece	0930 2130	IOR
IV	United States	0430 1030 1630 2230	AOR(W)
V	Brazil	0130 0730 1330 1930	AOR(E)
VI	Argentina	0230 1730	AOR(W)
VII	South Africa	0940 1940	AOR(E) & IOR
VIII	India	0900 1800 (For North of equator)	IOR
	Mauritius / La Réunion	0845 1630 (For South of equator)	
IX	Pakistan	0500 1700	IOR
	Australia	0845	
X	Australia	1030 2330	IOR
		0550 1100 1850 2300	POR
XI	China	0330 1530	IOR
	Japan	0230 0830 1430 2030	POR
XII	United States	0545 1145 1745 2345	POR & AOR(W)
XIII	Russian Federation	0930 2130 (For North of 60°N)	POR
	Japan *	0230 0830 1430 2030 (For South of 60°N)	
XIV	New Zealand	0930 2130 0100 1300 (NZ coast only) 0300 1530 (warnings only)	POR
XV	Chile	1800	AOR(W)
XVI	United States	0515 1115 1715 2315	AOR(W)

* Same service to METAREA XI

APPENDIX 3

BROADCAST SCHEDULES OF EACH SATELLITE REGION

Ocean region	Broadcast schedule(UTC)	
AOR-E	0130(MET V), 0400(NAV V), 0730(MET V), 0900(MET II), 0930(MET I), 0940(NAV & MET VII), 1200(NAV III and V)	1330(MET V), 1630(NAV II), 1730(NAV I), 1930(MET V), 1940(NAV & MET VII), 2100(MET II), 2130(MET I), 2400(NAV III)
AOR-W	0200(NAV VI), 0215(NAV XV), 0230(MET VI), 0430(MET IV), 0515(MET XVI), 0519(NAV XVI), 0545(MET XII), 0900(MET II), 1000(NAV IV), 1030(MET IV & NAV XII), 1115(MET XVI), 1119(NAV XVI), 1145(MET XII)	1400(NAV VI), 1430(NAV XV), 1630(MET IV), 1715(MET XVI), 1719(NAV XVI) 1730(MET VI), 1745(MET XII), 1800(MET XV), 2100(MET II), 2200(NAV IV), 2210(NAV XV), 2230(MET IV & NAV XII), 2315(MET XVI), 2319(NAV XVI), 2345(MET XII)
IOR	0005(NAV XI), 0330(MET XI), 0500(MET IX), 0700(NAV X), 0800(NAV IX), 0805(NAV XI), 0830(MET VIII), *0845(MET IX)*, 0900(MET VIII) 0920(MET VII), 0930(MET III), 0940(NAV & MET VII), 1000(NAV VIII), 1030(MET X)	1205(NAV XI), 1530(MET XI), 1630(MET VIII), 1700(MET IX), 1800(MET VIII), 1900(NAV X), 1940(NAV & MET VII), 2130(MET III), 2330(MET X)
POR	0100(MET XIV), 0005(NAV XI), 0230(MET XI & XIII), 0330(MET XIV), 0545(MET XII), 0550(MET X), 0700(NAV X), 0805(NAV XI), 0830(MET X & XI & XIII), 0930(*NAV XIII, MET XIII* & XIV), 1030(NAV XII), 1100(MET X), 1145(MET XII)	1205(NAV XI), 1300(MET XIV), 1430(MET XI & XIII), 1530(MET XIV), 1745(MET XII), 1850(MET X), 1900(NAV X), 2030(MET XI & XIII), 2100(MET XIV), 2130(*NAV XIII, MET XIII* & XIV), 2230(NAV XII), 2300(MET X), 2345(MET XII)

- Shaded broadcast are not operational (under trial).
- *Italic broadcasts* are interim services.

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ANNEX 9

HF NBDP MARITIME SAFETY INFORMATION BROADCAST SERVICE

Country	NBDP Coast Station	Position	Frequency Band *	Schedule (UTC)	Status of implementation [Date of operation]
Argentina	Comodoro Rivadavia PNA Radio	45 51S 67 25W	4 MHz	0530, 2300	Operational
			8 MHz	0530, 1300, 1830, 2300	
			12 MHz	0530, 1300, 1830, 2300	
			19 MHz	1300, 1830	
Egypt	Alexandria	31 12N 29 52E	8 MHz	TBD	TBD
	Serapeum	30 28N 32 22E	4 MHz		Planned[1.2.1999]
			6 MHz		
			8 MHz		
Greece	TBD				Planned[N.I.]
Indonesia	TBD				Planned[N.I.]
Iran	Abbas	27 12N 57 17E	4 MHz	0730, 1430	Operational
			8 MHz	0330, 0530, 1230	Operational
			12 MHz	0830, 1030	Operational
Italy	TBD				Planned[N.I.]
Peru	Paita	05 05S 81 07W	4,6,8,12,16,19,22,26MHz	N.I.	Operational
	Callao	12 03S 77 07W			
	Mollendo	17 01S 72 01W			Planned [12.1999]
South Africa	Cape Town	33 40S 18 43E	4 MHz(4214 kHz [1])	0615, 0900, 1700	Operational
			8 MHz(8428.5 kHz [1])	0615, 0900, 1700	Operational
			12 MHz(12601 kHz [1])	0615, 0900, 1700	Operational
			16 MHz(16816 kHz [1])	0615, 0900, 1700	Operational

([1]) These are national frequencies, not frequencies allocated by the Radio Ragulations(Article N38) for HF NBDP.

Country	NBDP Coast Station	Position	Frequency Band *	Schedule (UTC)	Status of implementation [Date of operation]
United States	Boston	41 39N 70 33W	6 MHz	0030, 0140	Operational
			8 MHz	0030, 0140, 1218, 1630	Operational
			12 MHz	0030, 0140, 1220, 1630	Operational
			16 MHz	1218, 1630	Operational
	Guam	13 29N 144 50E	12 MHz	0230, 0500, 0900, 1500, 1900, 2310	Operational
			16 MHz	0230, 0500, 0900, 1500, 1900, 2315	Operational
			22 MHz	0230, 0500, 0900, 1500, 1900, 2315	Operational
	Honolulu	21 26N 158 09W	8 MHz	0130, 0330, 0430, 0630, 0730, 1330, 1730, 2030, 2230	Operational
			12 MHz	0130, 0330, 0430, 0630, 0730, 1330, 1730, 2030, 2230	Operational
			22 MHz	0130, 1730, 2230	Operational
	San Francisco	37 56N 122 44W	8 MHz	0000, 1800	Operational
			16 MHz	0000, 1800	Operational

* The following frequencies are allocated for NBDP MSI broadcast by the Radio Regulations(Article N38) ;

4 MHz = 4210 kHz 6 MHz = 6314 kHz 8 MHz = 8416.5 kHz 12 MHz = 12579 kHz

16 MHz = 16806.5 kHz 19 MHz = 19680.5 kHz 22 MHz = 22376 kHz 26 MHz = 26100.5 kHz

***

ANNEX 10

LIST OF COSPAS-SARSAT MCCs (MISSION CONTROL CENTRES)
AND LEOLUTs (LOCAL USER TERMINALS IN LEOSAR SYSTEM)

Ground Segment Operator	MCC			LEOLUT		RCC ASSOCIATED
	Location	Designator	Status of implementation [Date of operation]	Location	Status of implementation [Date of operation]	
Algeria	Algiers	ALMCC	Operational	Ouargla	Operational	RCC Algiers
Australia	Canberra	AUMCC	Operational	Albany	Operational	RCC Australia
				Bundaberg	Operational	
Brazil	Brasilia-DF	BRMCC - primary	Operational	Brasilia-DF	Combined LEO/GEOLUT to be commissioned	Salvamar/Salvaero
	São José dos Campos - SP	BRMCC - back-up	Operational	Recife-PE	Operational	
				Manaus-AM	Operational	
Canada	Trenton	CMCC	Operational	Churchill	Operational	
				Edmonton	Operational	
				Goose Bay	Operational	
Chile	Santiago	CHMCC	Operational	Santiago	Operational	MRCC Chile
				Punta Arenas	Operational	
China	Beijing	CN~~H~~MCC	Operational	Beijing (Dual LEOLUT system~~)~~	Operational	
France	Toulouse	FMCC	Operational	Toulouse (Dual LEOLUT system~~)~~	Operational	MRCC Etel MRCC La Garde
Greece	TBD	GRMCC	Planned [2001]	TBD	Planned [2001]	
India	Bangalore	INMCC	Operational	Bangalore	Operational	
				Lucknow	Operational	
Indonesia	Jakarta	IDMCC	Operational	Ambon	Commissioned, not operational	RCC I; Soekarto-Hatta Airport, Jakarta RCC II; Djuanda Airport, Surabaya RCC III; Hasanudin Airport, Ujung Pandang RCC IV; Frans Karseifo Airport, Biak
				Jakarta	Operational	
Italy	Bari	ITMCC	Operational	Bari	Operational	Roma

Ground Segment Operator	MCC			LEOLUT		RCC ASSOCIATED
	Location	Designator	Status of implementation [Date of operation]	Location	Status of implementation [Date of operation]	
Japan	Tokyo	JAMCC	Operational	Yokohama (Dual LEOLUT system)	Operational	Otaru MRCC Shiogama MRCC Yokohama MRCC Nagoya MRCC Kobe MRCC Hiroshima MRCC Kitakyushu MRCC Maizuru MRCC Niigata MRCC Kagoshima MRCC Naha MRCC
Korea, Republic of	Taejon	KOMCC	Operational	Taejon (Dual LEOLUT system)	Operational	Inchon MRCC Kimpo RCC
New Zealand	Canberra (Australia)	AUMCC	Operational	Wellington	Operational	RCC Lower Hutt
Norway	Bodoe	NMCC	Operational	Tromso*e*	Operational	RCC Bodoe RCC Stavanger
Pakistan	Lahore	PAMCC	Under development	Lahore	Operational	CAA Lahore MSA Karachi
Peru	Callao	PEMCC	Operational	Callao	Operational	Callao
Russian Federation	Moscow	CMC	Operational	Arkhangelsk	Operational	
				Moscow	Operational	
				Nakhodka	Operational	
				Novosibirsk	Commissioned, not operational	
Saudi Arabia	Jeddah	SAMCC	Commissioned, subject of association with the Cospas-Sarsat Programme	Jeddah	Commissioned, subject of association with the Cospas-Sarsat Programme	
Singapore	Singapore	SIMCC	Operational	Singapore(Dual LEOLUT system)	Operational	Singapore Port Operations Control Centre
South Africa	Cape Town	ZSMCC	Commissioning is in progress	Cape Town	Commissioned, subject of association with the Cospas-Sarsat Programme	
Spain	Maspalomas	SPMCC	Operational	Maspalomas	Operational	RCC Madrid RCC Baleares RCC Canarias (part of RCC Cape Town)
Thailand				TBD		
United Kingdom	Kinloss	UKMCC	Operational	Combe Martin	Operational	MRCC Falmouth ARCC Kinloss

Ground Segment Operator	MCC			LEOLUT		RCC ASSOCIATED
	Location	Designator	Status of implementation [Date of operation]	Location	Status of implementation [Date of operation]	
United States	Suitland	USMCC	Operational	Alaska (Dual LEOLUT system)	Operational	CG Atlantic ; Portsmouth CG District 1 ; Boston, MA CG District 5 ; Portsmouth CG District 7 ; Miami, FL CG District 8 ; New Orleans, LA CG District 9 ; Cleveland, OH CG District 11 ; Alameda CG District 13 ; Seattle, WA CG District 14 ; Honolulu, HI CG District 17 ; Juneau, AK Elmendorf AFB ; Anchorage, AK Langley AFB ; Langley, VA CG Pacific ; Alamada, CA
				California (Dual LEOLUT system)	Operational	
				Hawaii (Dual LEOLUT system)	Operational	
				Texas (Dual LEOLUT system)	Operational	
				Guam (Dual LEOLUT system)	Operational	
				Puerto Rico (Dual LEOLUT system)	Operational	
Associate Member of IMO Hong Kong, China	Hong Kong	HKMCC	Operational	Hong Kong (Dual LEOLUT system)	Operational	MRCC Hong Kong

Note: LEOSAR low Earth orbit SAR satellite system.

LIST OF COSPAS-SARSAT GEOLUTs (LOCAL USER TERMINALS IN GEOSAR SYSTEM)

Ground Segment Operator	Location	Status of implementation	Comments
Brazil	Brasilia	Functional (a) (b)	Data not distributed internationally
Canada	Trenton (1) Trenton (2)	Functional (b) Functional (b)	
Chile	Santiago	Functional (b)	
India	Bangalore	Functional (b)	
New Zealand	Wellington	Operational	
Spain	Maspalomas	Functional (b)	
United Kingdom	Combe Martin	Operational	

Notes: GEOSAR geostationary SAR satellite system.

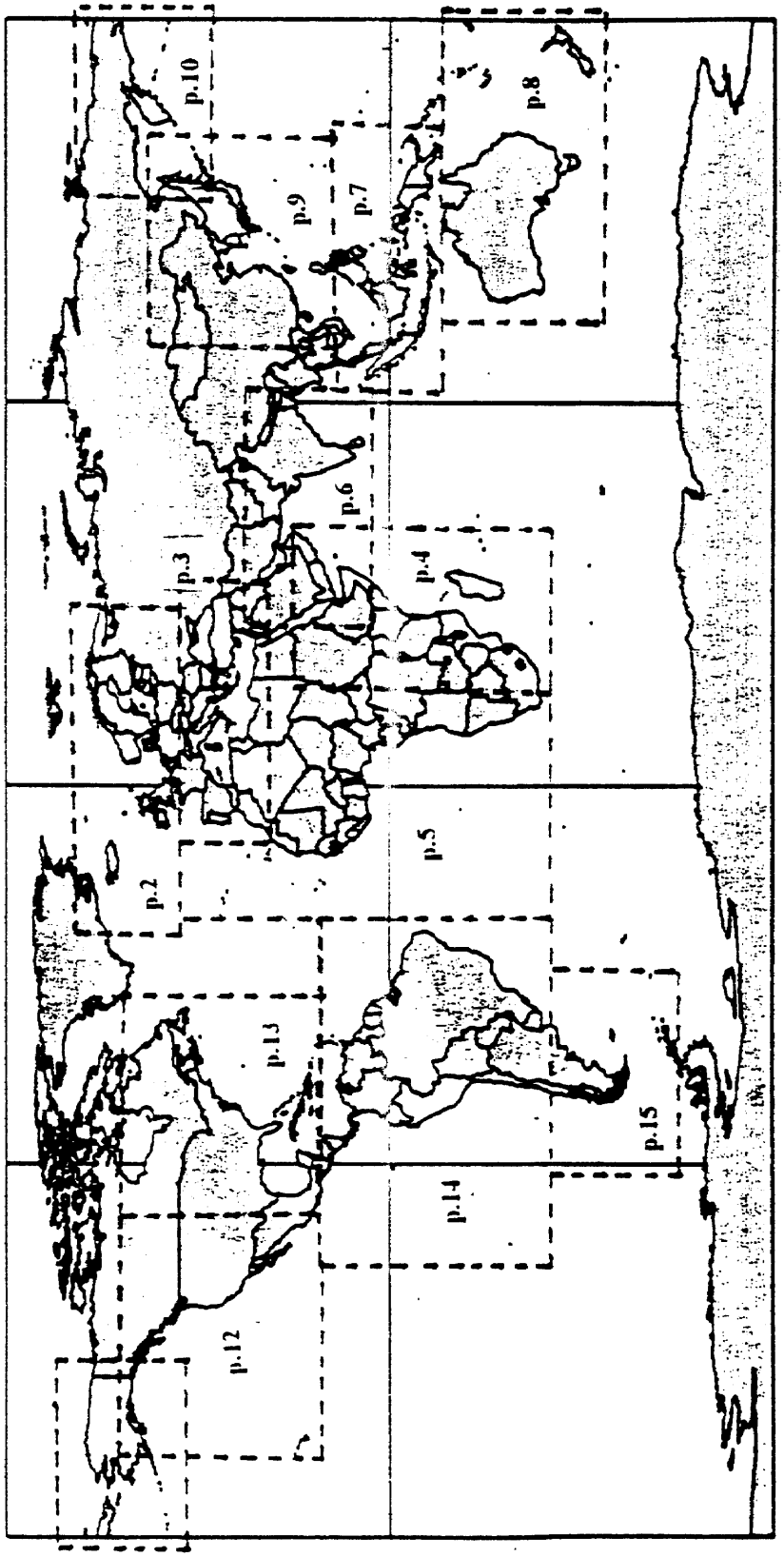
(a) Combined LEO/GEOLUT operates part-time as a GEOLUT and part-time as a LEOLUT.

(b) Functional GEOLUTs have not been commissioned, however, alert data are used operationally.

* * *

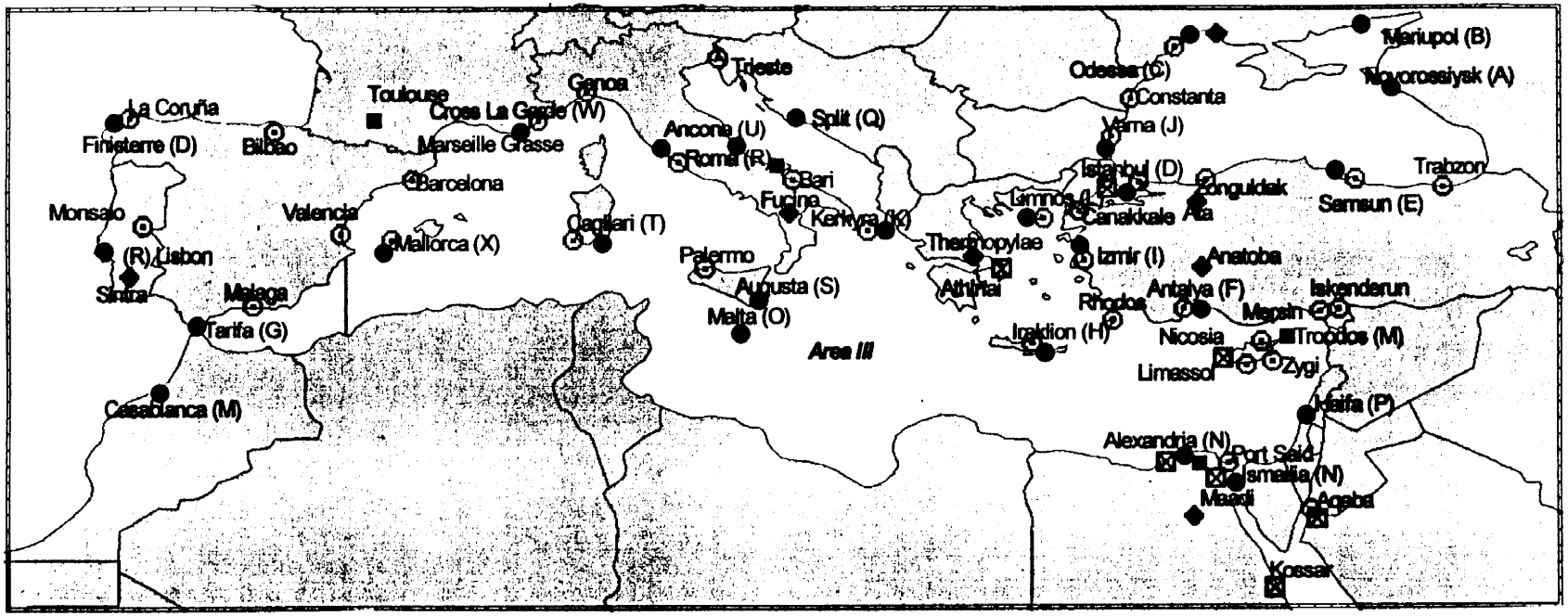
ANNEX 11

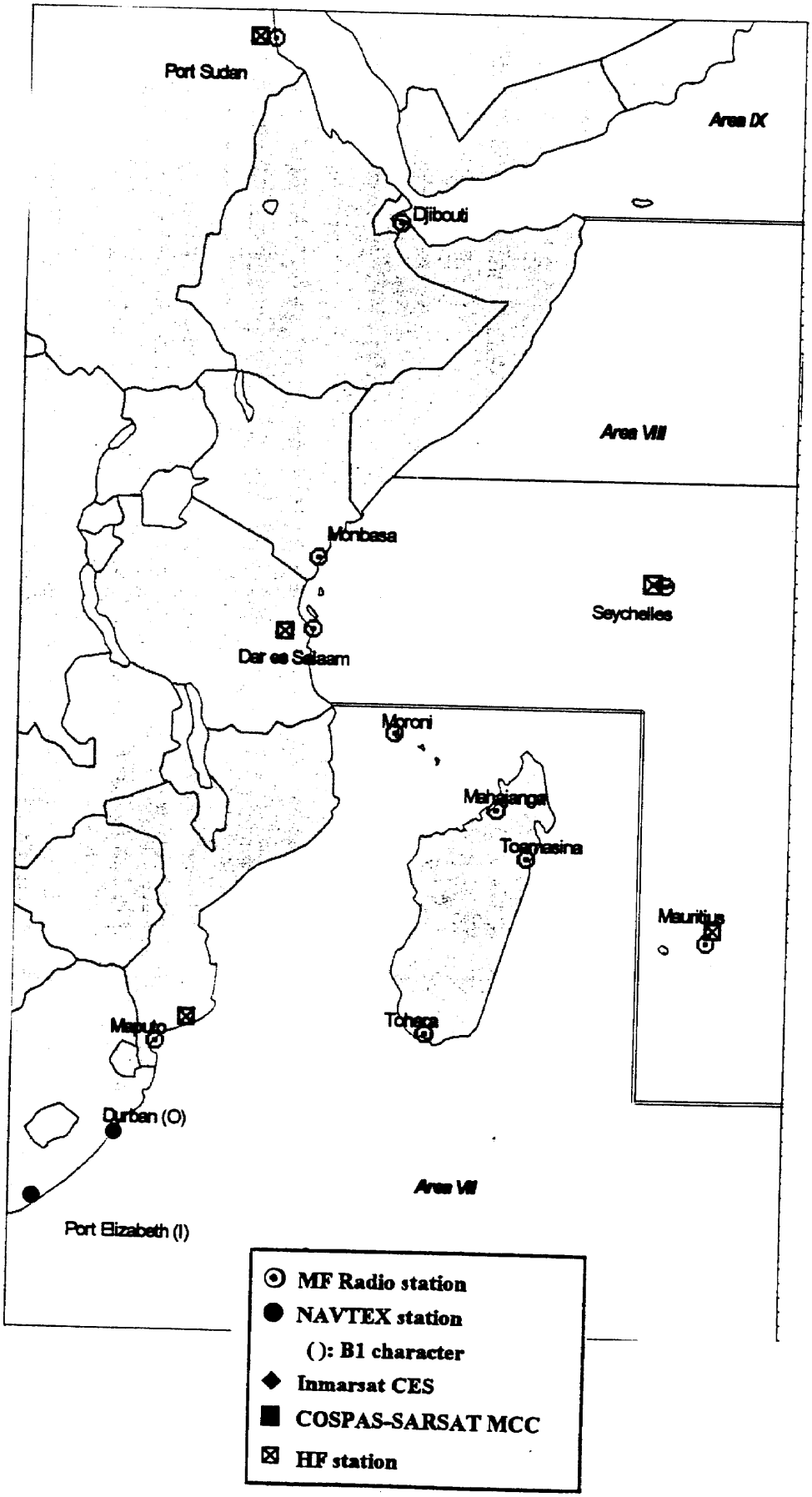
MAPS OF SHORE-BASED FACILITIES FOR THE GMDSS

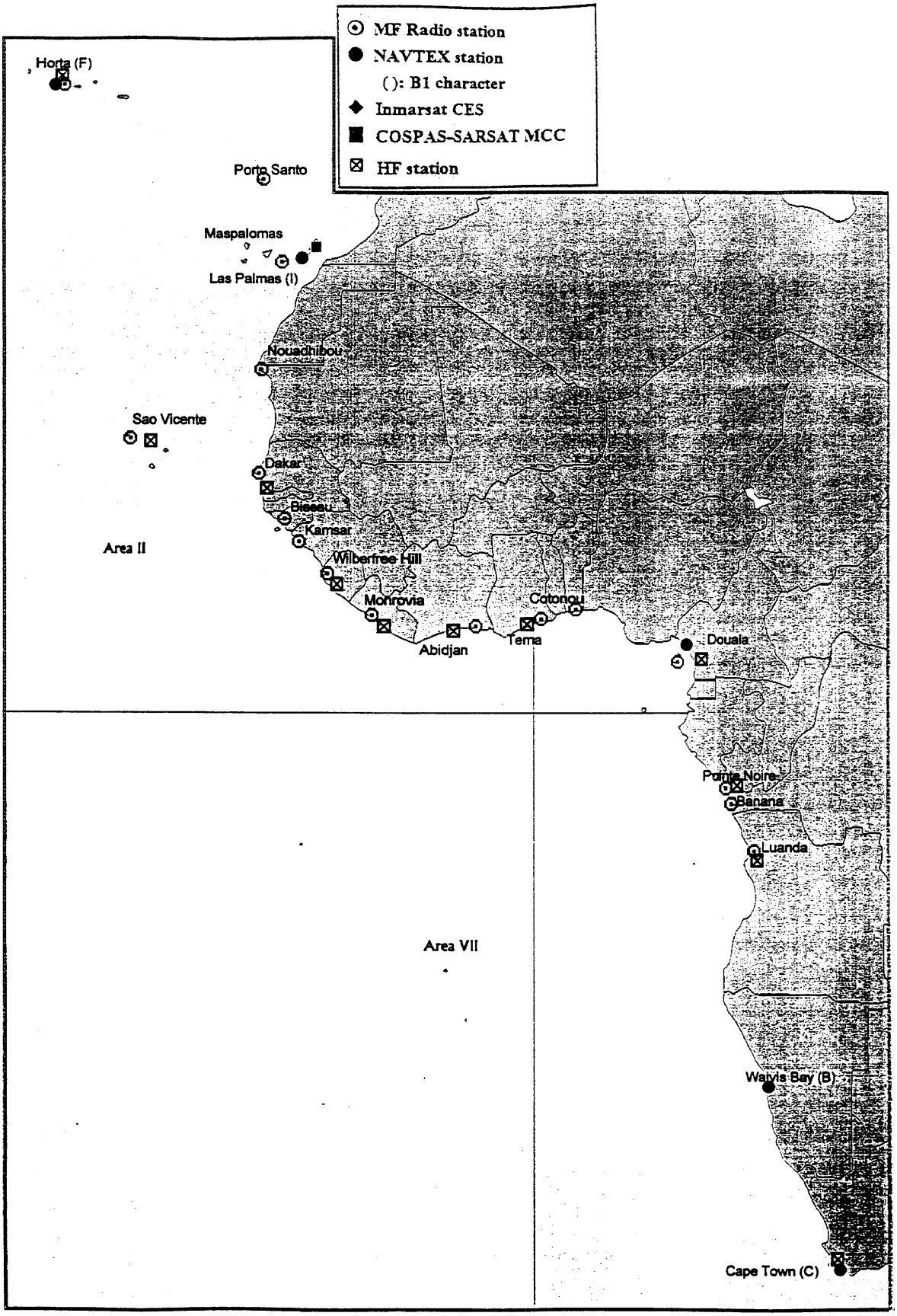


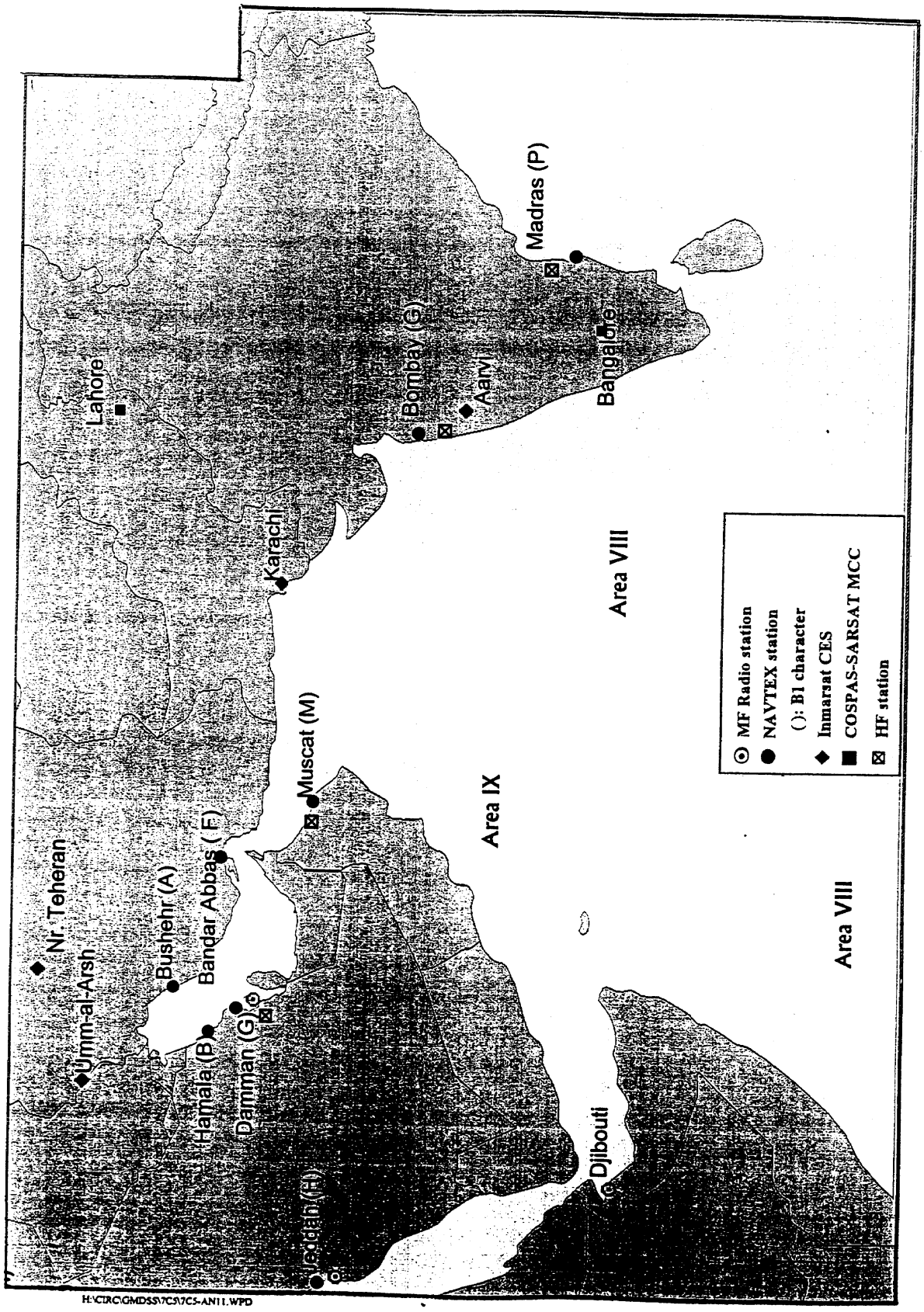
Note:
-VHF stations & MF monitor stations are not included.
-These maps contain all operational and planned stations without distinction.
-"Area" means NAVAREA & METAREA.

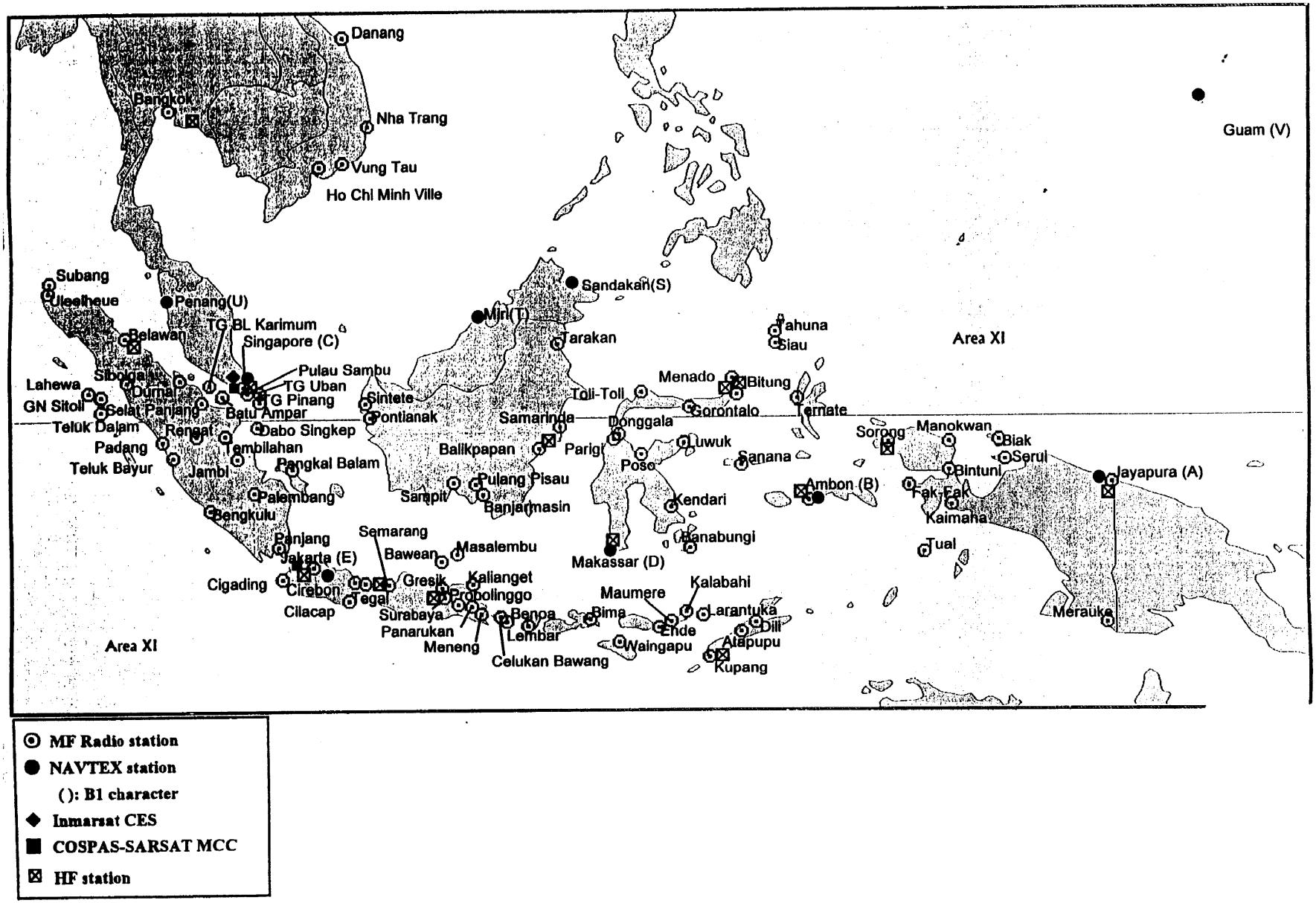
MF Radio station
NAVTEX station
( ): B1 character
Inmarsat CES
COSPAS-SARSAT MCC
HF station
Area I
Jan Mayen
Isafjordur
Siglufjordur
Neskaupstadur
(R) Reykjavik
Hornafjordur
Vsetmannaejar
Tornshaven
Lerwick
Stornoway
Kinloss
Aberdeen
Tiree
Malin Head
Tyne-Tees
Cullercoats (G)
Humber
Portpatrick (O)
Holyhead
Valentia
Milford Haven
Goonhilly
Falmouth
Plymouth
Niton (S)
Ouessant
Pleumeur Bodou
Cross Corsen (A)
Boulogne
Ostend (T)
Ijmuiden (P)
Station I2
Rsary
Szczecin
Wittowo
Lyngby
Blaavaland
Skagen
Farsund
Rogaland (L)
Berger
Florø
Ørlandet
Bodø (B)
Vardoe (V)
Murmansk (C)
Arkhangelsk (F)
Stockholm (H)
Tjome
Elk
Göteborg
Stockholm (J)
Moscow
Ralsting
Trieste
Odessa (C)
Mariupol


Mariupol (B)
Novorossiysk (A)
Odessa (C)
Constanta
Varna (J)
Trieste
Genoa
Toulouse
Cross La Garde (W)
Split (Q)
Ancona (U)
Roma (R)
Bari
Fucina
Kerkyra (K)
La Coruña
Finisterre (D)
Bilbao
Marseille Grasse
Barcelona
Monsalo
Valencia
Mallorca (X)
Cagliari (T)
(R) Lisbon
Sintra
Malaga
Tarifa (G)
Palermo
Augusta (S)
Malta (O)
Area III
Istanbul (D)
Zonguldak
Trabzon
Samsun (E)
Limnos
Canakkale Ata
Thermopylae
Izmir (I)
Anatoba
Athinai
Antalya (F)
Iskenderun
Rhodos
Mersin
Iraklion (H)
Nicosia
Troodos (M)
Limassol
Zygi
Haifa (P)
Casablanca (M)
Alexandria (N)
Port Said
Ismailia (N)
Masdi
Aqaba
Kossair
MF Radio station
NAVTEX station
( ): B1 character
Inmarsat CES
COSPAS-SARSAT MCC
HF station

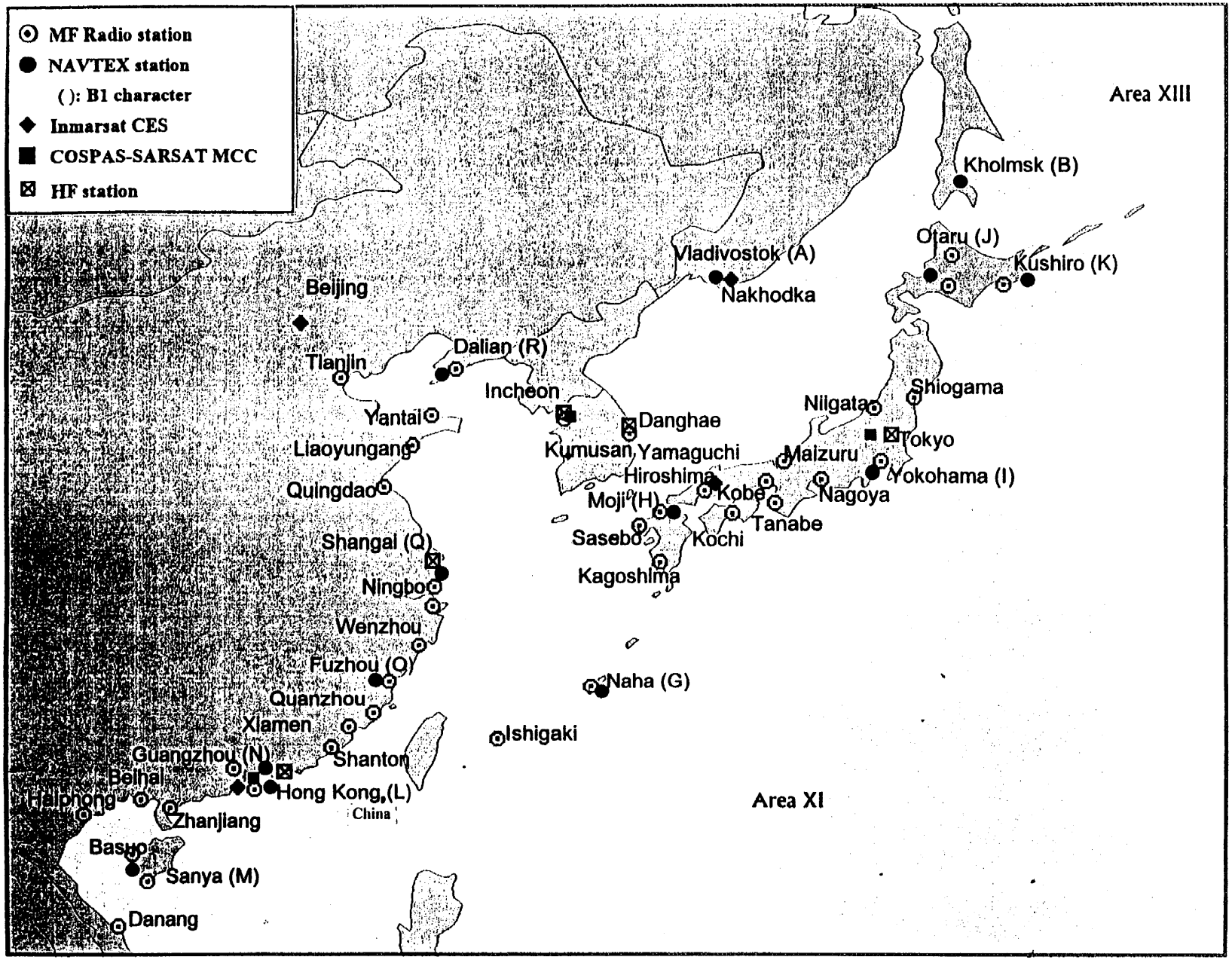

Port Sudan
Area IX
Djibouti
Area VIII
Mombasa
Seychelles
Dar es Salaam
Moroni
Mahajanga
Toamasina
Mauritius
Maputo
Tolagnaro
Durban (O)
Area VII
Port Elizabeth (I)
MF Radio station
NAVTEX station
( ): B1 character
Inmarsat CES
COSPAS-SARSAT MCC
HF station

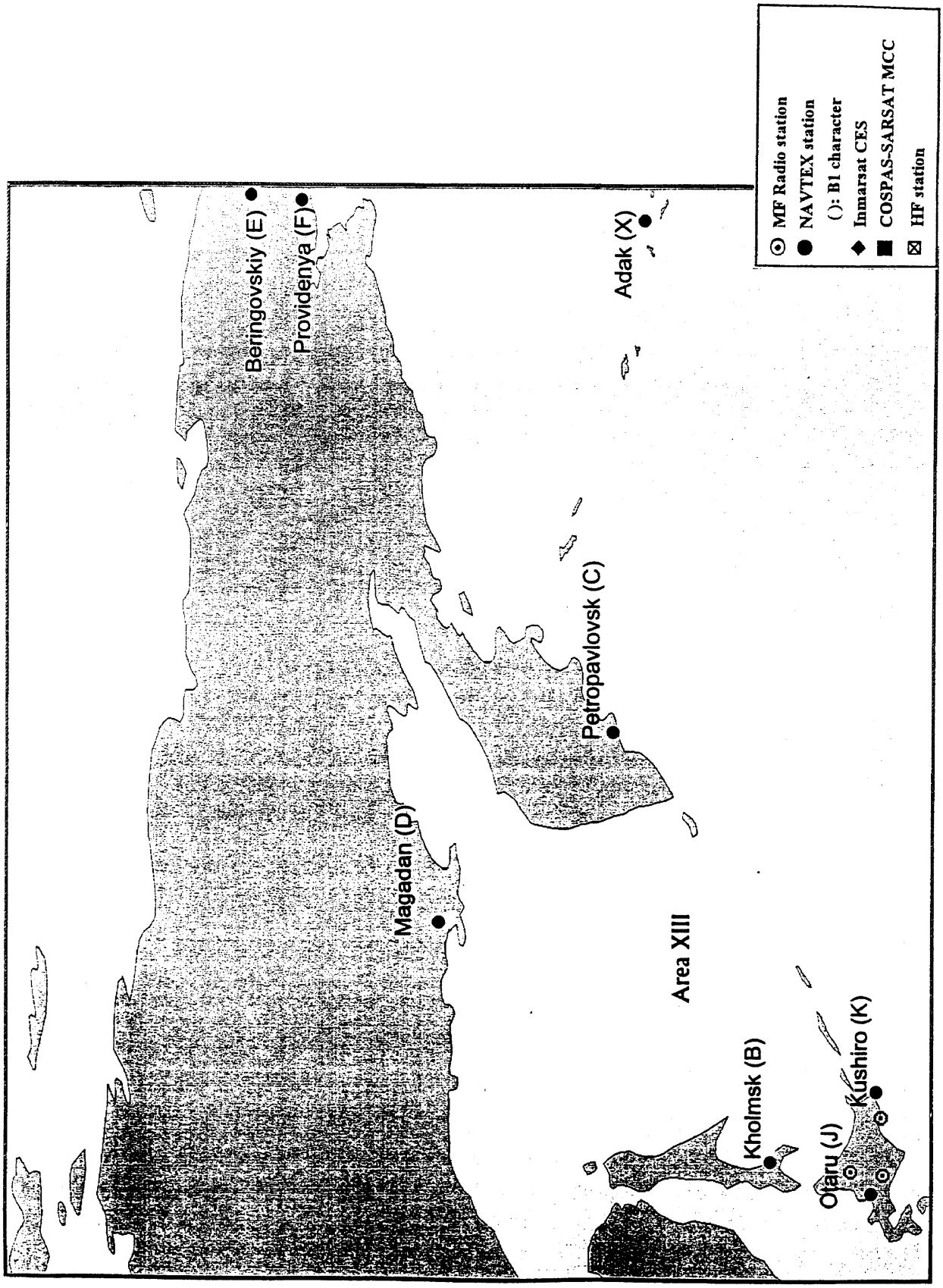

MF Radio station
NAVTEX station
( ): B1 character
Inmarsat CES
COSPAS-SARSAT MCC
HF station
Horta (F)
Porto Santo
Maspalomas
Las Palmas (I)
Nouadhibou
Sao Vicente
Dakar
Bissau
Kamsar
Area II
Wilberforce Hill
Monrovia
Abidjan
Cotonou
Tema
Douala
Pointe Noire
Banana
Luanda
Area VII
Walvis Bay (B)
Cape Town (C)

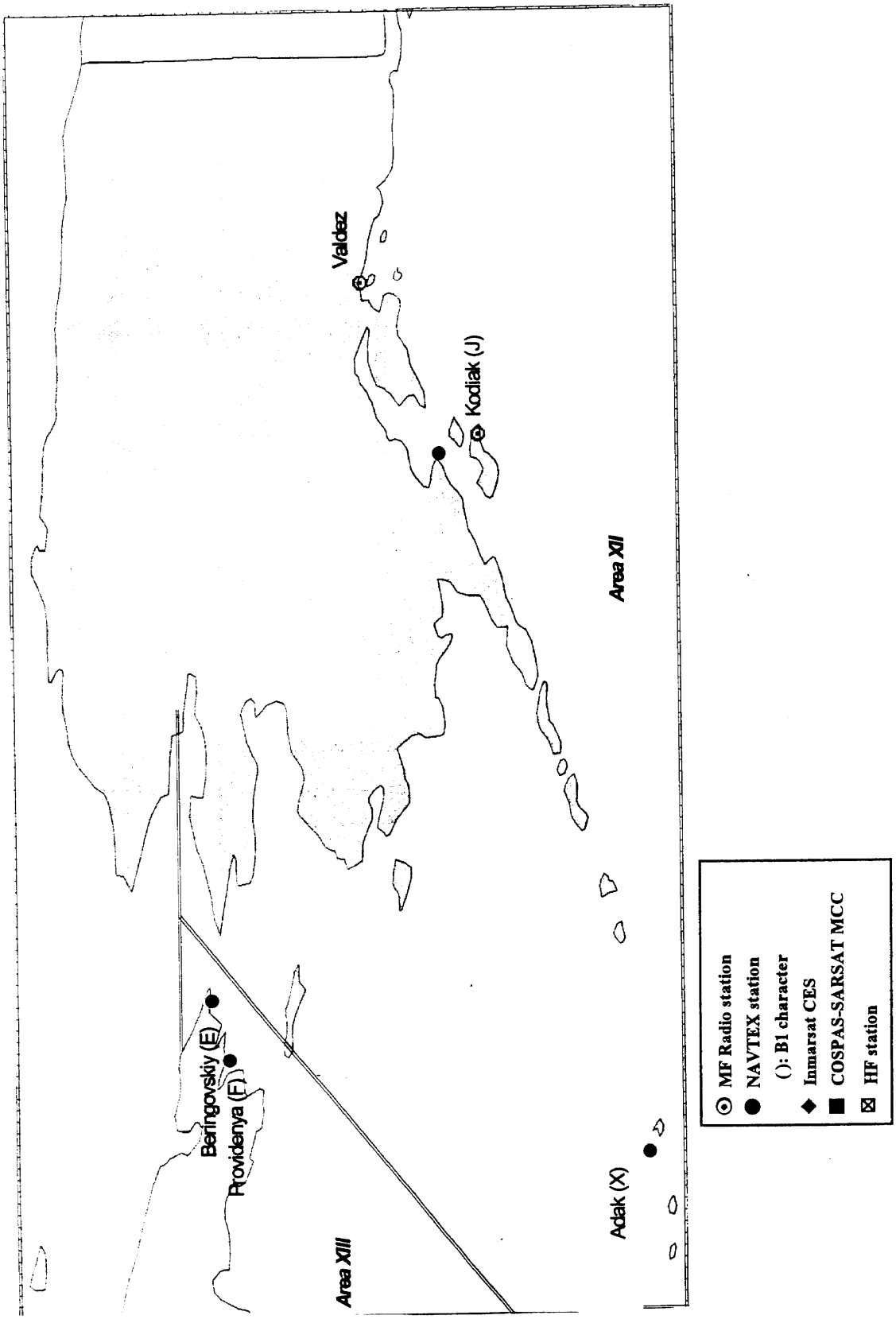

Nr. Teheran
Umm-al-Arsh
Bushehr (A)
Bandar Abbas (F)
Hamala (B)
Damman (G)
Jeddah (H)
Karachi
Muscat (M)
Lahore
Bombay (G)
Aarvi
Madras (P)
Bangalore
Djibouti
Area VIII
Area IX
Area VIII
MF Radio station
NAVTEX station
(): B1 character
Inmarsat CES
COSPAS-SARSAT MCC
HF station
H:\CIRC\GMDSS\7C5\7C5-AN11.WPD

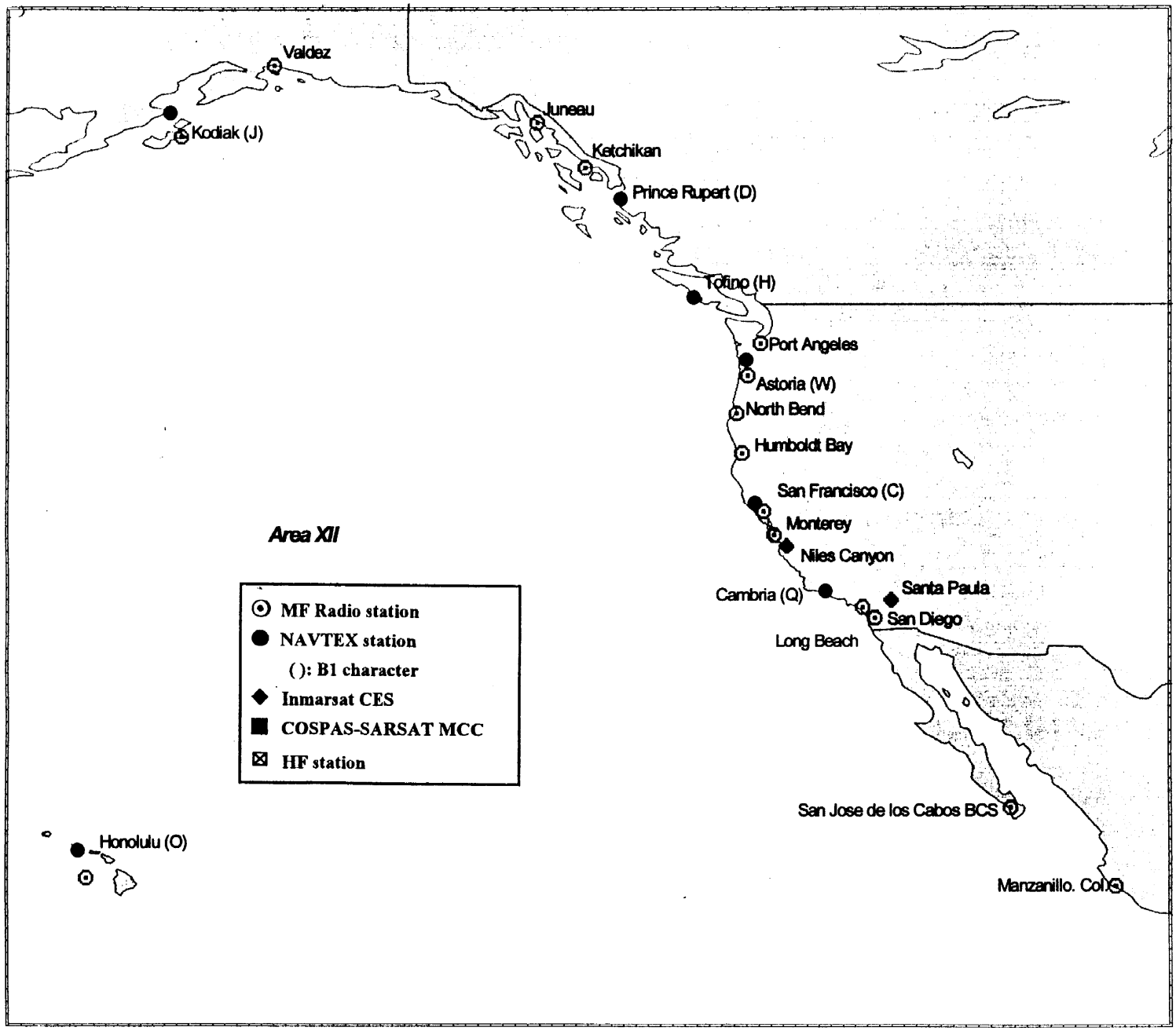

Danang
Bangkok
Nha Trang
Vung Tau
Ho Chi Minh Ville
Guam (V)
Subang
Ujungpandang
Penang(U)
TG BL Karimum
Singapore (C)
Belawan
Sandakan(S)
Miri(T)
Tarakan
Tahuna
Siau
Area XI
Pulau Sambu
TG Uban
TG Pinang
Batu Ampar
Sibolga
Lahewa
GN Sitoli
Selat Panjang
Teluk Dalam
Rengat
Dabo Singkep
Padang
Tambilahan
Teluk Bayur
Jambi
Bengkulu
Palembang
Pangkal Balam
Sintete
Pontianak
Samarinda
Balikpapan
Pulang Pisau
Sampit
Banjarmasin
Toli-Toli
Menado
Bitung
Gorontalo
Ternate
Donggala
Parigi
Poso
Luwuk
Kendari
Sanana
Ambon (B)
Sorong
Manokwan
Biak
Serui
Bintuni
Fak-Fak
Kaimana
Tual
Jayapura (A)
Merauke
Banabungi
Makassar (D)
Semarang
Bawean
Masalembu
Jakarta (E)
Cigading
Cirebon
Tegal
Cilacap
Gresik
Kalianget
Probolinggo
Surabaya
Panarukan
Meneng
Bangka
Lembar
Celukan Bawang
Maumere
Bima
Ende
Waingapu
Kalabahi
Larantuka
Dili
Atapupu
Kupang
Area XI
MF Radio station
NAVTEX station
( ): B1 character
Inmarsat CES
COSPAS-SARSAT MCC
HF station

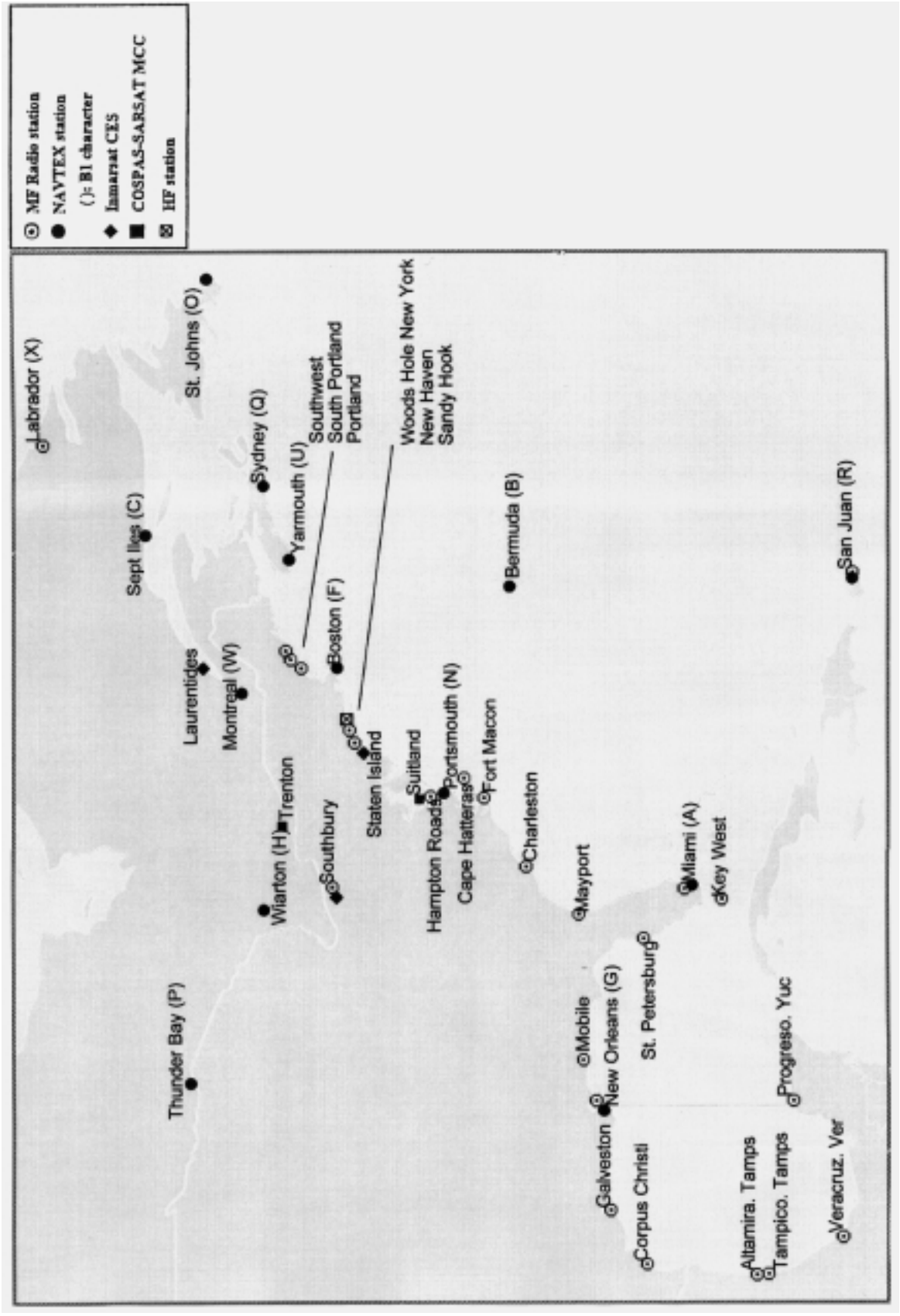

MF Radio station
NAVTEX station
(): B1 character
Inmarsat CES
COSPAS-SARSAT MCC
HF station
Brisbane
Canberra
Taupo Maritime Radio
Area X

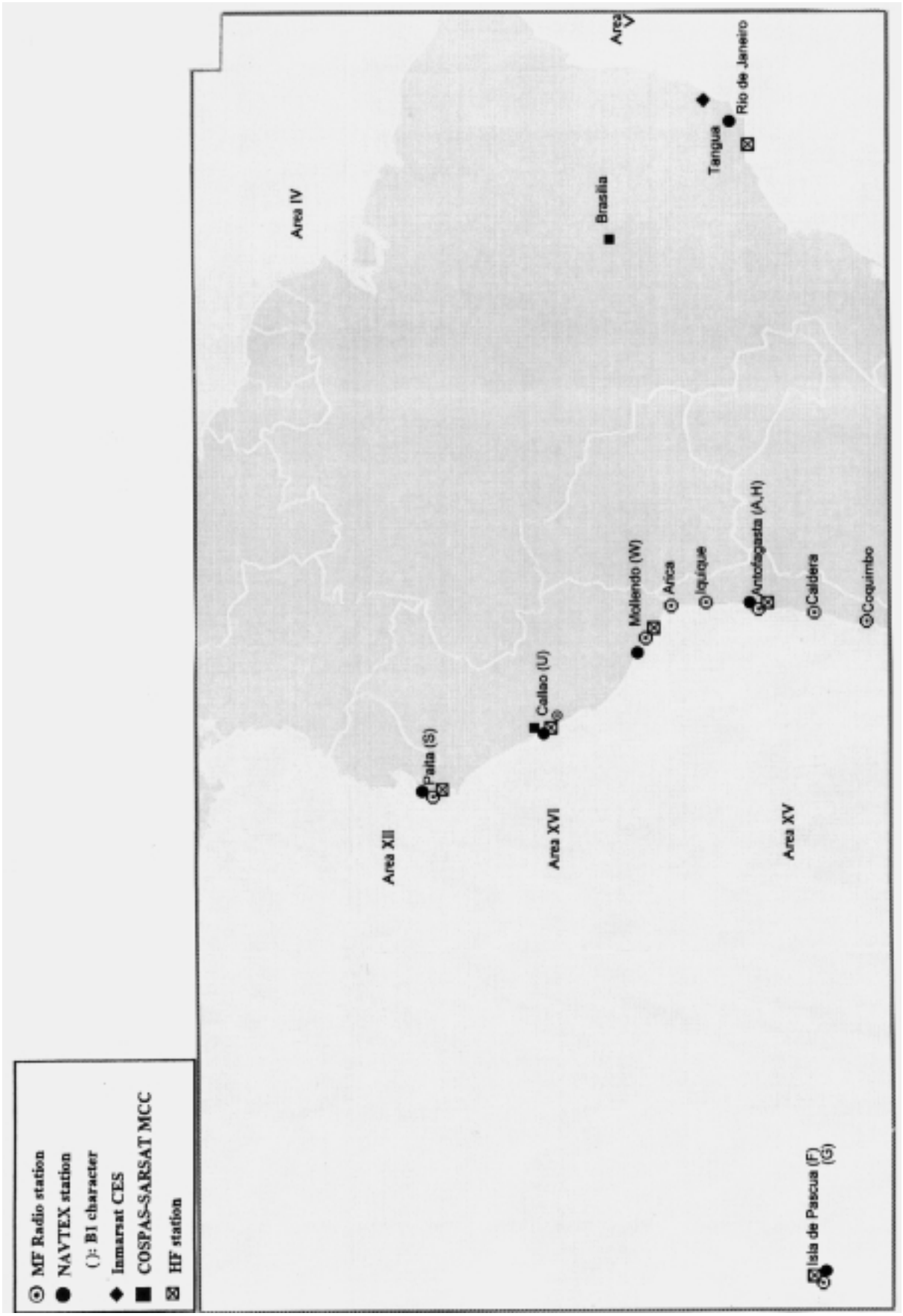

MF Radio station
NAVTEX station
( ): B1 character
Inmarsat CES
COSPAS-SARSAT MCC
HF station
Area XIII
Kholmsk (B)
Otaru (J)
Kushiro (K)
Vladivostok (A)
Nakhodka
Beijing
Dalian (R)
Tianjin
Incheon
Shiogama
Niigata
Yantai
Danghae
Tokyo
Liaoyungang
Kumusan
Yamaguchi
Maizuru
Hiroshima
Yokohama (I)
Quingdao
Kobe
Nagoya
Moji (H)
Tanabe
Sasebo
Kochi
Shangai (Q)
Kagoshima
Ningbo
Wenzhou
Fuzhou (O)
Naha (G)
Quanzhou
Xiamen
Ishigaki
Guangzhou (N)
Shanton
Beihai
Hong Kong, (L)
China
Haiphong
Zhanjiang
Area XI
Basuo
Sanya (M)
Danang

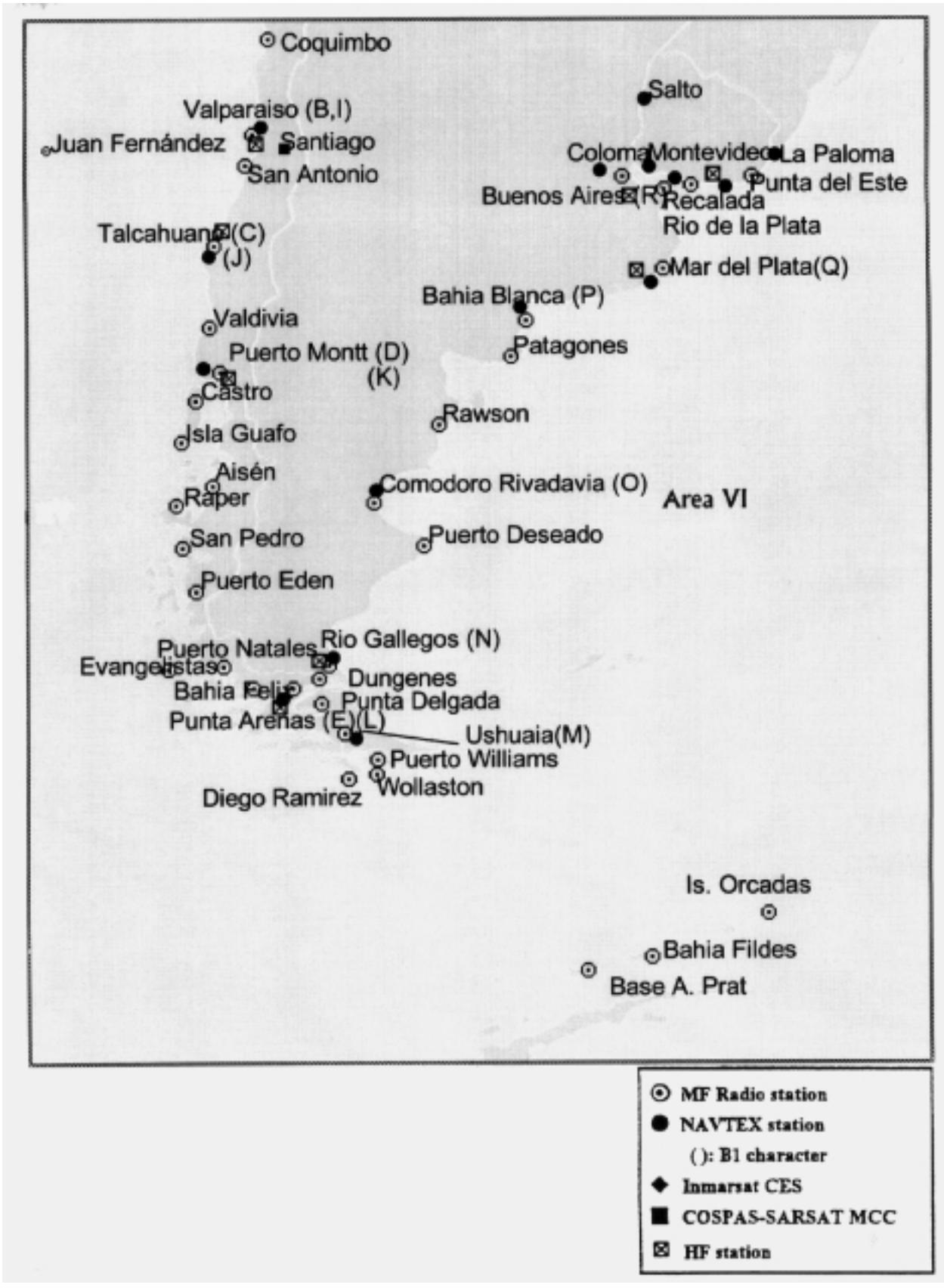

MF Radio station
NAVTEX station
( ): B1 character
Inmarsat CES
COSPAS-SARSAT MCC
HF station
Beringovskiy (E)
Providenya (F)
Adak (X)
Petropavlovsk (C)
Magadan (D)
Area XIII
Kholmsk (B)
Otaru (J)
Kushiro (K)


Valdez
Kodiak (J)
Area XII
Beringovskiy (E)
Provideniya (F)
Area XIII
Adak (X)
MF Radio station
NAVTEX station
(): B1 character
Inmarsat CES
COSPAS-SARSAT MCC
HF station


Valdez
Kodiak (J)
Juneau
Ketchikan
Prince Rupert (D)
Tofino (H)
Port Angeles
Astoria (W)
North Bend
Humboldt Bay
San Francisco (C)
Monterey
Niles Canyon
Cambria (Q)
Santa Paula
San Diego
Long Beach
San Jose de los Cabos BCS
Manzanillo. Col.
Honolulu (O)
Area XII
MF Radio station
NAVTEX station
( ): B1 character
Inmarsat CES
COSPAS-SARSAT MCC
HF station


MF Radio station
NAVTEX station
( ): B1 character
Inmarsat CES
COSPAS-SARSAT MCC
HF station
Labrador (X)
St. Johns (O)
Sept Iles (C)
Sydney (Q)
Yarmouth (U)
Southwest
South Portland
Portland
Laurentides
Montreal (W)
Boston (F)
Woods Hole New York
New Haven
Sandy Hook
Wiarton (H)
Trenton
Southbury
Staten Island
Suitland
Hampton Roads
Portsmouth (N)
Cape Hatteras
Fort Macon
Bermuda (B)
San Juan (R)
Charleston
Mayport
Miami (A)
Key West
Mobile
New Orleans (G)
Galveston
St. Petersburg
Corpus Christi
Altamira. Tamps
Tampico. Tamps
Progreso. Yuc
Veracruz. Ver
Thunder Bay (P)


MF Radio station
NAVTEX station
( ): B1 character
Inmarsat CES
COSPAS-SARSAT MCC
HF station
Area IV
Area XII
Area XVI
Area XV
Area V
Brasilia
Tangua
Rio de Janeiro
Paita (S)
Callao (U)
Mollendo (W)
Arica
Iquique
Antofagasta (A,H)
Caldera
Coquimbo
Isla de Pascua (F)
(G)


Coquimbo
Salto
Valparaiso (B,I)
Juan Fernández
Santiago
San Antonio
Coloma
Montevideo
La Paloma
Punta del Este
Buenos Aires (R)
Recalada
Rio de la Plata
Talcahuano (C)
(J)
Mar del Plata(Q)
Bahia Blanca (P)
Valdivia
Patagones
Puerto Montt (D)
(K)
Castro
Rawson
Isla Guafo
Aisén
Raper
Comodoro Rivadavia (O)
Area VI
San Pedro
Puerto Deseado
Puerto Eden
Puerto Natales
Rio Gallegos (N)
Evangelistas
Dungenes
Bahia Felix
Punta Delgada
Punta Arenas (E)(L)
Ushuaia(M)
Puerto Williams
Wollaston
Diego Ramirez
Is. Orcadas
Bahia Fildes
Base A. Prat
MF Radio station
NAVTEX station
( ): B1 character
Inmarsat CES
COSPAS-SARSAT MCC
HF station

O = Used
X = Not used

ANNEX 12

SATELLITE EPIRB REGISTRATION INFORMATION

Country [MID]	Type used		406MHz EPIRB coding methods			Agency maintaining 406 MHz EPIRB registration database		Frequency of updating database
	406MHz	L-BAND	Serial No	MMSI	Call Sign			
Argentina [701]	O	O	O	O	O	National Maritime, Fluvial and Lacustre SAR Agency, Address: Base Naval Puerto Belgrano(CP8111), Buenos Aires, Republica Argentina	Phone: +54(0)-0932-8-7140 +54(0)-0932-8-7150 +54(1)-317-2038 Fax: +54(0)-0932-8-7153	Dairy
Australia [503]	O	O	O	O	O	Manager Operations, Australian Search and Rescue (Aus SAR) Address: G.P.O.Box 2181, Canberra, Act 2601, Australia	Phone: +61-2-6230-6811 Fax: +61-2-6230-6868 Telex: +71-62349 AFTN: YSARYCYX Internet rrcaus@amsa.gov.au	Whenever new numbers are received, but it is audited annually.
Bahamas [308]	O	O	X	O	X	HM Coastguard Address: Pendennis Point, Falmouth, U.K.	Phone: +44-1326-317575 Fax: +44-1326-318342 Telex: 45560 (FALMCG G)	Continuous
Belgium [205]	O	O	X	O	X	IBPT (Institut belge des Services Postaux et des Telecommunications) Address: Sterrenkundelaan No.14, P.O.Box 21, B-1210 BRUXELLES	Phone: +32-2-226-8856 Telex: +32-2-226-8802 (Monday to Friday 0600-1500 UTC)	Daily
Bermuda(UK) [310]	O	X	X	O	X	Department of Telecommunications Address: Golinsky Building, 60 Reid Street Hamilton HM1R, P.O. Box HM101 HAMILTON HMAX, Bermuda	Phone: +1-441-292-4595 Fax: +1-441-295-1462	As required
Brazil [710]	O	X	X	O	X	Diretoria de Eletronica e Protecao Vo Address: DEPV, Aeroporto Santos Dumont-5º andar Rio de Janeiro, Brazil	Phone: +55-21-2125-240 2122-065 Fax: +55-21-2125-233	
Bulgaria [207]	O	X.	O	X	O	State Shipping Inspectorate Address: 5n Primorski Boulevard, 9000Varna, Bulgaria	Phone: +359-52-603113 Fax: +359-52-602317 Telex: 67-77460	Every 3 months
Canada [316]	O	X	O	X	X	Department of Communications Canadian Coast Guard Address: 9th Floor, Canada Building, 344 Slater Street, Ottawa, Ontario, K1A ON7, Canada	Phone: +1-613-990 3124 Fax: +1-613-996 8902	Daily with 365 day annual review

Country [MID]	Type used		406MHz EPIRB coding methods			Agency maintaining 406 MHz EPIRB registration database		Frequency of updating database
	406MHz	L-BAND	Serial No	MMSI	Call Sign			
Chile [725]	O	X	X	O	X	Direccion General del Territorio Maritimo y de Marina Mercante (D.G.T.M y MM) Address: Errazuriz 537, Valparaiso, Chile	Phone +56-32-208283 +56-32-208284 Fax: +56-32-208042 +56-32-208296 Telex: 34 230602 DGTM CL 34 330607 ANGEL CK	
China [412]	O	N.I.	N.I.	O	N.I.	China Maritime Search and Rescue Centre Address: 11 Jianguomennei Ave.,Beijing,100736, China	Phone: +86-10-65292221 +86-10-65292218 Fax: +86-10-65292245 Telex: 222258 CMSAR CN	As required
Colombia [730]	O	N.I.	N.I.	N.I.	N.I.	Departamento Administrativo de Aeronautica Civil Address: Bogota, Colombia	Phone: +57-1-4139598 +57-1-4139638 Fax: +57-1-4138091 Telex: 35-44844 35-44620	
Costa Rica [321]	O	N.I.	N.I.	N.I.	N.I.	Central America Search and Rescue Point of Contact	Fax: +55-21-2200515 Telex: 3912137113	
Croatia [238]	O	X	X	O	X	Harbour Master's Office (Open 24 hours a day) Address: 51000 Rijeka, Senjsko pristanište 3, Croatia	Phone: +385-51-214-031 51-212-474 Fax: +385-51-212-696 51-211-660	Every 10 days
Cyprus [209] [210] [212]	O	X	X	O	X	Department of Merchant Shipping P.O.Box 6193, CY3305 LIMASSOL/CYPRUS --- RCC LARNACA CY6650 LARNACA/CYPRUS --- Cyprus Radio P.O.Box 4929, CY1396 NICOSIA/Cyprus	Phone: +357-5-848100 Fax: +357-5-848200 Telex: 605 2004MERSHIPCY --- Phone: +357-4-630723 Fax: +357-4-643254 Telex: 605 4158 RCCCY CY --- Phone: +357-2-702286 Fax: +357-2-702392 Telex: 6057888 CYPRADIO CY	On a regulary basis once a year and Occasionally
Denmark [219]	O	N.I.	N.I.	N.I.	N.I.	RCC Karup Address: Flyvertaktisk Kommando RCC Karup, Koelvraa DK-7470 Karup J, Denmark	Phone: +45-99624950 ext.5631 Fax: +45-99624954 Telex: 66160(Rescue DK) AFTN: EKMCYCYX	
Ecuador [735]	O	N.I.	N.I.	N.I.	N.I.	Fuerza Aerea Ecuatoriana	Phone: +593-2-570622 Telex: 3648(SUDBAC ED) AFTN: SEGUZQZX	

Country [MID]	Type used		406MHz EPIRB coding methods			Agency maintaining 406 MHz EPIRB registration database		Frequency of updating database
	406MHz	L-BAND	Serial No	MMSI	Call Sign			
Egypt [622]	O	X	X	O	X	Ports & Lighthouses Address: Serapum – Ismailia SAR	Phone: 2064 322299 Fax: 2064 334869 Phone: 202 4184537 Fax: 202 4184531	
El Salvador [359]	O	N.I.	N.I.	N.I.	N.I.	Central America Search and Rescue Point of Contact	Fax: +55-21-2200515 Telex: 3912137113	
Estonia [276]	O	O	O	O	X	MRCC Tallinn Address: Susta 15, 11712, Tallinn, Estonia	Phone: +372-639-9500 692-2222 Fax: +372-639-9501 Telex: (537) 173341 PIIR EE mvk@mewal.pv.ee	Continuous
Færoe Islands(Denmark) [231]	O	N.I.	N.I.	N.I.	N.I.	RCC Karup Address: Flyvertaktisk Kommando RCC Karup, Koelvraa DK-7470 Karup J, Denmark	Phone: +45-99624950 ext.5631 Fax: +45-99624954 Telex: 66160(Rescue DK) AFTN: EKMCYCYX	
Fiji [520]	O	N.I.	O	O	O		Phone: Fax:	
Finland [230]	O	O	X	O	X	MRCC Helsinki Address: P.O. Box 150, FIN-00161, Helsinki, Finland	Phone: +358-0-667766 Fax: +358-0-631670 Telex: 57-124777 (SLMJK FIN)	Once a week
France [227] [228]	O	O	N.I.	O	X	MRCC Etel (EPIRBs) Centre Regional Operationnel de Surveillance et de Sauvetage BP 48, 56410 Etel France --- FMCC/DGAC (ELTs, PLBs)	Phone: +33- 29-755-3535 Fax: +33- 29-755-4934 Telex: 950519 AFTN: LFIEYYYX --- Phone: +33- 56-125-4382 Fax: +33- 56-127-4878 Telex: 530800 NCSAR A AFTN: LFIAZSZX	
Germany [211] [218]	O	O	X	O	X	MRCC Bremen	Phone: +49-42153 6870 Fax: 68714 Telex: 244754 or 246466 (mrccd) AFTN: EDDWYYYX attn: MRCC Bremen	Daily

Country [MID]	Type used		406MHz EPIRB coding methods			Agency maintaining 406 MHz EPIRB registration database		Frequency of updating database
	406MHz	L-BAND	Serial No	MMSI	Call Sign			
Greece [237] [239]	O	O	X	O	X	RCC Piraeus Address: 150 Gr.Lampraki St., GR-185 18 Piraeus, Greece	Phone: +30-1-4112500 (emergency) 4220772(emergency) 4191369 4191126 4191325 Fax: +30-1-4115798 4191561 4117801 4224417 4132398 4220466 Telex: +601-211588 RCC GR 211254 RCCGR 212239 YEN GR 212273 YEN GR 213594 YEN GR AFTN: LGGGYCYX Inmarsat A 1133207 RCCG Inmarsat C 423767310 RCCG (AOR-E/IOR)	
Greenland(Denmark) [331]	O	N.I.	N.I.	N.I.	N.I.	RCC Karup Address: Flyvertaktisk Kommando RCC Karup, Koelvraa DK-7470 Karup J, Denmark	Phone: +45-99624950 ext.5631 Fax: +45-99624954 Telex: 66160(Rescue DK) AFTN: EKMCYCYX	
Iceland [251]	O	X	X	O	X	Post- and Telecom Administration Smidjuvegur 68-70 IS-200 Kopavogur Iceland	Phone: +354-510 1500 Fax: +354-510 1509	
India [419]	O	N.I.	N.I.	N.I.	N.I.	Satellite Communications Programmes, Department of Space Address: ISRO Headquaters, Antariksh Bhaven, New B.E.L. Road, Bangalore-560 094, India	Phone: +91-80-334273 334474 Fax: +91-80-334229 Telex: 81-8452499	
Indonesia [525]	O	N.I.	N.I.	N.I.	N.I.	BASARNAS, National SAR Agency Address: Bandara Soekarno-Hata Building 628, Jakarta, Indonesia	Phone: +62-21-5501512 Fax: +62-21-5501513 Telex: 73-45937	
Ireland [250]	O	N.I.	N.I.	N.I.	N.I.	Shannon MRCC	Phone: +353-61-61219 Telex: +353-61-61969 AFTN: 26262 (MRCC EI) EINNYCYX	
Italy [247]	O	N.I.	O	O	O	ITMCC Address: Via D'Annunzio, 7 Bari Palese, Italy	Phone: +39-80-5316250 Fax: +39-80-5316254 Telex: 811375 AFTN: CIBD252X e-mail: ITMCC@PANGEANET.IT	Weekly

Country [MID]	Type used		406MHz EPIRB coding methods			Agency maintaining 406 MHz EPIRB registration database		Frequency of updating database
	406MHz	L-BAND	Serial No	MMSI	Call Sign			
Jamaica [339]	O	O	N.I.	O	N.I.	Port and Telecommunications Departments Address: South Camp Road, Kingston, Jamaica	Phone: 876-922-9430 Fax: 876-922-9449 Telex: 2133 POTELSKN JA e-mail: JAMPOST@wtjam.net	Upon receipt of new activation
Japan [431]	O	X	X	O	X	Japan Mission Control Centre (JAMCC), Japanese Coast Guard Address: Kaijo Hoan Cho 2-1-3 Kasumigaseki,Chiyoda-ku,Tokyo, 100-8989 Japan	Phone: +81-3-3591-9000 Fax: +81-3-3591-9000 Telex: 2225193(JMSAHQJ) AFTN: RJAAYKYX	Once a month
Latvia [275]	O	X	O	O	X	Maritime Administration of Latvia Address: Andrejsala 4, Riga, Latvia LV-1045	Phone: +371-7320100 Fax: +371-7320100 Telex: 161396 MRCC LV Inmarsat A 871 1420154	Regularly
Liberia [636]	O	O	X	O	O	Liberian International Ship & Corporate Registry, LLC Address: 8619 Westwood Center Drive, Vienna, Virginia 22182, USA	Phone: +1-703-790-3434 (working hours) +1-703-508-3019 (after hours) Fax: +1-703-790-5655 Telex: UK 940498535	Continuously
Lithuania [277]	O	N.I.	N.I.	N.I.	N.I.	State Radio Frequency Service Address: 27 Algerdo Street Vilnius 2006, Lithuania	Phone: +370-226-1177 Fax: +370-226-1524 Telex: 261111 VRDT SU	
Madagascar [647]	O	N.I.	N.I.	N.I.	N.I.	RCC Antananarivo Centre de Coordination Recherches et Sauvetage P.O.Box 46, Antananarivo, Ivato 105 Madagascar	Phone: +221-2022-44410 Telex: 22286 ASEMAD MG	
Malaysia [533]	O	X	O	O	O	MRCC Port Klang Marine Department Malaysia Safety of Navigation Division P.O. Box 12, 42007 Port Klang, Malaysia	Phone: +60-3-3670530 3686616 Fax: +60-3-3671334 3685020 e-mail: kpgr@marine.gov.my	On receipt of registration form
Malta [248] [249] [256]	O	O	X	O	X	Wireless Telegraphy Dept., Address: Evans Building, Merchants Street, Valletta CMR 02 Malta	Phone: +356-25993624 +356-247224-8 Fax: +356-232728 +356-233695 Telex: 0 406-1471 (MODMLT MW)	Continuously

Country [MID]	Type used		406MHz EPIRB coding methods			Agency maintaining 406 MHz EPIRB registration database		Frequency of updating database
	406MHz	L-BAND	Serial No	MMSI	Call Sign			
Marshall Islands [538]	O	O	X	O	O	International Registries, Inc Address: 11495 Commerce Park Drive, Reston, Virginia 20191, USA	Phone: +1-703-620-4880 (working hours) +1-703-620-4766 (after hours) Fax: +1-703-476-8522 Telex: 248403	Continuously
Mauritius [645]	O	O	X	O	X	Not available		
Mexico [345]	X	O	N.I.	X	N.I.	En Telecomm Eje Central Lazaro Cardenas 567 Torre Central De Telecomunicaciones Piso 6 Ala Sur, Col. Narvarte C.P. 03020, Deleg. Benito Juarez, Mexico, D.F.	Phone: Fax: 629-12-36 519-15-55	Daily
Netherlands [244] [245] [246]	O	X	X	O	X	Ministry of Transport Address: P.O.Box 450, 9700 AL Groningen, Van Sweientenlaan 27, The Netherlands	Phone: +31-50-222111 Fax: +31-50-135645 Telex: 77154	Daily
New Zealand [512]	O	N.I.	N.I.	N.I.	N.I.	Civil Aviation Athority Address: 1, Market Grove, P.O. Box 31441 Lower Hutt, New Zealand	Phone: +64-4-5600400 Fax: +64-4-5665030	
Nicaragua [350]	O	N.I.	N.I.	N.I.	N.I.	Central America Search and Rescue Point of Contact	Fax: +55-21-2200515 Telex: 3912137113	
Norway [257] [258] [259]	O	X	X	O	X	Teledirektoratet / TTI Address: P.O.Box 6701 ST Olavs PL, N-0130, Oslo, Norway --- [For 24 hours contact] RCC Bodoe RCC Stavanger	Phone; +47-2-2777519 Fax; 2488990 Telex; +47-2-2201136 11206 (TINSP N) --- Phone; +47-755-21267 Fax; +47-755-24200 Telex; 64302 Phone; +47-51-51-7000 Fax; +47-51-65-2334 Telex; 33163	
Pakistan [463]	O	N.I.	N.I.	N.I.	N.I.	Satellite Communication Division SPARC Address: P.O. Box 8402, Karachi 75270, Pakistn	Phone: +92-21-471001-5 7730312 Fax: +92-21-466902 Telex: 82-25720(SPACE PK)	

Country [MID]	Type used		406MHz EPIRB coding methods			Agency maintaining 406 MHz EPIRB registration database		Frequency of updating database
	406MHz	L-BAND	Serial No	MMSI	Call Sign			
Peru [760]	O	X	O	X	X	Centro de Control de Misiones del Peru Address: Calle Constitucion 130, Callao1 Peru	Phone: +51-1-4200355 4200766 4292458 4291735 Fax: +51-1-4202020 4200766 Telex: 26043(PE DICAPI) Internet postmast@pemcc.mil.pe	Daily
Philippines [548]	O	N.I.	N.I.	N.I.	N.I.	Manila RCC Address: Pasay City, Metro Manila, Philippines	Phone: +63-2-8323013 Fax: +63-2-8331577	
Poland [261]	N.I	N.I	N.I	N.I	N.I	Civil Aviation Department Ministry of Transport and Maritime Economy Address: U1. T. Chalubinskiego 4 00-928 Warsaw, Poland	Phone: +48-2- 2244-195 Fax: +48-2- 2296-378 Telex: 63-816651	
Portugal [204] [255] [263]	O	O	X	O	X	Direcçao-Geral de Portos, Navegaçâo e Transportes Maritimos Address: Edificio Vasco da Gama, Cais Alcantara Mar 1350 Liaboa, Portugal --- [For 24 hours contact] MRCC Lisboa Address: Reduto Gomes Freire, 2780 Oeiras	Phone: +351-1-3913529 Fax: +351-1-3979794 --- Fax; +351-1-441-6159 Telex; 404-60747P	Daily
Korea, Republic of [440]	O	O	X	O	X	Korean Mission Control Centre (KOMCC) Address: 1-105, Buksung-Dong, Jung-Gu, Inchon, 400-201 Republic of Korea	Phone: +82-42-861-2330 Fax: +82-42-861-2331 Telex: K 45502	
Romania [264]	O	X	X	O	X	Constanta Harbour Master Address: Incinta Port 8700 Constanta, Romania	Phone: +40-41-616431 617545 619100 (ext.1609 or 1232) Fax: +40-41-616431 617545 Telex; 14209 CPT	Every 3 months
Russian Federation [273]	O	O	O	O	X	Morsviazsputnik Address: 14/19 Novoslobodskaya St. Building 7 Moscow 103030, Russia	Phone: +7-095-9671860 9671862 Fax: +7-095-9671855 9671830 Telex: 64-411197 A MMF SU	Daily

Country [MID]	Type used		406MHz EPIRB coding methods			Agency maintaining 406 MHz EPIRB registration database		Frequency of updating database
	406MHz	L-BAND	Serial No	MMSI	Call Sign			
Singapore [563] [564]	O	O	X	O	O	Maritime and Port Authority of Singapore Address Port Master's Department, 7B Keppel Rd #19-07/09, Tanjong Pagar Complex, Singapore 089055 Singapore	Phone: +65-3252-582 453 Fax: 454 e-mail: pocc@mpa.gov.sg	Weekly
South Africa [601]	O	X	O	O	O	MRCC Cape Town Address Private Bag X8, Tokai, 7966 Cape Town, South Africa	Phone: +27-21-787-2222 Fax: +27-21-787-2337 Telex: 95-527722	
Spain [224]	O	X	X	O	O	Area de Inspccion Radiomaritima Direccion General de la Marina Mercante Address: Calle Ruiz de Alarcon, 1 28071 Madrid, Spain	Phone: +34-1-580-1463 580-1456 Fax: 580-1400 +34-1-580-1432 580-1514	
Suriname [765]	O	N.I.	N.I.	N.I.	N.I.	Department of Civil Aviation P.O.Box 1981, Zorg en Hoop, Paramaribo-South, Surinam	Phone: +597-497914 Telex: +597-498898 AFTN: 148(CIVPBM SN) SMPBYAYX	
Sweden [265]	O	O	O	O	O	Address: Box 5158, SE-426-05 Vastra Frolunda, Sweden	Phone: +46-31 699080 Fax: +46-31 648010 Telex: +54 201 80 MRCC-Gbg S AFTN: ESORYCYX e-mail: mrccgbg@sjofartsverket.se	Daily
Switzerland [269]	O	X	O	O	O	Schweizerisches Seesciffahrtsamt Address: Elisabethenstrasse 31, CH-4010 Basel Switzerland	Phone: +41-61-287-1444 Fax: +41-61-287-1570	
Thailand [567]	O	X	X	O	O	RCC Bangkok	Phone: +66-2 2860506 Telex: 2855450 Fax: 2860594 22720 BKK RCC TH AFTN: +66 2 22862913 2873186 VTBAYCYX	
Turkey [271]	O	O	X	X	X	Undersecretariat for Maritime Affairs Address: Anit Cd.N:8 Tandogan/ANKARA, Turkey	Phone: +90-312-231 0105 232 4783 232 3849 / 2620 Telex: +90-312-212 0823	Monthly
Ukraine [272]	O	N.I.	N.I.	N.I.	N.I.	Cospas Mission Centre (CMC) Address: 1/4 Rozhdestvenka St. Moscow 103759, Russia	Phone: +7-095-9261374 Fax: +7-095-9269375 Telex: 411469A or 411469B (COPA SU)	

Country [MID]	Type used		406MHz EPIRB coding methods			Agency maintaining 406 MHz EPIRB registration database		Frequency of updating database
	406MHz	L-BAND	Serial No	MMSI	Call Sign			
United Arab Emirates [470]	O	N.I.	N.I.	N.I.	N.I.	Emirates RCC	Phone: +971-2-757388 Telex: 22475(ADIAAS EM) AFTN: OMAAYC	
United Kingdom [232]	O	O	O	X	X	EPIRB Registry Maritime and Coastguard Agency Address: MRCC Falmouth, Pendennis Point, Castle Drive, Falmouth TRII 4WZ, U.K.	Phone: +44-1326-211569 Fax: +44-1326-319264 Telex: 45560	Daily
United States [366] [367] [368]	O	X	O	X	X	NOAA/NESDIS Address: Federal Office Building 4, Room 0158, Code: E/SP3, Washington, D.C.20233, USA	Phone: +1-301-457-5428 Fax: +1-301-457-5406 Telex: 230-7400649	Daily
Vanuatu [576]	O	X	X	O	X	Vanuatu Maritime Services Address: 90 Washington - 22nd Floor, New York NY 10006, USA	Phone: +1-212-4259600 Fax: +1-212-4259652 Telex: 229346 Van Mar Svcs	
Venezuela [775]	O	N.I.	N.I.	N.I.	N.I.	RCC Maiquetia	Phone: +58-31-27601(RCC) +58-31-22372(RCC) +58-31-28751(RCC) +58-31-26620(SAR) +58-31-25385(SAR) +58-31-26409(SAR) +58-2-5092264 +58-2-5092210 (AeroCivil) Fax: +58-31-23269(RCC) +58-2-5744035 (Aero.Civil) Telex: 28022(MICACVC) 24626(MICTAVC) AFTN: SVSCYFYX	
Associate Member of IMO Hong Kong, China [477]	O	X	O	O	O	SAR Section, Marine Department Address: P.O. Box 4155, Hong Kong	Phone: +852-5433558 Fax: +852-5417714 Telex: 802-82952 MRCC HX	

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ANNEX 13

LIST OF 24 HOUR POINTS OF CONTACT FOR MMSI SHIP'S IDENTIFICATION

Country [MID]	24 hour point of contact (Agency maintaining national database for MMSI-number)		Frequency of updating MMSI database	
			National database	ITU database*
Argentina [701]	National Maritime, Fluvial and Lacustre SAR Agency, Address: Base Naval Puerto Belgrano(CP8111), Buenos Aires, Republica Argentina	Phone: +54(0)-0932-8-7140 +54(0)-0932-8-7150 +54(1)-317-2038 Fax: +54(0)-0932-8-7153	Daily	Monthly
Australia [503]	Manager Operations, Australian Search and Rescue (Aus SAR) Address: G.P.O.Box 2181, Canberra, Act 2601, Australia	Phone: +61-2-6230-6811 Fax: +61-2-6230-6868 Telex: +71-62349 AFTN: YSARYCYX Internet: rrcaus@amsa.gov.au	When new numbers are issued	Quarterly
Bahamas [N.I.]	HM Coastguard Address Pendennis Point, Falmouth, TR11 4WZ, United Kingdom	Phone: +44-1326-317575 Fax: +44-1326-318342 Telex: 45560(FALMCG G)	Continuous	Continuous
Belgium [205]	Radio Maritime Service Address Perronstraat 6, 8400, Oostendo	Phone: +32-59-706 565 Fax: +32-59-701 339 Telex: 46 81257	Monthly	
Bermuda (United Kingdom) [310]	RCC Bermuda Address: 9 Ft George Hill, St.George's GE01 Bermuda	Phone: +1-441-297-1010 Fax: +1-441-297-1530 Telex: 3208 RCC BA Internet: rccbda@ibl.bm	As required	
Brazil [710]	MRCC Brazil Address Comando de Operacoes Navais Praca Barao de Ladario, s/n Ed. Alte. Tamandare, 6, andar Centro, Rio de Janeiro - RJ	Phone: +55-21-216-6056 Fax: +55-21-216-6038 Telex: 21-35231		
Canada [316]	Industry Canada(Attention: Mark Hanrahan) [OPEN 0800-1630 hrs.] Address Journal Tower North, 300 Slator Street, Ottawa, Ont. Canada, K1A OC8	Phone: +1-613-998 3431	As required	Annually (Denise Duchesne phone; +1-613-991 9421)
Chile [725]	MRCC Chile Address Servicio de Busqueda y Rescate Maritim (SERBREM), Errazuriz 537, Valparaiso, Chile	Phone: +56-32-208237 Fax: +56-32-208262 Telex: 034-330607 Internet: mrccchile@directemar.cl		
China [412]	China Maritime Search and Rescue Centre Address: 11 Jianguomennei Ave., Beiging, 100736, China	Phone: +86-10-65292221 +86-10-65292218 Fax: +86-10-65292245 Telex: 222258 CMSAR CN	As required	

Country [MID]	24 hour point of contact (Agency maintaining national database for MMSI-number)		Frequency of updating MMSI database	
			National database	ITU database*
Croatia [238]	Harbour Master's Office Address: 51000 Rijeka, Senjsko pristanište 3, Croatia	Phone: +385-51-214-031 51-212-474 Fax: +385-51-212-696 51-211-660	Every 10 days	N.I.
Denmark [219]	MRCC Aarhus	Phone: +45-86123099 ext.5103 Fax: +45-86181140 Telex: 64485		
Estonia [276]	Estonian National Communication Board Adala 4D 10614 Tallinn, Estonia (open 6:00-15:00, Mon-Friday)	Phone: +372-693-1183 Fax: + 1155 e-mail: postbox@sa.ee	Every week	Every month
Færoe Islands(Denmark) [231]	Thorshaven Radio	Phone: +45-29812965 Telex: 81200		
Fiji [520]		Phone: Telex:		
Finland [230]	MRCC Turku Address: PL 16, 20101 Turku Finland	Phone: +358-21-2815803 Fax: +358-21-2500950 Telex: 62249 SMMVE PT		Twice a year
France [227]	MRCC Etel, Address Chateau de la Garenne, Avenue Louis Bougo,56410 Etel, France	Phone: +33-2 97 55 3535 Fax: +33-2 97 55 4934 Telex: 950519		
Germany [211] [218]	Deutsche Gesellschaft zur Rettung Schiffbruchiger MRCC Bremen Address Postfach 10 63 40, 28063 Bremen, Germany	Phone: +49-421-53-6870 Fax: +49-421-53-68714 Telex: 244754 or 246466 (mrccd) AFTN: EDDWYYYX attn: MRCC BREMEN	Daily	Once a month
Greece [237] [239]	Hellenic ministry of merchant marine/Piraeus Joint RCC Address: 150 Gr.Lampraki St., GR-185 18 Piraeus, Greece	Phone: +30-1-4112500 (emergency) 4220772 (emergency) 4191369 4191126 4191325 Fax: +30-1-4115798 4191561 4117801 4224417 4132398 4220466 Telex: +601-211588 RCC GR 211254 RCCGR 212239 YEN GR 212273 YEN GR 213594 YEN GR AFTN: LGGGYCYX Inmarsat A 1133207 RCCG Inmarsat C 423767310 RCCG (AOR-E/IOR)		

Country [MID]	24 hour point of contact (Agency maintaining national database for MMSI-number)		Frequency of updating MMSI database	
			National database	ITU database*
Greenland (Denmark) [331]	RCC Sondrestrom	Phone: +45-29911201 Fax: +45-29911020 Telex: 90839		
Iceland [251]	MRCC Reykjavik	Phone: +354-113099 Fax: +354-1610240 Telex: 2048		
Italy [247]	Ministero dei Trasporti e della Navigazione Comando Generale delle Capitanerie di Porto - IMRCC Address Via dell'Arte, No.16, 00144, Roma/EUR, Italy	Phone: +39-6 5924145 5923569 Fax: +39-6 5922737 59084793 Telex: +39-43-611172 614103 e-mail: COGECAP3@FLASHNET.IT	Real time	
Jamaica [339]	Port and Telecommunications Departments Address: South Camp Road, Kingston, Jamaica	Phone: 876-922-9430 Fax: 876-922-9449 Telex: 2133 POTELSKN JA e-mail: JAMPOST@wtjam.net	Upon receipt of new activation	
Japan [431]	Information System Management Division, Japanese Coast Guard Address: Kaiho Hoan Cho, 2-1-3 Kasumigaseki,Chiyoda-ku,Tokyo, 100-8989 Japan	Phone: +81-3-3591-9000 Fax: +81-3-3591-9000 Telex: 2225193(JMSAHQJ) AFTN: RJAAYKYX	Once a month	Once in three months
Latvia [275]	Maritime Administration of Latvia Address: PO Box-10, Andrejsala 4, Riga, Latvia LV-1045	Phone: +371-2-323103 Fax: +371-9-320100 +371-9-343772 Telex: 161396 MRCC LV	Regularly	Regularly
Liberia [636]	Liberian International Ship & Corporate Registry, LLC Address: 8619 Westwood Center Drive, Vienna, Virginia 22182, USA	Phone: +1-703-790-3434 (working hours) +1-703-508-3019 (after hours) Fax: +1-703-790-5655 Telex: UK 940498535	Continuously	Monthly
Malaysia [533]	Jabatan Telekomunikasi Malaysia Kementerian Tenaga, Telekom dan Multimedia Wisma Damansara, Jalan Semantan, 50668 Kuala Lumpur, Malaysia	Phone: +60-3-2575100 Fax: +60-3-2530508 Telex: GENTEL MA 28020 e-mail: jtmhq@tm.net.my	On issue of MMSI	Annually
Malta [248] [249] [256]	Wireless Telegraphy Dept., Address: Evans Building, Merchants Street, Valletta CMR 02 Malta	Phone: +356-25993624 +356-247224-8 Fax: +356-232728 +356-233695 Telex: 0 406-1471 (MODMLT MW)	Continuously	Periodically

Country [MID]	24 hour point of contact (Agency maintaining national database for MMSI-number)		Frequency of updating MMSI database	
			National database	ITU database*
Marshall Islands [538]	International Registries, Inc Address: 11495 Commerce Park Drive, Reston, Virginia 20191, USA	Phone: +1-703-620-4880 (working hours) +1-703-620-4766 (after hours) Fax: +1-703-476-8522 Telex: 248403	Continuously	Monthly
Mauritius [2700]	Mauritius Telecommunications Authority Address: Blendax House, 6th Floor, Dumas Street, Port Louise, Mauritius	Phone: +230 212 9252 Fax: +230 211 2871		
Mexico [N.I.]	N.I. Address:	Phone: 629-1236 Fax: 519-1855 Telex: 1771266	Daily	Monthly
Netherlands [244] [245] [246]	Netherlands Coast Guard Centre/RCC Ijmuiden Address P.O.Box 303, 1970, AH IJmuiden, Netherlands	Phone: +31-255034344 Fax: +31-255023496 Telex: 71088(KUSTW-NL)	Daily	Once a month
Norway [257] [258] [259]	RCC Stavanger Address RCC Southern Norway, Sikrings Bygget, 4050 Sola, Norway	Phone: +47-51646061 +47-51517000 Fax: +47-51652334 Telex: 33163 (RCCSN)		
Portugal [204] [255] [263]	MRCC Lisboa Address: Reduto Gomes Freire, 2780 Oeiras	Phone: +351-1-441-6581 Fax: +351-1-441-6159 Telex: 404-60747 P	Daily	Quarterly
Korea, Republic of [440]	Korea National Maritime Police Agency Address: 1-105 Buksung-Dong, Jung-Gu, Inchon, Korea 400-201	Phone: +82-32-883-0461 Fax: +82-32-881-9595		
Romania [264]	Constanta Harbour Master Address: Incinta Port 8700 Constanta, Romania	Phone: +40-41-616431 617545 619100 (ext.1609 or 1232) Fax: +40-41-616431 617545 Telex; 14209 CPT	Every 3 Months	
Singapore [563] [564]	Singapore Radio Address Yokbrs, 380, YIO CHU KANG Road, A03-00 Singapore 805942, Singapore	Phone: +65-1800 4816231 Fax: 4818050 Telex: 34842 e-mail: pocc@mpa.gov.sg	Weekly	Monthly
Spain [224]	MRCC Madrid	Phone: +34-15801465 Fax: +34-15219510 Telex: 41210		

Country [MID]	24 hour point of contact (Agency maintaining national database for MMSI-number)		Frequency of updating MMSI database	
			National database	ITU database★
Sweden [265]	Address: Box 5158, SE-426-05 Vastra Frolunda, Sweden	Phone: +46-31 699080 Fax: +46-31 648010 Telex: +54 201 80 MRCC-Gbg S AFTN: ESORYCYX e-mail: mrccgbg@sjofartsverket.se	Daily	Monthly
Turkey [271]	Undersecretariat for Maritime Affairs Address: Anit Cd.N:8 Tando_an/ANKARA, Turkey	Phone: +90-312-231 0105 232 4783 232 3849 / 2620 Fax: +90-312-212 0823	Daily	Monthly
United Kingdom [232] [233]	MRCC Falmouth Address HM Coastguard, Pendennis Point, Falmouth, TR11 4WZ, United Kingdom	Phone: +44-1326-317575 Fax: +44-1326-318342 Telex: 45560(FALMCG G)	Daily	Monthly
United States [303] [366] [367] [368]	Federal Communications Commission Address 445 12th Street NW, Washington, DC 20554	Phone: +1-202-632-6975 Fax: +1-202-418-2813	Daily	Monthly
Associate Member of IMO Hong Kong, China [477]	Hong Kong Maritime Rescue Co-ordination Centre Address: G.P.O.4155, Hong Kong	Phone: +852-2545-4645 Fax: +852-2541-7714 Telex: 82952(MRCC HX) AFTN: VHHHYKYX		

★ ITU database = ITU MARS(Maritime mobile Access & Retrieval System).
For detail, contact: "ITU TIES HELPDESK"

Address: ITU TIES, ITU Information Service Department, Place des Nations, 1211 Geneva 20, Switzerland
TEL: +41-22-730-5054 X.400 e-amil: S=helpdesk;A=arcom; P=itu; C=ch
FAX: +41-22-730-5337 Internet e-mail: helpdesk@itu.ch

ANNEX 14

MSC/Circ.684

QUESTIONNAIRE ON SHORE-BASED FACILITIES FOR THE GLOBAL MARITIME DISTRESS AND SAFETY SYSTEM (GMDSS)

1 The Maritime Safety Committee, at its sixty-fifth session (9 to 17 May 1995), approved circulation of the revised questionnaire on shore-based facilities in the GMDSS, attached hereto. The revised questionnaire includes the requests for information on EPIRB Registration Data and International Points of Contact for national Maritime Mobile Service Identities (MMSI), which were circulated to Governments by COM/Circ.126 and MSC/Circ.641, respectively.

2 Governments, including those which have submitted answers to the above-mentioned circulars, are invited to provide or update the information as appropriate.

3 Administrations should submit information obtained, as appropriate, from national authorities responsible for shore-based facilities for the GMDSS, NAV/MET Area Co-ordinators and search and rescue authorities.

4 This questionnaire revokes and replaces MSC/Circ.468/Rev.2, COM/Circ.126 and MSC/Circ.641.

ANNEX 1

Sea Area A1 (Within range of shore-based VHF DSC coverage)

1 Does your Administration intend to establish Sea Area A1 ? YES ☐ NO ☐ Is it operational now ? YES ☐ NO ☐
If not operational now, indicate the date of operation in the following table.

2 Do they keep fulltime DSC watch on channel 70 ? YES ☐ NO ☐
If not, indicate watch hours in the following table.

3 Indicate details of VHF stations

NAV/ MET Area	Type (Main or Monitor ?)(1)	Name and position [Latitude, Longitude] of stations	MMSI	Range(2) (NM)	Date of Operation	Purpose (PC or SD or PS ?)(3)	Watch hours (24 hours on CH70 ?)	RCC Associated

(1) Monitored stations mean the stations remotely controlled by the main stations.
(2) Refer to resolution A.801(19). See appendix.
(3) PC = "Public Correspondence" only, SD = "Distress and Safety" only, PS = Both "Public Correspondence" and "Safety and Distress".

4 Provide a map indicating;
- Name and location of **main** VHF stations
- Coverage of main and monitored Transmitter & Receivers
- Name and location of associated RCC(s)

APPENDIX TO ANNEX 1

IMO RESOLUTION A.801(19) , annex 3, paragraph 2

Criteria for establishing GMDSS sea areas

2.3 Determination of radius A

2.3.1 The following formula should be used to calculate the range A in nautical miles:

$$A = 2.5(\sqrt{H(in\text{-}meters)} + \sqrt{h(in\text{-}meters)})$$

H is the height of the coast station VHF receiving antenna and h is the height of the ship's transmitting antenna which is assumed to be 4 m.

2.3.2 The following table gives the range in nautical miles (NM) for typical values of H:

h \ H	50 m	100 m
4 m	23 NM	30 NM

2.3.3 The formula given above applies to line-of-sight cases but is not considered adequate for cases where both antennae are at a low level. The VHF range in Sea Area A1 should be verified by field strength measurements.

ANNEX 2

Sea Area A2 (Within range of shore-based MF DSC coverage)

1 Does your Administration intend to establish Sea Area A2 ? YES ☐ NO ☐ Is it operational now ? YES ☐ NO ☐
If not operational now, indicate the date of operation in the following table.

2 Do they keep fulltime DSC watch on 2187.5 kHz ? YES ☐ NO ☐
If not, indicate watch hours in the following table.

3 Indicate details of MF stations

NAV/ MET Area	Type (Main or Monitor ?)(1)	Name and position [Latitude, Longitude] of stations	MMSI	Range(2) (NM)	Date of Operation	Purpose (PC or SD or PS ?)(3)	Watch hours (24 hours on 2187.5kHz ?)	RCC Associated

(1) Monitored station means the station remotely controlled by the main station.
(2) Refer to resolution A.801(19). See appendix.
(3) PC = "Public Correspondence" only, SD = "Distress and Safety" only, PS = Both "Public Correspondence" and "Safety and Distress".

4 Provide a map indicating;
- Name and location of **main** MF stations
- Coverage of main and monitored Transmitter & Receivers
- Name and location of associated RCC(s)

APPENDIX TO ANNEX 2

IMO RESOLUTION A.801(19) , annex 3, paragraph 3

Criteria for establishing GMDSS sea areas

3.3 Determination of radius B

The radius B may be determined for each coast station by reference to Recommendation ITU-R PN.368-7 and CCIR Report 322 for the performance of a single sideband(J3E) system under the following conditions:

Frequency	-	2182 kHz
Bandwidth	-	3 kHz
Propagation	-	ground wave
Time of day & Season	-	(Administration should determine time periods and seasons appropriate to their geographic area based on prevailing noise level)
Ship's transmitter power(PEP)	-	60 W (See footnote to regulation IV/16(c)(i) of the 1981 amendments to the 1974 SOLAS Convention)
Ship's antenna efficiency	-	25 %
S/N(RF)	-	9 dB(voice)
Mean transmitter power	-	8 dB below peak power
Fading margin	-	3 dB

The range of sea area A2 should be verified by field strength measurements.

ANNEX 3

Sea Areas A3 and A4 (Outside of Sea Area A2)

1 Does your Administration intend to equip one or more HF DSC station ? YES ☐ NO ☐ Is it operational now ? YES ☐ NO ☐
If not operational now, indicate the date of operation in the following table.

2 Do they keep fulltime DSC watch on the bands ?

	YES	NO
4MHz (4207.5kHz)?	☐	☐
6MHz (6312kHz) ?	☐	☐
8MHz (8414.5kHz)?	☐	☐
12MHz(12577kHz) ?	☐	☐
16MHz(16804.5kHz)?	☐	☐

If not, indicate watch hours in the following table.

3 Indicate details of HF stations

NAV/ MET Area	Name and position [Latitude, Longitude] of stations	MMSI	Date of operation	Purpose (PC or SD or PS ?)*	Operational frequency band					Watch hours (24 hours ?)	RCC Associated
					4	6	8	12	16		

* PC = "Public Correspondence" only, SD = "Distress and Safety" only, PS = Both "Public Correspondence" and "Safety and Distress".

ANNEX 4

INMARSAT facilities

1 Does your Administration operate an INMARSAT Coast Earth Station(CES) ? YES ☐ NO ☐ Is it operational now ? YES ☐ NO ☐
If not operational now, indicate the date of operation in the following table.

2 Indicate details of INMARSAT CES

Name of CES	Position	Ocean Area*	Service provided (Date of operation)				RCC Associated
			INMARSAT-A	INMARSAT-B	INMARSAT-C	INMARSAT-E	

* AOR-E(Atlantic Ocean Region - East) , AOR-W(Atlantic Ocean Region - West), IOR(Indian Ocean Region) or POR(Pacific Ocean Region)

ANNEX 5

Rescue Co-ordination Centres(RCCs) using Ship Earth Stations(SESs)

1 Does your Administration intend to commission a ship earth station for RCC operation ? YES ☐ NO ☐

Is it operational now ? YES ☐ NO ☐

If not operational now, indicate the date of operation in the following table.

2 Indicate details of SES

Name of RCC	Position	Date of operation	SES details		
			INMARSAT I.D.	Type of SES(1)	Ocean Regions accessed(2)

(1) INMARSAT-A, INMARSAT-B, or INMARSAT-C

(2) AOR-E, AOR-W, IOR, or POR

ANNEX 6

NAVTEX Service on 518 kHz

1 Does your Administration operate NAVTEX Service on 518 kHz ? YES ☐ NO ☐ Is it operational now ? YES ☐ NO ☐
If not operational now, indicate the date of operation in the following table.

2 Indicate details of NAVTEX stations

NAV/ MET Area	Name of NAVTEX station	Position	Range* (NM)	Transmitter identification charactor (B1)	Transmission times(UTC)	Language	Date of operation

* Refer to resolution A.801(19). See appendix.

4209.5 kHz NAVTEX Service

1 Does your Administration operate an 4209.5 kHz NAVTEX Service ? YES ☐ NO ☐ Is it operational now ? YES ☐ NO ☐
If not operational now, indicate the date of operation in the following table.

2 Indicate details of 4209.5 kHz NAVTEX stations

NAV/ MET Area	Name of NAVTEX station	Position	Transmitter identification charactor (B1)	Transmission times(UTC)	Language	Date of operation

APPENDIX

IMO RESOLUTION A.801(19) , annex 4, paragraph 3

Criteria for use when providing a NAVTEX service

The ground-wave coverage may be determined for each coast station by reference to Recommendation ITU-R PN.368-7 and CCIR Report 322 for the performance of a system under the following conditions:

Frequency	-	518 kHz
Bandwidth	-	500 Hz
Propagation	-	ground wave
Time of day & Season	-	(Administration should determine time periods in accordance with NAVTEX time transmission table(NAVTEX Manual, figure 3) and seasons appropriate to their geographic area based on prevailing noise level.)
Transmitter power & Antenna efficiency	-	(The range of a NAVTEX transmitter depends on the transmitter power and local propagation conditions. The actual range achieved should be adjusted to the minimum required for adequate reception in the NAVTEX area served, taking into account the needs of ships approaching from other areas. Experience has indicated that the required range of 250 to 400 nautical miles can generally be attained by transmitter power in the range between 100 and 1,000 W during daylight with a 60 % reduction at night.)
RF S/N in 500 Hz bandwith	-	8 dB(Bit error rate 1 x 10^{-2})
Percentage of time	-	90

Full coverage of NAVTEX service area should be verified by field strength measurements.

ANNEX 7

International SafetyNET Service

1 Does your Administration intend to broadcast MSI through the International SafetyNET Service ? YES ☐ NO ☐ Is it operational now ? YES ☐ NO ☐
If not operational now, indicate the date of operation in the following table.

2 Indicate detail of International SafetyNET Service

NAV/MET Area	Type of MSI	Coast Earth Station		Ocean Area(1)	Area covered(2)	Broadcast schedule(UTC)	Date of operation
		Name	Country				
	NAV						
	MET						
	SAR						
	Coastal Warning				(3)		

(1) AOR-E, AOR-W, IOR, or POR
(2) Service area covered in NAV/MET information
(3) Provide a map indicating Area covered and B1 charactors

ANNEX 8

HF Narrow Band Direct Printing(NBDP) MSI Broadcast Service

1 Does your Administration intend to broadcast MSI through HF NBDP ? YES ☐ NO ☐ Is it operational now ? YES ☐ NO ☐
If not operational now, indicate the date of operation in the following table.

2 Indicate details of HF NBDP MSI Broadcast Service

Name of station	Position	Frequency Band	Schedule	Date of operation
		4 MHz (4210 kHz)		
		6 MHz (6314 kHz)		
		8 MHz (8416.5 kHz)		
		12 MHz (12579 kHz)		
		16 MHz (16806.5 kHz)		
		19 MHz (19680.5 kHz)		
		22 MHz (22376 kHz)		
		26 MHz (26100.5 kHz)		

ANNEX 9

COSPAS-SARSAT MCC and LUT

1 Does your Administration intend to operate COSPAS-SARSAT ground facilities ? YES ☐ NO ☐ Is it operational now ? YES ☐ NO ☐
If not operational now, indicate the date of operation in the following table.

2 Indicate details of the COSPAS-SARSAT facilities

MCC			LUT			RCC Associated
Location	Designator	Date of operation	Location	LEO or GEO ?	Date of operation	

ANNEX 10

EPIRB Registration Data

EPIRB Type permitted

	YES	NO		YES	NO
406 MHz EPIRB:	☐	☐	L-Band EPIRB:	☐	☐

406 MHz EPIRB

1 MID-Numbers(country codes) assigned to 406 MHz EPIRBs ?:_____

2 406 Mhz coding schemes currently used by the country:

	YES	NO
Serial protocol:	☐	☐
MMSI:	☐	☐
Radio call sign:	☐	☐

3 Database for 406 MHz EPIRBs:

- Address:_____
  _____

	YES	NO
Open 24 hours a day, all days of the year ?	☐	☐

If not, specify the opening hours(UTC), days etc:_____

- Telephone No. for database information: _____
- Telefax No. for database information:_____
- Telex No. for database information: _____
- AFTN No. for database information: _____
- Electronic Mail ID for database information: _____

4 How often does your Administration update the database ?_____

ANNEX 11

Maritime Mobile Service Identities(MMSI)

1 MID-Numbers(country codes) assigned to equipment other than 406 MHz EPIRBs ?: _____

2 National database for MMSI number:

YES NO

- Same database as for 406 MHz EPIRBs ? ☐ ☐

If not, fill in the following information:

- Address:_____

…_____

YES NO

Open 24 hours a day, all days of the year ? ☐ ☐

If no, specify the opening hours(UTC), days etc: _____

- Telephone No. for database information : _____
- Telefax No. for database information:_____
- Telex No. for database information: _____
- AFTN No. for database information: _____
- Electronic Mail ID for database information: _____

3 How often does your Administration update the national database ? _____

4 How often does your Administration update the ITU database ? _____

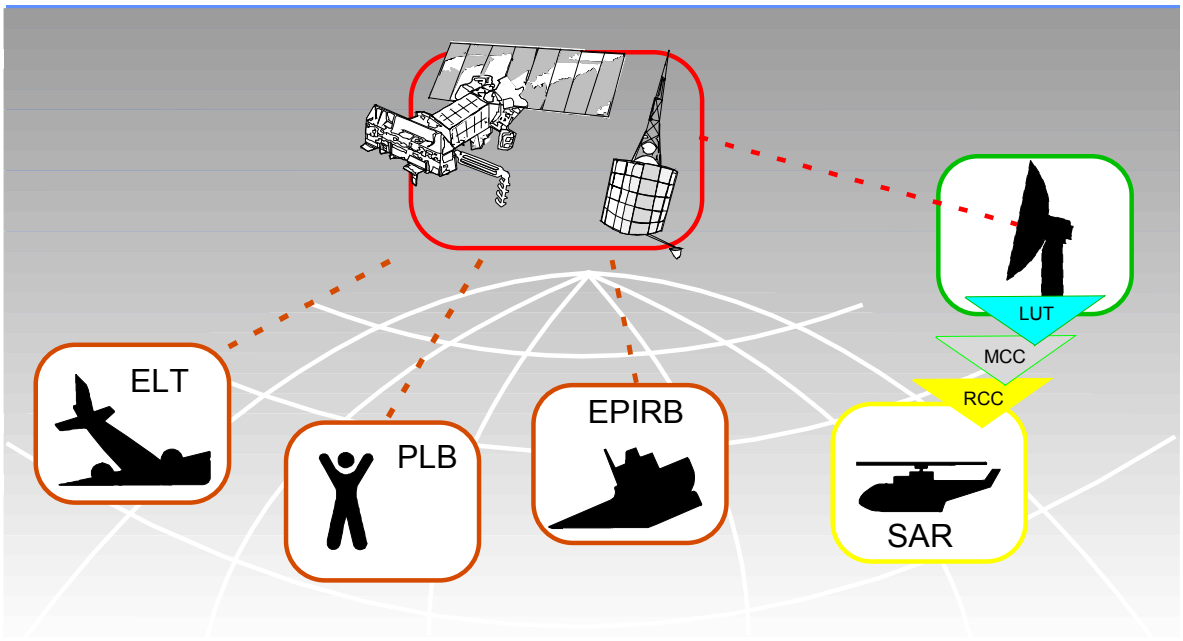
Annex 6

COSPAS-SARSAT SYSTEM DATA

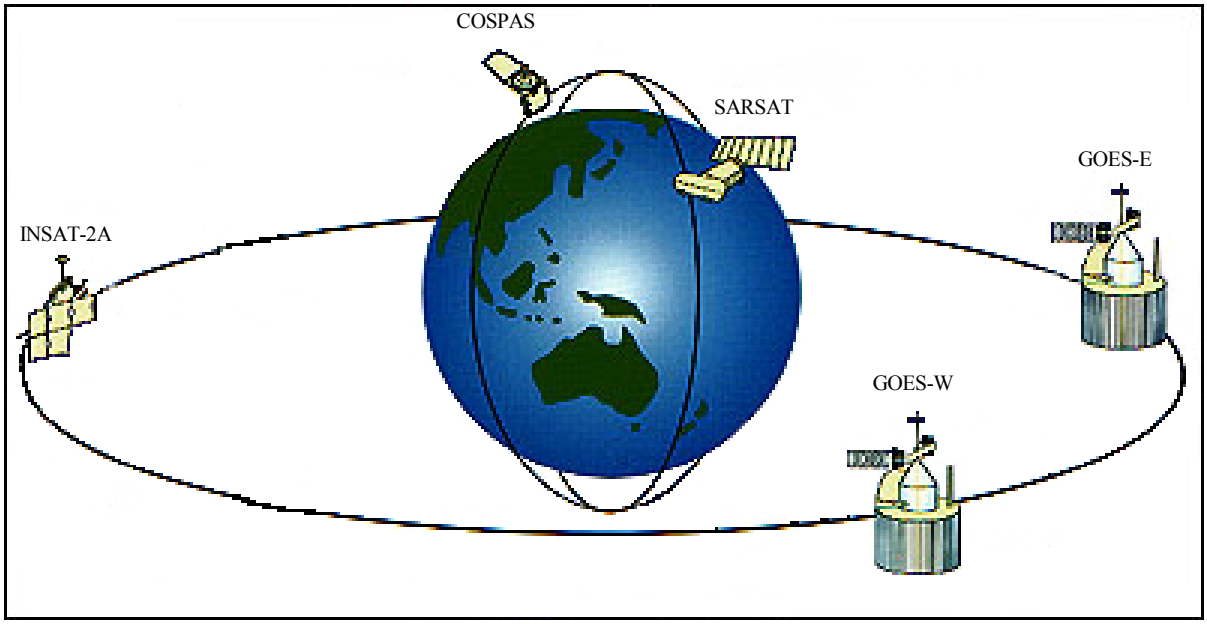
No.25
October 2000

Published by the Cospas-Sarsat Secretariat
c/o Inmarsat, 99 City Road, London EC1Y 1AX, United Kingdom

COSPAS-SARSAT SYSTEM DATA
No.25, October 2000



Basic Concept of the Cospas-Sarsat System



Combined LEOSAR - GEOSAR Operations

Notes:

ELT	Emergency locator transmitter
EPIRB	Emergency position-indicating radio beacon
PLB	Personal locator beacon
GEOLUT	Local user terminal in a GEOSAR system
LEOLUT	Local user terminal in a LEOSAR system
LUT	Local user terminal
MCC	Mission control centre
RCC	Rescue coordination centre
SAR	Search and rescue
GEOSAR	Geostationary satellite system for SAR
LEOSAR	Low Earth Orbit satellite system for SAR

TABLE OF CONTENTS

Page

Summary Status 2

LIST OF FIGURES

Figure 1 Cospas-Sarsat System Usage (January - December 1999) 3

Figure 2 Number of SAR Events in which Cospas-Sarsat was Used (January 1989 - December 1999) 3

Figure 3 Satellite Visibility Area of Cospas-Sarsat Operational LEOLUTs (October 2000) 8

Figure 4 406 MHz GEOSAR Satellites Coverage and GEOLUTs (October 2000) 9

LIST OF TABLES

Table I Cospas-Sarsat Participating Countries 4

Table II Cospas-Sarsat Participating Organizations 4

Table III LEOSAR Spacecraft Availability 5

Table IV LEOSAR Space Segment Instrument Status (October 2000) 5

Table V GEOSAR Spacecraft Availability 6

Table VI LEOSAR Ground Segment Status (October 2000) 7

Table VII GEOSAR Ground Segment Status (October 2000) 9

Table VIII List of 406 MHz Beacon Manufacturers 10

Table IX List of Cospas-Sarsat Type Approval Certificates for 406 MHz Beacons 12

Table X List of Aircraft External Antennas for 406 MHz ELTs Tested to Cospas-Sarsat Requirements 17

Table XI List of Cospas-Sarsat Type Approved 406 MHz Beacon Models 18

Table XII Cospas-Sarsat System Documents 22

SUMMARY STATUS

Participants

- Parties to the Cospas-Sarsat Agreement 4
- Ground Segment Providers 19
- User States 8
- Participating Organizations 2

Total number of Participants 33

Space Segment

LEOSAR: 8 satellites in polar orbit

GEOSAR: 3 satellites in geostationary orbit

Distress Beacons Worldwide

121.5 MHz
estimated number: 640,000

406 MHz
estimated number: 220,000

Ground Segment

22 Mission Control Centres (MCCs)

37 Local User Terminals (LEOLUTs) in the LEOSAR System

7 Local User Terminals (GEOLUTs) in the GEOSAR System

System Operations

From January to December 1999, the Cospas-Sarsat System provided assistance in rescuing 1,227 persons in 340 SAR events:

- Aviation distress: 85 persons in 60 SAR events
- Maritime distress: 1,008 persons in 216 SAR events
- Land distress: 134 persons in 64 SAR events

The 406 MHz system was used in 180 of these events (882 persons rescued) and the 121.5 MHz system was used in the other 160 SAR events

From September 1982 to December 1999, the Cospas-Sarsat System provided assistance in rescuing 11,227 persons in 3,361 SAR events

Figure 1: Cospas-Sarsat System Usage
(January - December 1999)

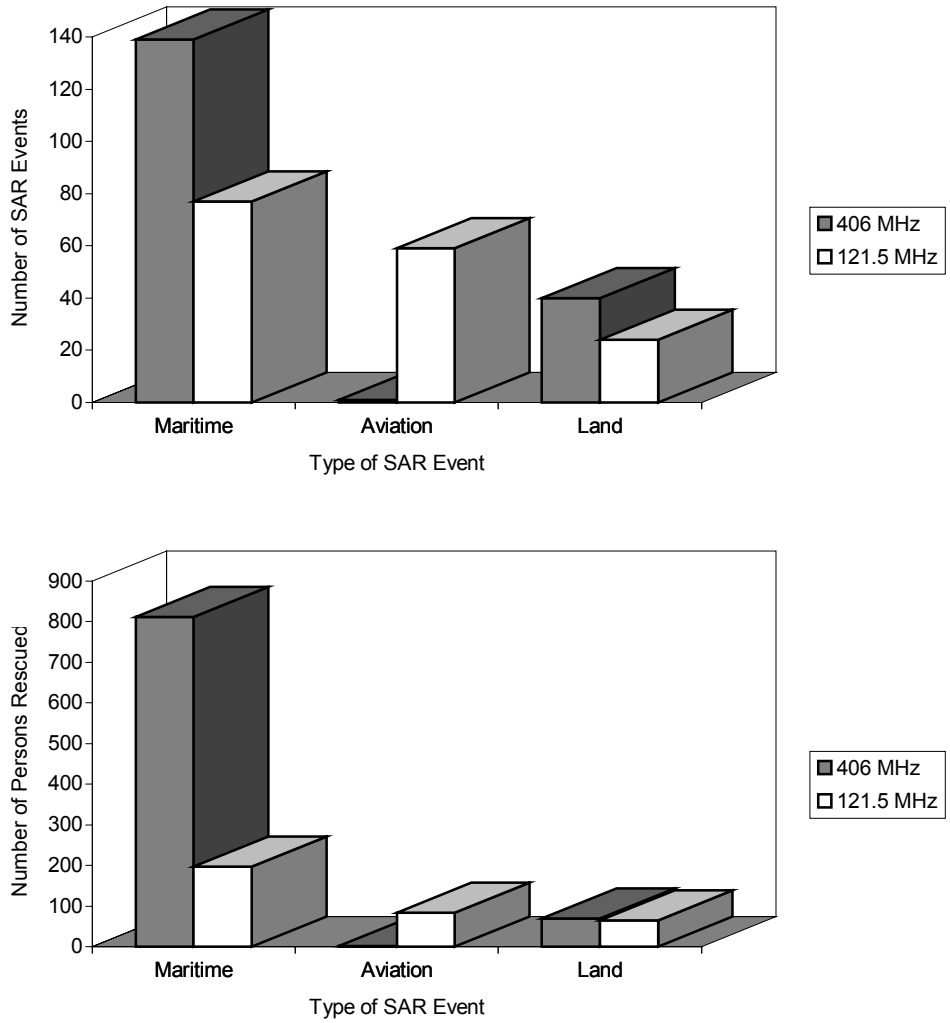


Figure 2: Number of SAR Events in which Cospas-Sarsat was Used
(January 1989 - December 1999)

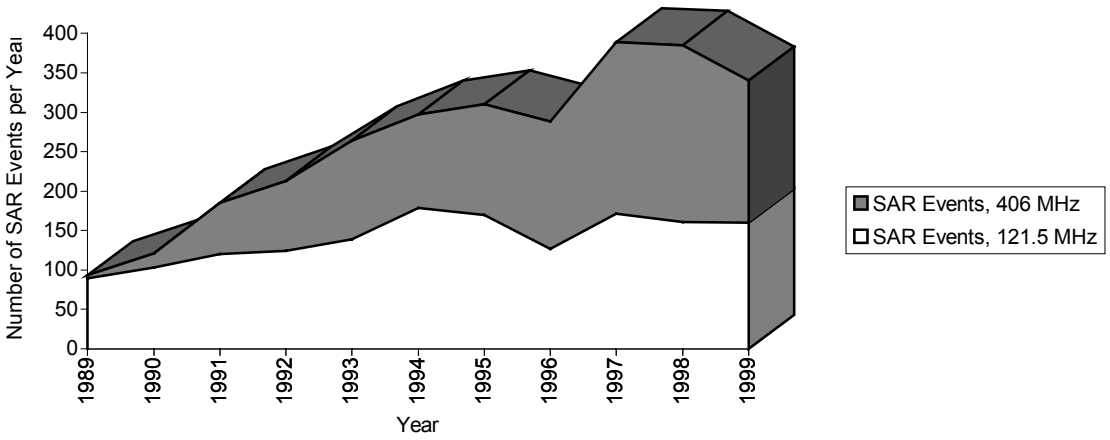


Table I - Cospas-Sarsat Participating Countries

Country	Agency	Status
Algeria	Ministry of Defence	Ground Segment Provider
Australia	Australian Maritime Safety Authority (AMSA)	Ground Segment Provider
Brazil	Ministry of Aeronautics, Directorate of Electronics and Flight Protection (DEPV)	Ground Segment Provider
Canada	National Search and Rescue Secretariat (NSS)	Party-Space Segment Provider
Chile	Search and Rescue Service of the Chilean Air Force	Ground Segment Provider
China (P.R.of)	Maritime Safety Administration	Ground Segment Provider
Denmark	Civil Aviation Administration (Statens Luftfartsvaesen)	User State
France	National Space Centre (CNES)	Party-Space Segment Provider
Germany	Ministry of Transport (Ab. Luft und Raumfahrt)	User State
Greece	Ministry of Merchant Marine	User State
India	Indian Space Research Organization (ISRO)	Ground Segment Provider
Indonesia	National SAR Agency (BASARNAS)	Ground Segment Provider
Italy	Department of Civil Protection	Ground Segment Provider
Japan	Japan Coast Guard	Ground Segment Provider
Korea (Rep.of)	Korea National Maritime Police Administration	Ground Segment Provider
Madagascar	Search and Rescue Co-ordination Centre	User State
Netherlands (The)	Ministry of Transport, Public Works and Water Management	User State
New Zealand	Civil Aviation Authority	Ground Segment Provider
Norway	Ministry of Justice and Police	Ground Segment Provider
Pakistan	Space and Upper Atmosphere Research Commission (SUPARCO)	Ground Segment Provider
Peru	Direction-General of Captaincy and Coastguard	Ground Segment Provider
Russian Federation	State Enterprise Morsviazsputnik of the Ministry of Transport	Party-Space Segment Provider
Saudi Arabia	Presidency of Civil Aviation	Ground Segment Provider
Singapore	Civil Aviation Authority of Singapore	Ground Segment Provider
Spain	National Institute of Aerospace Engineering (INTA)	Ground Segment Provider
Sweden	Swedish Rescue Services Agency	User State
Switzerland	Federal Office for Civil Aviation	User State
Thailand	Department of Aviation	Ground Segment Provider
Tunisia	Ministry of Foreign Affairs	User State
UK	Maritime and Coastguard Agency, Dept. of Transport	Ground Segment Provider
USA	National Oceanic and Atmospheric Administration (NOAA)	Party-Space Segment Provider

Table II - Cospas-Sarsat Participating Organizations

The International Telecommunication Development Corporation (ITDC)	Ground Segment Operator
The Marine Department of Hong Kong, China	Ground Segment Operator

Table III - LEOSAR Spacecraft Availability

Cospas-Sarsat Payload	Spacecraft	Launch Date	Status
Cospas-1	Cosmos 1383	June 1982	Decommissioned (March 1988)
Cospas-2	Cosmos 1447	March 1983	Decommissioned (December 1989)
Cospas-3	Cosmos 1574	June 1984	Decommissioned (June 1990)
Cospas-4	Nadezda-1	July 1989	In operation
Cospas-5	Nadezda-2	February 1990	Decommissioned (February1996)
Cospas-6	Nadezda-3	March 1991	In operation
Cospas-7	Nadezda-4	July 1994	Decommissioned (July 1997)
Cospas-8	Nadezda-5	December 1998	In operation
Cospas-9	Nadezda-6	June 2000	In operation
Cospas-10	Nadezda-7	Projected 2001	Integration phase
Cospas-11	To be determined	Projected 2001	Integration phase
Cospas-12	To be determined	Projected 2003	Integration phase
Sarsat-1	NOAA-8	March 1983	Decommissioned (December 1985)
Sarsat-2	NOAA-9	December 1984	Decommissioned (December 1997)
Sarsat-3	NOAA-10	September 1986	In operation
Sarsat-4	NOAA-11	September 1988	In operation
Sarsat-5	NOAA-13	August 1993	Failed after launch
Sarsat-6	NOAA-14	December 1994	In operation
Sarsat-7	NOAA-15	May 1998	In operation
Sarsat-8	NOAA-16	September 2000	Under test
Sarsat-9	NOAA-M	Projected 2001	Integration phase
Sarsat-10	METOP-1	Projected 2003	Integration phase
Sarsat-11	NOAA-N	Projected 2003	Integration phase

Table IV - LEOSAR Space Segment Instrument Status (October 2000)

Cospas-Sarsat Payload	406 MHz SARP		406 MHz SARR	121.5 MHz SARR	243 MHz SARR
	Global Mode	Local Mode			
Cospas-4 (1)	O	O	NA	O	NA
Cospas-6 (2)	O	O	NA	O	NA
Cospas-8	O (3)	O	NA	O	NA
Cospas-9	O	O	NA	O	NA
Sarsat-3	N	N	O	O	O
Sarsat-4	O	O	N	O (4)	O
Sarsat-6	N	N	O	O	O
Sarsat-7	O	O	O	O	
Sarsat-8	UT	UT	UT	UT	UT

Notes: O - Operational.
NA - Not applicable.
N - Not operational.
SARP - SAR processor.
SARR - SAR repeater.
UT - Under test.

(1) - Limited operation in Southern hemisphere.
(2) - Reduced 406 MHz message throughput.
(3) - Memory dump malfunction requires correction to LEOLUT global-mode data processing.
(4) - Some Electromagnetic Interference (EMI) degradation.

Table V - GEOSAR Spacecraft Availability

Spacecraft	Launch Date	Position	Status
GOES-8	April 1994	75° W	In operation
GOES-9	May 1995	106.7° W	In-orbit spare
GOES-10	April 1997	135° W	In operation
GOES-11	May 2000	To be determined	In-orbit spare
INSAT-2A	1992	74° E	In operation
INSAT-2B	1993	93.5° E	In-orbit spare
INSAT-3	2001	To be determined	Projected
Luch M-1	2000	95° E	Projected
MSG	2001	0°	Projected

Note: On 5 February 1999, the USA notified the International Civil Aviation Organization, as Depositary of the International Cospas-Sarsat Programme Agreement, of a change in the USA contribution to the Cospas-Sarsat Space Segment, and declared the addition of the 406 MHz capability on the Geostationary Environmental Satellites (GOES-East and GOES-West) as an enhancement to the existing Cospas-Sarsat (LEOSAR) Space Segment.

At its CSC-23 Session in October 1999, the Cospas-Sarsat Council requested Ground Segment Providers to commission their 406 MHz GEOLUTs as soon as possible. Although none of the GEOLUTs have been formally commissioned at this time, the GEOSAR distress alerts that they detect continue to be processed for distribution to SAR authorities.

Table VI - LEOSAR Ground Segment Status (October 2000)

Participant	MCC			LEOLUT			
	Designator	Location	Status	Location	406 MHz SARP	406 MHz SARR	121.5 MHz SARR
Algeria	ALMCC	Algiers	O	Ouargla	O	O	O
Australia	AUMCC	Canberra	O	Albany	O	O	O
				Bundaberg	O	O	O
Brazil	BRMCC	Brasilia	O	Brasilia	UT	TBD	UT
				Manaus	O	NA	O
				Recife	O	NA	O
Canada	CMCC	Trenton	O	Churchill	O	O	O
				Edmonton	O	O	O
				Goose Bay	O	O	O
Chile	CHMCC	Santiago	O	Santiago	O	O	O
				Punta Arenas	O	O	O
China (P.R.of)	CNMCC	Beijing	O	Beijing	O	O	O
France	FMCC	Toulouse	O	Toulouse	O	O	O
Hong Kong, China	HKMCC	Hong Kong	O	Hong Kong	O	O	O
India	INMCC	Bangalore	O	Bangalore	O	O	O
				Lucknow	O	O	O
Indonesia	IDMCC	Jakarta	O	Ambon	N	NA	N
				Jakarta	O	NA	O
Italy	ITMCC	Bari	IOC	Bari	IOC	IOC	IOC
ITDC	TAMCC	Taipei	O	Keelung	O	O	O
Japan	JAMCC	Tokyo	O	Yokohama	O	O	O
Korea (Rep.of)	KOMCC	Taejon	O	Taejon	O	O	O
New Zealand	-	(1)	-	Wellington	O	O	O
Norway	NMCC	Bodoe	O	Tromsoe	O	O	O
Pakistan	PAMCC	Lahore	UT	Lahore	O (2)	NA	O (2)
Peru	PEMCC	Callao	O	Callao	O	O	O
Russia	CMC	Moscow	O	Arkhangelsk	O	NA	O
				Moscow	O	NA	O
				Nakhodka	O	NA	O
				Novosibirsk	N	NA	N
Saudi Arabia	SAMCC	Jeddah	IOC	Jeddah	IOC	IOC	IOC
Singapore	SIMCC	Singapore	O	Singapore	O	O	O
Spain	SPMCC	Maspalomas	O	Maspalomas	O	O	O
UK	UKMCC	Kinloss	O	West Freugh	O	O	O
USA	USMCC	Suitland	O	Alaska	O	O	O
				California	O	O	O
				Guam	O	O	O
				Hawaii	O	O	O
				Puerto Rico	O	O	O
				Texas	O	O	O

Notes:
- IOC - Initial Operational Capability.
- N - Not currently in operation.
- NA - Not applicable.
- O - Operational.
- SARP - SAR processor (provides the 406 MHz local and global mode coverage).
- SARR - SAR repeater (provides 121.5 MHz and 406 MHz local mode coverage only).
- TBD - To be determined.
- UT - Under test.
- (1) - The NZ LUT is directly connected to the Australian MCC (AUMCC).
- (2) - LEOLUT data not distributed internationally.

Figure 3: Satellite Visibility Area of Cospas-Sarsat Operational LEOLUTs (October 2000)
(white area: 406 MHz and 121.5 MHz coverage; grey area: only 406 MHz coverage)

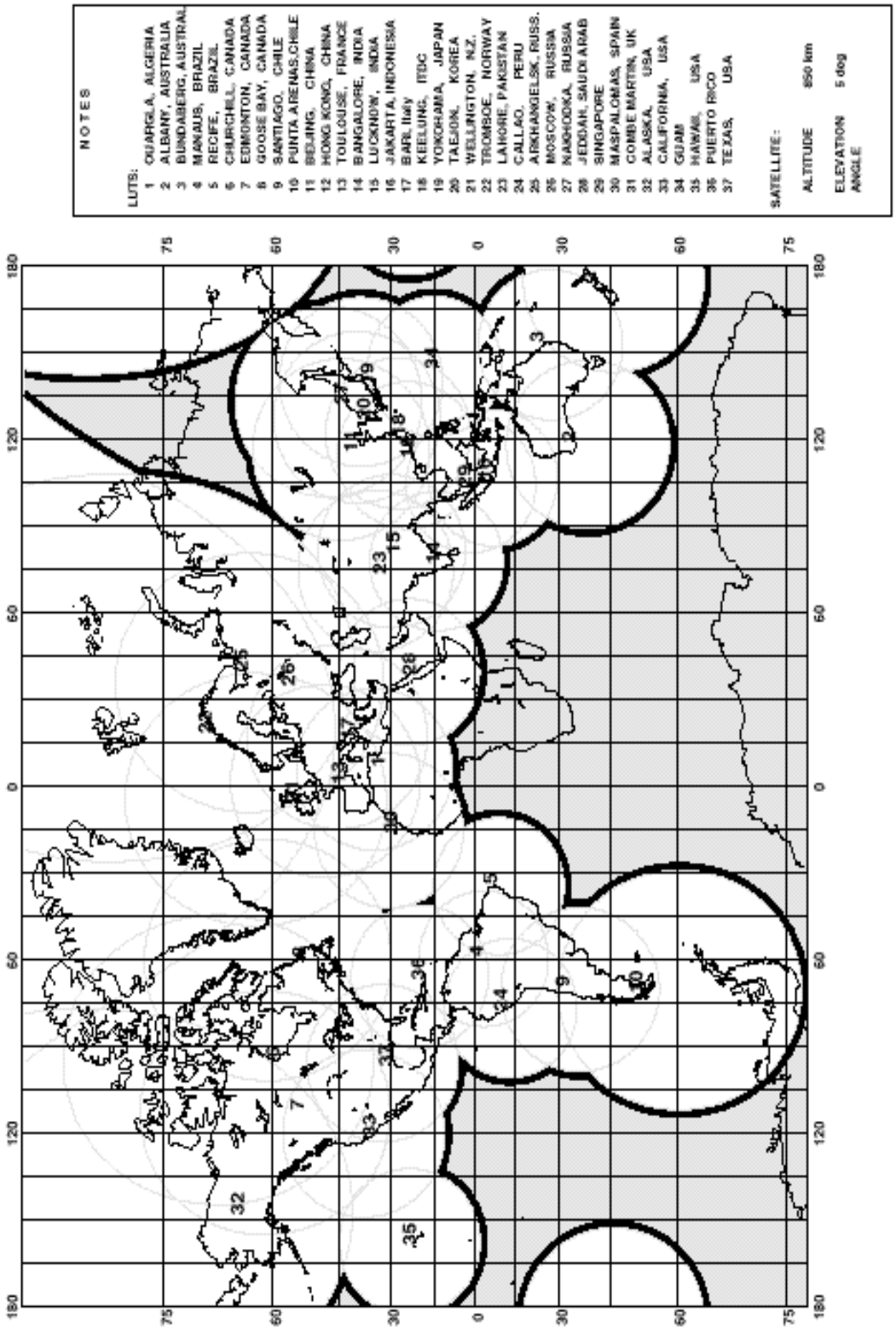


Table VII - GEOSAR Ground Segment Status (October 2000)

Geostationary Satellite	GEOLUTs* Associated to Geostationary Satellites					
	Trenton, Canada (**)	Santiago, Chile	Bangalore, India	Wellington, New Zealand	Maspalomas, Spain	Combe Martin, UK
GOES-8	√	√			√	√
GOES-10	√			√		
INSAT-2A			√			

Notes: * - See note on page 6.
** - Two GEOLUTs.

Figure 4: 406 MHz GEOSAR Satellite Coverage and GEOLUTs (October 2000)

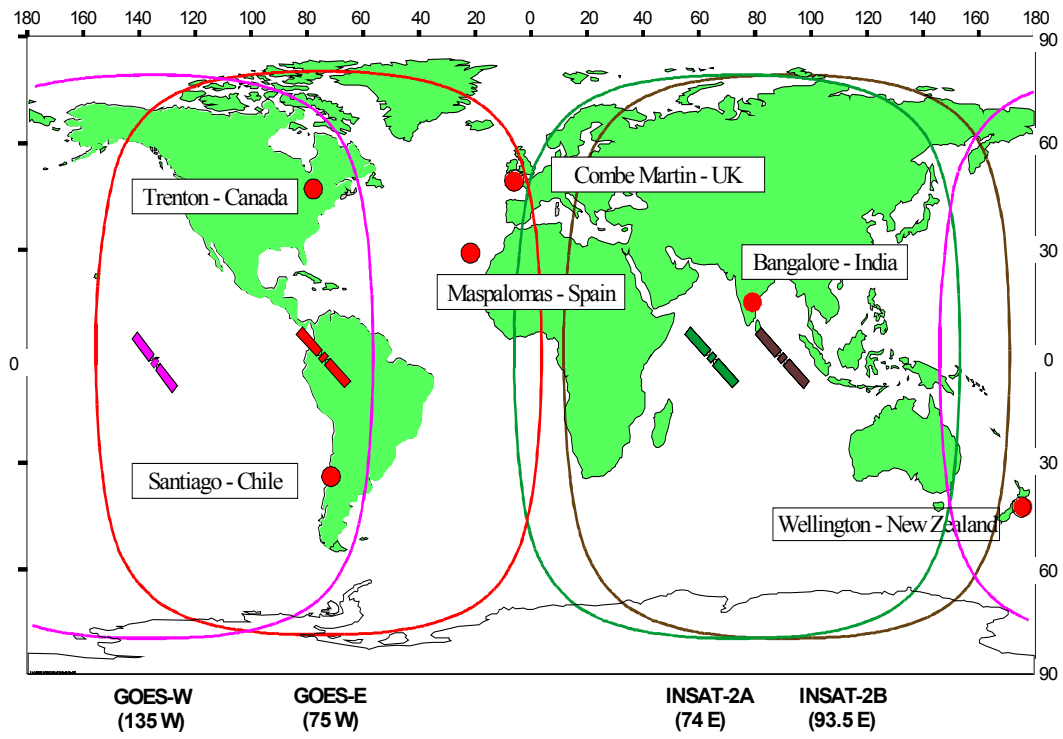


Table VIII - List of 406 MHz Beacon Manufacturers 1/2

AUSTRALIA		
ADI Limited	858 Knights Road, Albury New South Wales, 2640, Australia	Tel: 61-2 60251100 Fax: 61-2 60401990
BULGARIA		
Bitova Electronic Co.	Kvartal Cholakovtzi Veliko Turnovo Bulgaria	Tel: 359-62 20038 Tlx: 66551 Fax: 359-62 44868
CANADA		
AlliedSignal Aerospace Canada	(See Honeywell - Canada)	
Honeywell *	3333 Unity Drive Mississauga, Ontario Canada 5L5 3S6	Tel: 1-905 6086000 Fax: 1-905 6086189 E-mail: carl.weisser@honeywell.com
MPR Teltech Ltd.	(See Northern Airborne Technology Ltd. - Canada)	
Northern Airborne Technology Ltd.	14-1925 Kirschner Road, Kelowna British Columbia, Canada V1Y 4N7	Tel: 1-250 7632232 Fax: 1-250 7623374
DENMARK		
Skanti	Skandinavisk Teleindustri SKANTI A/S Lautrupvang 4, DK-2750 Ballerup Denmark	Tel: 45 44748400 Fax: 45 44748401 E-mail: skanti@skanti.dk
FRANCE		
ELTA	14, place Marcel Dassault BP 48, 31702 Blagnac Cedex France	Tel: 33 534361000 Fax: 33 534361001 E-mail: des@elta.fr
SERPE-IESM	Zone Industrielle des Cinq-Chemins 56520 Guidel France	Tel: 33 297024949 Tlx: 950535F Fax: 33 297650020 E-mail: contact@serpe-iesm.com
Socata	P.O.Box 930 65009 Tarbes Cedex France	Tel: 33 562417300 Tlx: 532835F Fax: 33 562417654
JAPAN		
Japan Radio Co. Ltd.	Mitaka Plant, 1-1 Shimorenjaku 5 Chome Mitaka-Shi, Tokyo 181 Japan	Tel: 81-422 459547 Tlx: 2822351 Fax: 81-422 459957
NEC Radio & Electronics Ltd.	(See TAIYO MUSEN Co. Ltd. - Japan)	
TAIYO MUSEN Co. Ltd.	20-7, Ebisu-Nishi 2-chome Sibuya-ku, Tokyo 150-002, Japan	Tel: 81-3 37803267 Fax: 81-3 54890571
TOYO Communication Equipment Co. Ltd.	12-32, Konan 2-chome Minato-ku, Tokyo 108 Japan	Tel: 81-3 54629600 Tlx: 0242-3115 TOYOCO J Fax: 81-3 54629625
KOREA		
Samyang Radio Co. Ltd.	141-37, 3KA Namhang-dong Youngdo-ku, Pusan, Korea	Tel: 82-51 4135000 Tlx: K53700 SUNMAX Fax: 82-51 4135002
Samyung Electronic Co. Ltd.	65-20, 2Ga Namhang-Dong Youngdo-Gu, Busan, 606-032, Korea	Tel: 82-51 4134445 (Direct) Tel: 82-51 4165555 (Rep.) Fax: 82-51 4126616 E-mail: planning@sam-yung.co.kr

Note: * On January 1, 2000 company name was changed from AlliedSignal Aerospace Canada to Honeywell.

Table VIII - List of 406 MHz Beacon Manufacturers 2/2

NORWAY

Jotron Electronics A.S.	P.O. Box 85 3280 Tjodalyng Norway	Tel: 47-33 124577 Fax: 47-33 126780 E-mail: Salesmar@jotron.com

RUSSIA

Yaroslavsky Radio Engineering Works	13 Industrialnaya St. 150010 Yaroslavl Russia	Tel: 7-085 2463552 Tlx: 217229 PTB Fax: 7-085 2463552

SPAIN

ENA Telecomuni-caciones S.A.	C/San Rafael, 14 Poligono Industrial Alcobendas 28100 Alcobendas (Madrid), Spain	Tel: 34-91 6616227 Tlx: 22123 TLCON Fax: 34-91 6618941

UKRAINE

Musson-Exim	29 Vakulenchuk St. Box 20, Sevastopol 335053 Ukraine	Tel: 380-692 238081 Tlx: 197304 Fax: 380-692 233490
State Designer's Bureau of Radio-communication	29 Vakulenchuk St. Sevastopol 335053 Ukraine	Tel: 380-692 247173 Fax: 380-692 243170

UNITED KINGDOM

Caledonian Airborne Systems Ltd.	6 Ninian Road Dyce, Aberdeen Airport AB2 0PD Scotland, United Kingdom	Tel: 44-1224 722274 Tlx: 73645 CASABZ G Fax: 44-1224 722896
Kelvin Hughes Ltd.	New North Road Hainault, Ilford Essex IG6 2UR, United Kingdom	Tel: 44-20 85001020 Tlx: 896401 Fax: 44-20 85598526
Lokata Ltd.	(See Kelvin Hughes Ltd. - UK)	
McMurdo Ltd.	Rodney Road, Fratton, Portsmouth Hampshire PO4 8SG, United Kingdom	Tel: 44-23 92775044 Fax: 44-23 92819087
Nova Marine Systems Ltd.	(See McMurdo Ltd. - UK)	
Techtest Limited	Street Court, Kingland, Leominster Herefordshire HR6 9QA, United Kingdom	Tel: 44-1568 708744 Fax: 44-1568 708713

UNITED STATES OF AMERICA

ACR Electronics Inc.	5757 Ravenswood Road P.O. Box 5247, Ft. Lauderdale Florida 33312-6645 USA	Tel: 1-954 9813333 Tlx: 519645 Fax: 1-954 9835087, 1-508 8982427 E-mail: jff@concentric.net
Alden Marine	(See Northern Airborne Technology Ltd. - Canada)	
Artex Inc.	P.O. Box 1270 Canby, Oregon 97013 USA	Tel: 1-503 2663959 Fax: 1-503 2663362 E-mail: info@artex.net
BAE SYSTEMS	Ocean Systems 115 Bay State Drive Braintree, Massachusetts 02184, USA	Tel: 1-781 8483400 Fax: 1-781 8432153 E-mail: hartigan@hazeltine.com
Litton Special Devices	(See The Guest Company Inc. - USA)	
The Guest Company Inc.	95 Research Parkway Meriden, Connecticut 06450-7198, USA	Tel: 1-203 2354421 Fax: 1-203 235 0039
Microwave Monolithics Inc.	2263 Ward Avenue, Simi Valley California 93065, USA	Tel: 1-805 5846642 Fax: 1-805 5849594

Table IX - List of C/S Type Approval Certificates for 406 MHz Beacons 1/6

Cert. No.	Manu-facturer	Model (Additional Model Names)	Battery Manufacturer (Model, No. of Cells)	First Issued	Last Amend.
1	Jotron Electronics [1)]	Tron 30S	N/A (N/A, N/A)	07/07/89	
2	Nova Marine	RT 160M (McMurdo RB406)	N/A (N/A, 5 cells)	07/07/89	27/06/94
3	CEIS TM	BSU 85	Saft (LSH 14, 5 C-cells)	07/07/89	
4	Sextant [1)]	SDT 406 M	Saft (LSH 14, 5 C-cells)	07/07/89	
5	SERPE-IESM	Kannad 406	Saft (LSH 20, 4 D-cells)	07/07/89	
6	Sextant [1)]	SDT 406 A	Saft (LSH 14, 5 C-cells)	07/07/89	
7	SERPE-IESM	Kannad 406 F	Saft (LSH 20, 4 D-cells)	07/07/89	
8	Caledonian	CPT-600M	Saft (SK 419, N/A)	07/07/89	
9	CEIS TM	BSP 86	Saft (LSH 20, 5 D-cells)	07/07/89	09/11/92
10	Lokata [2)]	406 P	Altus (N/A, 2 F-cells)	07/07/89	
11	Lokata [2)]	406 M	Altus (N/A, 2 F-cells)	07/07/89	
12	Lokata [2)]	406 H	Hoppecke (LSC 3460M, 3 D-cells); Altus (N/A, 2 F-cells);	07/07/89	09/11/92
13	SERPE-IESM	Kannad 406 S	Hoppecke (LSC 3460M, 4 D-cells); Saft (LSH 20, 4 D-cells)	07/07/89	
14	SERPE-IESM	Kannad 406 F (or P)	Hoppecke (LSC 3460M, 4 D-cells); Saft (LSH 20, 4 D-cells)	07/07/89	
15	Japan Radio	JQE-2A (Class 1)	JRC (E1 3B75 or E13B76, 4 cells)	07/07/89	
16	CEIS TM	M 02	Saft (LSH 20B, 5 D-cells)	07/07/89	
17	ACR Electronics	RLB-23	Panasonic (BRC, 21 C-cells)	14/07/89	
18	ACR Electronics	RLB-24	Panasonic (BRC, 21 C-cells)	14/07/89	
19	The Guest Co. Inc. [3)]	948 (Float-free)	Panasonic (BRC, 10 C-cells)	14/07/89	10/07/92
20	CEIS TM	A06 and S06	Saft (LSH 14, 5 C-cells); Hoppecke (LSC 2650M, 5 C-cells); Ultralife (U2550VH, 5 C-cells)	09/10/89	14/08/95
21	Japan Radio	JQE-2A (Class 2)	JRC (E1 3B75 or E13B76, 4 cells)	09/10/89	
22	SERPE-IESM	Kannad 406 S	Hoppecke (LSC 3460M, 4 D-cells); Saft (LSH 20, 4 D-cells)	09/10/89	
23	SERPE-IESM	Kannad 406 F (or P)	Hoppecke (LSC 3460M, 4 D-cells); Saft (LSH 20, 4 D-cells)	09/10/89	
24	CEIS TM	M 04	Hoppecke (LSC 3460M, 7 D-cells)	09/10/89	
25	Lokata [2)]	406 P(Y)	Hoppecke (LSC 3460M, 3 D-cells)	09/10/89	
26	Lokata [2)]	406 M(Y)	Hoppecke (LSC 3460M, 3 D-cells)	09/10/89	
27	Lokata [2)]	406 H(Y)	Hoppecke (LSC 3460M, 3 D-cells)	09/10/89	
28	Nova Marine	RT 161M	Hoppecke (LSC 3460M, 5 D-cells)	09/10/89	27/06/94
29	The Guest Co. Inc. [3)]	948 (Non float-free)	Panasonic (BRC, 10 C-cells)	09/10/89	10/07/92
30	Japan Radio	JQE-2A (Class 1)	JRC (E1 3B75A or E13B76A, 4 cells)	08/01/90	

Table IX - List of C/S Type Approval Certificates for 406 MHz Beacons 2/6

Cert. No.	Manu-facturer	Model (Additional Model Names)	Battery Manufacturer (Model, No. of Cells)	First Issued	Last Amend.
31	Nova Marine	RT 160	N/A (N/A, 5 cells)	16/02/90	27/06/94
32	Nova Marine	RT 161	Hoppecke (LSC 3460M, 5 D-cells)	16/02/90	27/06/94
33	Caledonian	CPT 600N	Crompton Vidor (XSG15-5238, 5 cells)	12/04/90	
34	CEIS TM	MT06	Saft (LSH 14, 5 C-cells); Hoppecke (LSC 2650M, 5 C-cells); Ultralife (U2550VH, 5 C-cells)	12/04/90	14/08/95
35	SERPE-IESM	Kannad 406 FH (or PH)	Saft (LSH 20, 4 D-cells); Hoppecke (LSC 3460M, 4 D-cells)	30/04/90	
36	Musson-Exim	ARB-MK	Saft (LSH 20, 5 D-cells)	02/08/90	
37	TOYO Comm.	C-2277 (Furuno FSO-400)	Hoppecke (LSC 3460M, 5 D-cells); Ultralife (U3360H, 5 D-cells) [4]	02/08/90	10/07/92
38	MPR Teltech [1]	L-1000	Saft (L026 SHX, 5 D-cells)	20/08/90	
39	SERPE-IESM	Kannad 406 S (or SW) (Rescuer 406 S)	Hoppecke (LSC 3460M, 4 D-cells); Saft (LSH 20, 4 D-cells); Saft (LSH 20, 3 D-cells) [5]	05/11/90	11/03/98
40	SERPE-IESM	Kannad 406 F (or P)	Hoppecke (LSC 3460M, 4 D-cells); Saft (LSH 20, 4 D-cells); Saft (LSH 20, 3 D-cells) [5]	05/11/90	11/03/98
41	SERPE-IESM	Kannad 406 FH (or PH or WH) (Rescuer 406 P or PW)	Hoppecke (LSC 3460M, 4 D-cells); Saft (LSH 20, 4 D-cells); Saft (LSH 20, 3 D-cells) [5]	05/11/90	11/03/98
42	SERPE-IESM	Kannad 406 ATP	Hoppecke (LSC 3460M, 4 D-cells);	05/11/90	
43	MPR Teltech [1]	SATFIND-406$_{TM}$ M (Alden SATFIND-406 $_{TM}$M)	Hoppecke (LSC 3460M, 5 D-cells); Ultralife (U3360H, 5 D-cells)	16/11/90	14/09/95
44	CEIS TM	H-06	Hoppecke (LSC 2650M, 5 C-cells)	14/03/91	
45	Bitova Electronic	SEVT-406	Saft (LSH 20, 5 D-cells)	14/03/91	
46	Yaros-lavsky Radio	ARB-PK	Eliac (TXL-5.03, 6 C-cells)	14/03/91	
47	Yaros-lavsky Radio	ARB-PK1	Eliac (TXL-10.01, 5 D-cells)	14/03/91	
48	Yaros-lavsky Radio	ARB-PK10	Eliac (TXL-10, 6 D-cells)	14/03/91	
49	Japan Radio	JQE-2A (Class 1)	JRC (E1 3B75A or E13B76A, 4 cells)	05/04/91	
50	Jotron Electronics	Tron 30 S mkII	Saft (LSH 20, 8 D-cells) Saft (LO26SX, 2x5 D-cells) [4]	15/04/91	
51	CEIS TM	P-07	Hoppecke (LSC 3460M, 2 D-cells)	15/04/91	
52	Musson-Exim	ARB-PC	Eilac (TXL-10, 6 D-cells); Saft (LSH 20, 6 D-cells)	27/04/91	
53	McMurdo	LDT 61 or LDT 62	Electrochem (BCX 72, 4 D-cells)	30/09/91	26/03/93
54	Lokata [2]	406 PF(Y)	Hoppecke (LSC 3460M, 3 D-cells)	04/10/91	
55	Lokata [2]	Honeywell ECB	Hoppecke (LSC 3460M, 4 D-cells)	06/12/91	

Table IX - List of C/S Type Approval Certificates for 406 MHz Beacons 3/6

Cert. No.	Manu-facturer	Model (Additional Model Names)	Battery Manufacturer (Model, No. of Cells)	First Issued	Last Amend.
56	TAITO MUSEN Co. Ltd.	REB-22 (Anritsu RJ301A and ZENICAL EP) [12]	NEC (Necrel P-31M, 5 D-cells)	06/12/91	26/05/92
57	The Guest Co. Inc. [3]	952-02	Panasonic (BRC, 8 C-cells)	06/12/91	19/04/96
58	Aviation and Marine [1]	Avmar M1-406	Hoppecke (LSC 3460M, 4 D-cells)	06/02/92	
59	Yaros-lavsky Radio	ARB-MKS "Afalina"	Eliac (TXL-10.01, 9 D-cells)	06/02/92	
60	Yaros-lavsky Radio	ARB-PKE "Excom"	Eliac (TXL-10.01, 5 D-cells)	06/02/92	
61	Musson-Exim	ARB-M	Eliac (TXL-10.01, 5 D-cells); Saft (LSH 20, 5 D-cells)	06/02/92	
62	Musson-Exim	Musson-501	Eliac (TXL-10.01, 4/8 D-cells) [6]; Saft (LSH 20, 4/8 D-cells) [6]	16/04/92	
63	Lokata [2]	406 MH(Y)	Hoppecke (LSC 3460M, 3 D-cells)	28/05/92	
64	Lokata [2]	406 M(Y)E	Hoppecke (LSC 3460M, 3 D-cells)	28/05/92	
65	Lokata [2]	406 MH(Y)E	Hoppecke (LSC 3460M, 3 D-cells)	28/05/92	
66	Jotron Electronics	Tron 30 S mkII	Vidor (G20, 10 D-cells) Saft (LO26SX, 2x5 D-cells) [4]	22/07/92	
67	Artex	ELT 110-406	Hoppecke (LSC 3460M, 4 D-cells); Blue Star (LM-3455, 4 D-cells); Ultralife (U3360H, 4 D-cells)	05/10/92	15/07/96
68	Musson-Exim	Cospas-ARB-MK1	Eilac (TXL-10.01, 5 D-cells)	12/10/92	
69	CEIS TM	M-05 Sealife	Hoppecke (LSC 3460M, 4 D-cells); Saft (LSH 20, 4 D-cells)	09/11/92	
70	Nova Marine	RT 260M (Newcom NC-270, Tellumat PT 280-A and McMurdo MCM 406 A)	Hoppecke (LSC 3460M, 4 D-cells); Ultralife (U3360H, 4 D-cells); Nova Marine (FRIWO/SILBERKRAFT, 4 D-cells) [7]	09/11/92	04/12/97
71	Northern Airborne	SATFIND-406$_{TM}$ Pocket PLB [8]	Saft (L026 SX, 2 D-cells)	16/11/92	26/07/96
72	Nova Marine	RT 260 (Newcom NC-270a, Tellumat PT 280-M and McMurdo MCM 406 M)	Hoppecke (LSC 3460M, 4 D-cells); Ultralife (U3360H, 4 D-cells); Nova Marine (FRIWO/SILBERKRAFT, 4 D-cells) [7]	20/11/92	04/12/97
73	The Guest Co. Inc. [3]	952-01	Panasonic (BRC, 8 C-cells)	30/11/92	19/04/96
74	Socata	ELT 96, -96 S	Saft (LSH 20, 4 D-cells)	09/12/92	26/03/93
75	Lokata [2]	406-2A, -2AH, -2M	Hoppecke (LSC 3460M, 4 D-cells); Ultralife (U3360H, 4 D-cells); Ultralife (U3360H/4/28/S, 4 D-cells)	09/12/92	24/09/97
76	Litton	952-21, -23, -25	Panasonic (BRC, 8 C-cells)	09/12/92	
77	Skanti	TP 2	Ultralife (U3360H, 6 D-cells)	24/02/93	04/12/95

Table IX - List of C/S Type Approval Certificates for 406 MHz Beacons 4/6

Cert. No.	Manu-facturer	Model (Additional Model Names)	Battery Manufacturer (Model, No. of Cells)	First Issued	Last Amend.
78	Northern Airborne	SATFIND-406$_{TM}$ Survival EPIRB [8)]	Saft (180028, 4 D-cells); Dowty (LIM 336H, 4 D-cells); Hoppecke (LSC 3460M, 4 D-cells); Ultralife (U3360H, 4 D-cells); Blue Star (LM-3455, 4 D-cells); Blue Star (LS-3355, 4 D-cells)	11/08/93	26/07/96
79	CEIS TM	MO56	Hoppecke (LSC 2650M, 5 C-cells); Saft (LSH 15, 5 C-cells); Ultralife (U2550VH, 5 C-cells)	11/08/93	14/08/95
80	Japan Radio	JQE-3A	Hoppecke (LSC 3460M, 4 D-cells); Ultralife (U3360H, 4 D-cells)	03/12/93	22/09/97
81	ENA	ENASAT-406 A or ENASAT-406 M	Hoppecke (LSC 3460M, 4 D-cells)	31/01/94	
82	ACR Electronics	RLB-23E1	Saft (L029 SHX, 21 C-cells)	03/05/94	
83	ACR Electronics	RLB-27 (Satellite 406)	Saft (L029 SHX, 3 D-cells); Ultralife (U3360H, 3 D-cells)	14/10/94	07/06/95
84	ACR Electronics	RLB-28 (Satellite 406)	Saft (L029 SHX, 3 D-cells); Ultralife (U3360H, 3 D-cells)	14/10/94	07/06/95
85	McMurdo	Locat LDT 61 A (Locat LDT 62 A)	Dowty (LIM336H, 4 D-cells); Hoppecke (LSC 3460M, 4 D-cells)	16/11/94	
86	TAIYO MUSEN Co. Ltd.	REB-23-02 or REB-23-01 (Anritsu RJ302A and ZENICALL-F) [12)]	NEC (Necrel P-33 [9)], 4 D-cells); Ultralife (U3360H, 4 D-cells)	16/11/94	03/08/00
87	TAIYO MUSEN Co. Ltd.	REB-24 [12)]	NEC (Necrel P-33 [9)], 4 D-cells); Ultralife (U3360H, 4 D-cells)	16/11/94	03/08/00
88	Honeywell [13)]	Rescu 406	Allied Signal (1095599-1 [7)], 8 cells)	31/05/95	
89	CEIS TM	P076	Ultralife (U3360H, 2 D-cells)	14/08/95	
90	Caledonian	ADELT CPT 609	Electrochem (3PD0164-XA, 4 DD-cells)	17/10/95	
91	SERPE-IESM	Kannad 406 ATP	Ultralife (U3360VH, 3 D-cells) FRIWO M20 (M20, 3 D-cells) [4)]	17/10/95	
92	SERPE-IESM	Kannad 406 m	Saft (LSH 20, 2 D-cells)	17/11/95	
93	Northern Airborne	SATFIND-406 ELT Model A-1000 [8)]	Ultralife (U3360H, 4 D-cells)	24/01/96	02/10/96
94	Samyang	EB-10	Teckraft (EB-96, 4 D-cells)	02/09/96	
95	Jotron Electronics	Tron 40 S	Saft (LSH 20, 4 D-cells)	11/02/97	
96	State Design Bureau	SM-511	Teckraft (EB-96, 4 D-cells)	11/02/97	
97	Techtest	ELT 503-1, 503-3, 503-11	Blue Star (LS-3355, 4 D-cells)	15/07/97	06/05/98
98	Jotron Electronics	Tron 45 SX	Saft (LSH 20, 4 D-cells)	25/10/97	
99	Jotron Electronics	Tron 45 S	Saft (LSH 20, 2 D-cells)	29/10/97	
100	GEC-Marconi	639 SIU	GEC-Marconi (A2/254041/020 [7)], 48 D-cells)	29/10/98	
101	SERPE-IESM	Kannad 406 XS	Williamson/WILPA 0314 (LSH, 3 C-cells)	05/01/98	

Table IX - List of C/S Type Approval Certificates for 406 MHz Beacons 5/6

Cert. No.	Manu-facturer	Model (Additional Model Names)	Battery Manufacturer (Model, No. of Cells)	First Issued	Last Amend.
102 [10]	Northern Airborne	SATFIND-406 GPIRB$_{TM}$*	Blue Star (LS-3355, 4 D-cells) Saft (LO26SX, 4 D-cells) [4]	28/04/98	
103	Techtest	ELT 503-12; ELT 503-2; ELT 503-8; PLB 500-4; PLB 500-20	Blue Star (LS-3355, 4 D-cells)	06/05/98	
104 [11]	Artex	ELT 110-406 NAV**; ELT 110-406 HM NAV**; ELT B406-2 NAV**; ELT 110-406 ED NAV**	Blue Star (LM-3455, 4 D-cells)	25/05/98	
105	SERPE-IESM	Kannad 406 AP; Kannad 406 AF; Kannad 406 AF-H; Kannad 406 AS	FRIWO M20TT (M20TT, 3 D-cells); FRIWO M20 (M20, 3 D-cells) [4]	11/09/98	
106	McMurdo	E3m (SOS Rescue 406m, Sea 406m, Sailor 406m) or E3c (SOS Rescue 406c, Sea 406c, Sailor 406c) or E3a (SOS Rescue 406a, Sea 406a, Sailor 406a)	Saft (LO26SX, 3 D-cells)	26/01/99	24/05/99
107	ACR Electronics	RLB-32	Saft (LO26SX, 3 D-cells)	19/04/99	
108	ACR Electronics	RLB-33**	Saft (LO26SX, 3 D-cells)	19/04/99	
109	ACR Electronics	PLB-100**	Blue Star (LS-2660, 3 5/4 C-cells) ACR A1-13-0117 [7] (3 5/4 C-cells) [4]	29/04/99	
110	Microwave Monolithics	MBT-040600**	Duracel (DL 2/3A, 6 2/3 A-cells)	16/06/99	
111	Techtest	500-12	Hawker Eternacell (M54, 3 5/4 C-cells)	20/07/99	
112	Artex	C406-1**, C406-2**	Artex (452-01333, 4 D-cells)	20/07/99	
113	Microwave Monolithics	MBT-040600A	Duracel (DL 2/3A, 6 2/3 A-cells)	25/08/99	
114	Microwave Monolithics	MBT-040600B**	Duracel (DL 2/3A, 6 2/3 A-cells)	25/08/99	
115	Microwave Monolithics	MBT-040600C	Duracel (DL 2/3A, 6 2/3 A-cells)	25/08/99	
116	BAE SYSTEMS	T-1630/SRT Buoy, Radio Transmitting SEPIRB*	Ultralife (U3360H/3/76, 3 D-cells)	08/12/99	
117	Samyung Electronic	SEP-406	Saft (LSH 20, 4 D-cells)	17/12/99	
118	ADI Ltd.	SERB MkII	Eternal (Cell “D” size Model M20, 4D-cells)	03/03/00	
119	McMurdo	G4a* (SOS Precision 406a*, Sailor GPS 406a*) or G4m* (SOS Precision 406m*, Sailor GPS 406m*) or G4c* (SOS Precision 406c*, Sailor GPS 406c*)	Friemann & Wolf (3.M 20 TKZ4A0001, 3 D-cells)	30/06/00	

Table IX - List of C/S Type Approval Certificates for 406 MHz Beacons 6/6

Notes:

1. Models no longer in production.
2. Models no longer in production but supported by Kelvin Hughes Ltd.
3. On January 31, 1996 Litton Special Devices (USA) sold the design and production rights for EPIRB Models 948 and 952 (Certif. Nos. 19, 29,57,73) to The Guest Company Inc. (USA).
4. In accordance with C/S T.007 - Issue 3 - Rev.4 beacon with the battery was tested at beacon manufacturer test facilities. No change was made to the original C/S certificate.
5. Applicable to beacon modifications from 1998.
6. Larger number of cells corresponds to Class 1 requirements (temperature range from -40C° to +55C°), smaller number of cells corresponds to Class 2 requirements (temperature range from -20C° to +55C°).
7. Battery assembled by beacon manufacturer in accordance with their own technical drawing.
8. On July 3, 1996 Northern Airborne Technology Ltd. (Canada) purchased the designs from MPR Teltech (Canada) and production from Alden Electronics (USA) for SATFIND-406 TM Pocket PLB (Certif. No.71), SATFIND-406 TM Survival EPIRB (Certif. No.78) and SATFIND-406 ELT Model A-1000 (Certif. No.93).
9. Designated Ultralife U3360H battery.
10. Beacon was originally tested with internal navigation device KODEN GSU-15 GPS receiver. In accordance with C/S T.007 - Issue 3 - Rev. 4 beacon was re-tested at beacon manufacturer test facilities with alternative internal navigation device Ashtech G8 GPS receiver. No change was made to the original C/S certificate.
11. Navigation device ELT/NAV, interface part No.453-6500 or 453-6501.
12. On April 1, 2000 NEC Radio Electronics Co. Ltd. (Japan) sold the design and production rights for EPIRB Models REB-22, REB-23-01, REB-23-02 and REB-24 (Certificates Nos. 56, 86 and 87) to TAIYO MUSEN Co. Ltd. (Japan).
13. On January 1, 2000 company name was changed from AlliedSignal Aerospace Canada to Honeywell.

N/A Not available.

* With internal navigation device.

** With external navigation device.

Table X - List of Aircraft External Antennas for 406 MHz ELTs Tested to Cospas-Sarsat Requirements

No.	Antenna Manufacturer	Antenna Model No. Tested
1.	Société Rayan, 7 Chemin de Vaubesnard, 91410 Dourdan France Tel: +33 1 64 59 79 09, Fax: +33 1 64 59 39 94	Rayan Type 2614-82
2.	Dayton Granger, 3299 S.W. 9th Avenue, Fort Lauderdale Florida 33335-0550, USA Tel: +1 305 463 3451, Fax: +1 305 761 3172	Dayton Granger Model 720055

Table XI - List of C/S Type Approved 406 MHz Beacon Models 1/4

Manufacturer	Model Names	C/S Type Approval Certificate No. (a)	C/S Class (b)	Application (c)
ADI Limited	SERB MkII	118	2	Float-Free EPIRB
ACR Electronics Inc.	RLB-23	17	2	Float-Free EPIRB
	RLB-24	18	2	Non Float-Free EPIRB
	RLB-23E1	82	1	Float-Free EPIRB
	RLB-27 or Satellite 406 (see Note d)	83	1 or 2	Float-Free EPIRB
	RLB-28 or Satellite 406 (see Note d)	84	1 or 2	Non Float-Free EPIRB
	RLB-32	107	1	Float-Free EPIRB
	RLB-33**	108	1	Float-Free EPIRB
	PLB-100**	109	1	PLB
Artex Inc.	ELT 110-406	67	2	Automatic ELT
	ELT 110-406 NAV**, ELT 110-406 HM NAV**, ELT B406-2 NAV**, ELT 110-406 ED NAV**	104	2	Automatic ELT
	C406-1**, C406-2**	112	2	Automatic ELT
Aviation and Marine Techn. Inc.	Avmar M1-406 (see Note e)	58	2	Float-Free EPIRB
BAE SYSTEMS	T-1630/SRT Buoy, Radio Transmitting SEPIRB*	116	2	Non Float-Free EPIRB
Bitova Electr. Co.	SEVT-406	45	2	Float-Free EPIRB
Caledonian Airborne Systems Ltd.	CPT-600M (see Note d)	8	1 or 2	Float-Free EPIRB
	CPT-600N	33	2	Float-Free EPIRB
	ADELT CPT 609	90	2	Automatic ELT
CEIS TM / ELTA	BSU 85	3	2	Non Float-Free EPIRB
	BSP 86	9	2	Float-Free EPIRB
	M 02	16	1	Float-Free EPIRB
	A06	20	2	Automatic ELT
	S06	20	2	Manual ELT
	M 04	24	2	Float-Free EPIRB
	MT06	34	2	Non Float-Free EPIRB
	H-06	44	2	Automatic ELT
	P-07	51	2	PLB
	M05 Sealife (see Note d)	69	1 or 2	Float-Free EPIRB
	MO56	79	2	Float-Free EPIRB
	P076	89	2	PLB
ENA Telecomunicaciones S.A.	ENASAT-406 A	81	2	Float-Free EPIRB
	ENASAT-406 M	81	2	Non Float-Free EPIRB
GEC-Marconi Radar and Defence Systems	639 SIU	100	2	Float-Free EPIRB
(The) Guest Co. Inc.	948 (see Note f)	19	2	Float-Free EPIRB
	948 (see Note f)	29	2	Non Float-Free EPIRB
	952-02 (see Note f)	57	2	Non Float-Free EPIRB
	952-01 (see Note f)	73	2	Float-Free EPIRB
Honeywell (see Note x)	Rescu 406	88	2	Manual ELT
Japan Radio Co. Ltd.	JQE-2A	15,30	1	Float-Free EPIRB
	JQE-2A	49	1	Float-Free EPIRB
	JQE-2A	21	2	Float-Free EPIRB
	JQE-3A	80	2	Float-Free EPIRB
Jotron Electronics A.S.	Tron 30S (see Note e)	1	2	Float-Free EPIRB
	Tron 30 S mkII	50,66	2	Float-Free EPIRB
	Tron 40S	95	2	Float-Free EPIRB
	Tron 45 SX	98	2	Non Float-Free EPIRB
	Tron 45 S	99	2	Non Float-Free EPIRB

Table XI - List of C/S Type Approved 406 MHz Beacon Models 2/4

Manufacturer	Model Names	C/S Type Approval Certificate No. (a)	C/S Class (b)	Application (c)
Litton Special Devices	952-21 or 952-25	76	2	Automatic ELT
	952-23	76	2	Manual ELT
Lokata Ltd.	406 P (see Note g)	10	2	Non Float-Free EPIRB
	406 M (see Note g)	11	2	Non Float-Free EPIRB
	406 H (see Note g)	12	2	Float-Free EPIRB
	406 P(Y) (see Note g)	25	2	Non Float-Free EPIRB
	406 M (Y) (see Note g)	26	2	Non Float-Free EPIRB
	406 H(Y) (see Note g)	27	2	Float-Free EPIRB
	406 PF(Y) (see Note g)	54	2	Non Float-Free EPIRB
	Honeywell ECB (see Note g)	55	2	Non Float-Free EPIRB
	406 MH(Y) (see Note g)	63	2	Float-Free EPIRB
	406 M(Y)E (see Note g)	64	2	Non Float-Free EPIRB
	406 MH(Y)E (see Note g)	65	2	Float-Free EPIRB
	406-2A or 406-2AH (see Note g)	75	2	Float-Free EPIRB
	406-2M (see Note g)	75	2	Non Float-Free EPIRB
McMurdo Ltd.	Locat LDT 61	53	2	Float-Free EPIRB
	Locat LDT 62	53	2	Non Float-Free EPIRB
	Locat LDT 61A	85	2	Float-Free EPIRB
	Locat LDT 62A	85	2	Non Float-Free EPIRB
	E3a (see Note h)	106	1	Float-Free EPIRB
	E3c (see Note i)	106	1	Non Float-Free EPIRB
	E3m (see Note j)	106	1	Non Float-Free EPIRB
	G4a* (see Note k)	119	2	Float-Free EPIRB
	G4m* (see Note l)	119	2	Non Float-Free EPIRB
	G4c* (see Note m)	119	2	Non Float-Free EPIRB
Microwave Monolithics Inc.	MBT-040600**	110	2	PLB
	MBT-040600A	113	2	PLB
	MBT-040600B**	114	2	PLB
	MBT-040600C	115	2	PLB
MPR Teltech Ltd.	L-1000 (see Note e)	38	1	PLB
	SATFIND-406$_{TM}$ M (see Note e)	43	2	Float-Free EPIRB
Musson-Exim	ARB-MK	36	2	Float-Free EPIRB
	ARB-PC	52	1	PLB
	ARB-M	61	2	Float-Free EPIRB
	Musson-501 (see Note d)	62	1 or 2	Float-Free EPIRB
	Cospas-ARB-MK1	68	2	Float-Free EPIRB
Northern Airborne Technology Ltd.	SATFIND-406$_{TM}$ Pocket PLB (see Note p)	71	1	PLB
	SATFIND-406$_{TM}$ Survival EPIRB (see Note p)	78	2	Float-F./Non F.-F. EPIRB
	SATFIND-406 ELT Model A-1000 (see Note p)	93	2	Automatic ELT
	SATFIND-406 GPIRB $_{TM}$*	102	2	Float-Free EPIRB
Nova Marine Systems Ltd.	RT 160M (see Note q)	2	1	Float-Free EPIRB
	RT 161M	28	2	Float-Free EPIRB
	RT 160	31	1	Non Float-Free EPIRB
	RT 161	32	2	Non Float-Free EPIRB
	RT 260M (see Note r)	70	2	Float-Free EPIRB
	RT 260 (see Note s)	72	2	Non Float-Free EPIRB
Samyang	EB-10	94	2	Float-Free EPIRB
Samyung	SEP-406	117	2	Float-Free EPIRB
SERPE-IESM	Kannad 406	5	2	Non Float-Free EPIRB
	Kannad 406 S (see Note d)	13	1 or 2	Non Float-Free EPIRB
	Kannad 406 S	22	2	Non Float-Free EPIRB
	Kannad 406 S (or SW) (see Note s)	39	2	Non Float-Free EPIRB
	Kannad 406 F	7	2	Float-Free EPIRB
	Kannad 406 F(or P) (see Note d)	14	1 or 2	Float-Free EPIRB

Table XI - List of C/S Type Approved 406 MHz Beacon Models 3/4

Manufacturer	Model Names	C/S Type Approval Certificate No. (a)	C/S Class (b)	Application (c)
SERPE-IESM (Cont.)	Kannad 406 F (or P)	23,40	2	Float-Free EPIRB
	Kannad 406 FH (or PH)	35	2	Float-Free EPIRB
	Kannad 406 FH (or PH or WH) (see Note u)	41	2	Float-Free EPIRB
	Kannad 406 ATP	42,91	2	Automatic ELT
	Kannad 406 m	92	1	PLB
	Kannad 406 XS	101	2	Non Float-Free EPIRB/ Manual ELT/PLB
	Kannad 406 AP/AF/AF-H/AS	105	2	ELT
Sextant	SDT 406 M (see Note e)	4	2	Non Float-Free EPIRB
	SDT 406 A (see Note e)	6	2	Automatic ELT
Skanti	TP 2	77	1	Float-Free EPIRB
Socata	ELT 96	74	2	Automatic ELT
	ELT 96 S	74	2	Manual ELT
State Designer's Bureau of Radiocommunication	SM-511	96	2	Float-Free EPIRB
Techtest Limited	ELT 503-1	97	1	Manual ELT
	ELT 503-3	97	1	Automatic ELT
	ELT 503-11	97	1	Automatic ELT
	ELT 503-2, ELT 503-8	103	1	Automatic ELT
	ELT 503-12	103	1	Manual ELT
	PLB 500-4, PLB 500-20	103	1	PLB
	500-12	111	2	Automatic ELT or PLB
TAIYO MUSEN Co. Ltd. (see Note v)	REB-22 (see Note n)	56	2	Float-Free EPIRB
	REB-23-01 (see Note o)	86	2	Float-Free EPIRB
	REB-23-02	86	2	Non Float-Free EPIRB
	REB-24	87	2	Non Float-Free EPIRB
TOYO Communication Equipment Co. Ltd.	C-2277 (see Note w)	37	2	Float-Free EPIRB
Yaroslavsky Radio Engineering Works	ARB-PK	46	2	PLB
	ARB-PK1	47	1	PLB
	ARB-PK10	48	1	PLB
	ARB-MKS "Afalina"	59	1	Float-Free EPIRB
	ARB-PKE "Excom"	60	1	PLB

Notes:

(a) Cospas-Sarsat Type Approval is a confirmation that the beacon meets all Cospas-Sarsat requirements as defined in documents C/S T.001 and C/S T.007, and is compatible with equipment in the Cospas-Sarsat System. It does not waive the manufacturer's obligations to obtain national type acceptance and/or relevant authorizations from national Administrations regarding registration and use of 406 MHz beacons.

(b) Cospas-Sarsat Classes (operating temperature range): Class 1: -40°C to +55°C;
Class 2: -20°C to +55°C.

(c) As stated by manufacturer. Installation characteristics are not addressed in Cospas-Sarsat specification and type approval testing.

(d) Class of the beacon (1 or 2) is dependent on type of battery installed.

(e) Models no longer in production.

Table XI - List of C/S Type Approved 406 MHz Beacon Models 4/4

Notes (Cont.):

(f) On January 31, 1996 Litton Special Devices (USA) sold the design and production rights for EPIRB Models 948 and 952 (Certif. Nos. 19, 29, 57, 73) to The Guest Company Inc. (USA).

(g) Models no longer in production but supported by Kelvin Hughes Ltd.

(h) Also sold as SOS Rescue 406a, Sea 406a and Sailor 406a (Certif. No.106).

(i) Also sold as SOS Rescue 406c, Sea 406c and Sailor 406c (Certif. No.106).

(j) Also sold as SOS Rescue 406m, Sea 406m and Sailor 406m (Certif. No.106).

(k) Also sold as SOS Precision 406a, Sailor GPS 406a.

(l) Also sold as SOS Precision 406m, Sailor GPS 406m.

(m) Also sold as SOS Precision 406c, Sailor GPS 406c.

(n) Also sold as Anritsu RJ301A and ZENICALL EP (Certif. No.56).

(o) Also sold as Anritsu RJ302A and ZENICALL-F (Certif. No.86).

(p) On July 3, 1996 Northern Airborne Technology Ltd. (Canada) purchased the designs from MPR Teltech (Canada) and production from Alden Electronics (USA) for SATFIND-406 $_{TM}$ Pocket PLB (Certif. No.71), SATFIND-406 $_{TM}$ Survival EPIRB (Certif. No.78) and SATFIND-406 ELT Model A-1000 (Certif. No.93).

(q) Also sold as McMurdo RB406 (Certif. No.2).

(r) Also sold as Newcom NC-270, Tellumat PT280-A and McMurdo MCM 406 A (Certif. No.70).

(s) Also sold as Newcom NC-270a, Tellumat PT280-M and McMurdo MCM 406 M (Certif. No.72).

(t) Also sold as Rescuer 406 S (Certif. No.39).

(u) Also sold as Rescuer 406 P or PW (Certif. No.41).

(v) On April 1, 2000 NEC Radio Electronics Co. Ltd. (Japan) sold the design and production rights for EPIRB Models REB-22, REB-23-01, REB-23-02 and REB-24 (Certificates Nos. 56, 86 and 87) to TAIYO MUSEN Co. Ltd. (Japan).

(w) Also sold as Furuno FSO-400 (Certif. No.37).

(x) On January 1, 2000 company name was changed from AlliedSignal Aerospace Canada to Honeywell.

* With internal navigation device.

** With external navigation device.

Table XII - Cospas-Sarsat System Documents 1/2

General:

Introduction to the Cospas-Sarsat System
C/S G.003, Issue 5 - Revision 1, October 1999

Cospas-Sarsat Glossary
C/S G.004, Issue 1 - Revision 4, October 1999

Cospas-Sarsat Guidelines on 406 MHz Beacon Coding, Registration and Type Approval
C/S G.005, Issue 2 - Revision 1, October 1999

Technical:

Specification for Cospas-Sarsat 406 MHz Distress Beacons
C/S T.001, Issue 3 - Revision 3, October 1999

Cospas-Sarsat LEOLUT Performance Specification and Design Guidelines
C/S T.002, Issue 3 - Revision 1, October 1999

Description of the Payloads Used in the Cospas-Sarsat LEOSAR System
C/S T.003, Issue 3, October 2000 *

Cospas-Sarsat Space Segment Technical Measurement Standard
C/S T.004, Issue 1 - Revision 2, October 1999

Cospas-Sarsat LEOLUT Commissioning Standard
C/S T.005, Issue 2 - Revision 1, October 1999

Cospas-Sarsat Orbitography Network Specification
C/S T.006, Issue 1 - Revision 2, October 1997

Cospas-Sarsat 406 MHz Distress Beacon Type Approval Standard
C/S T.007, Issue 3 - Revision 7, October 2000 *

Cospas-Sarsat Acceptance of 406 MHz Beacon Type Approval Test Facilities
C/S T.008, Issue 1 - Revision 2, October 2000 *

Cospas-Sarsat GEOLUT Performance Specification and Design Guidelines
C/S T.009, Issue 1 - Revision 2, October 1999

Cospas-Sarsat GEOLUT Commissioning Standard
C/S T.010, Issue 1 - Revision 1, October 1999

Description of 406 MHz Payloads Used in the Cospas-Sarsat GEOSAR System
C/S T.011, Issue 1 - Revision 2, October 2000 *

Note: * - Subject to Council approval in October 2000.

Table XII - Cospas-Sarsat System Documents 2/2

Operational:

Cospas-Sarsat Data Distribution Plan
C/S A.001, Issue 4 - Revision 3, October 2000 *

Cospas-Sarsat Mission Control Centres Standard Interface Description
C/S A.002, Issue 4 - Revision 3, October 2000 *

Cospas-Sarsat System Monitoring and Reporting
C/S A.003, Issue 1 - Revision 7, October 2000 *

Cospas-Sarsat System Exercising
C/S A.004, Issue 1 - Revision 1, June 1998

Cospas-Sarsat Mission Control Centre Performance Specification and Design Guidelines
C/S A.005, Issue 3, October 2000 *

Cospas-Sarsat Mission Control Centre Commissioning Standard
C/S A.006, Issue 2 - Revision 4, October 1999

Reports:

1990 Exercise of the Cospas-Sarsat 406 MHz System
C/S R.005, October 1992 (Summary Report)

GEOSAR D&E Summary Report
C/S R.009, October 1999

Note: * - Subject to Council approval in October 2000.

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Cospas-Sarsat Web Site Address: *http://www.cospas-sarsat.org*

Annex 7
MSC Circulars relevant to the GMDSS

Annex 7-1	–	MSC/Circ.560 25.06.91	Meteorological wind profiler radars and their effect on the COSPAS–SARSAT system
Annex 7-2	–	MSC/Circ.610 07.07.93	Use and application of computers
Annex 7-3	–	MSC/Circ.640 27.05.94	International SafetyNET service
Annex 7-4	–	MSC/Circ.660 12.01.95	Proper use of lanyards attached to satellite EPIRBs
Annex 7-5	–	MSC/Circ.682 22.05.95	Implementation of the GMDSS on board all ships
Annex 7-6	–	MSC/Circ.683 22.05.95	Present homing capability of satellite EPIRBs
Annex 7-7	–	MSC/Circ.748 13.06.96	Implementation of the GMDSS
Annex 7-8	–	MSC/Circ.803 09.06.97	Participation of non-SOLAS ships in the GMDSS
Annex 7-9	–	MSC/Circ.862 22.05.98	Clarifications of certain requirements in IMO performance standards for GMDSS equipment
Annex 7-10	–	MSC/Circ.863 22.05.98	Recommendation on prevention of harmful interference to 406 MHz EPIRBS operating with the COSPAS–SARSAT system
Annex 7-11	–	MSC/Circ.882 14.12.98	Guidelines on annual testing of 406 MHz satellite EPIRBs
Annex 7-12	–	MSC/Circ.883 14.12.98	Maritime safety and Inmarsat ship earth station barring procedures
Annex 7-13	–	MSC/Circ.891 21.12.98	Guidelines for the on-board use and application of computers

Annex 7-1
METEOROLOGICAL WIND PROFILER RADARS AND THEIR EFFECT ON THE COSPAS–SARSAT SYSTEM [MSC/Circ.560 (25.06.91)]

1 The Sub-Committee on Radiocommunications (COM) at its thirty-sixth session (10 to 14 December 1990) (COM 36/21, paragraphs 8.5 to 8.9) noted information provided by the United States (COM 36/8/1) on the potentially serious problem of harmful interference being caused to the COSPAS–SARSAT system by transmissions from meteorological wind profilers (ground-based pulsed radars, which measure wind direction and speed as a function of altitude and work in the 402–406 MHz frequency band adjacent to the 406 MHz band used by satellite EPIRBs operating through the COSPAS–SARSAT system).

2 The COM Sub-Committee also noted similar concern expressed by Australia (COM 36/8/4) with respect to interference from wind profiler radars and to possible interference by near-frequency users, i.e. between the 1.6 GHz Inmarsat downlink frequency for EGC and 1,544.5 MHz COSPAS–SARSAT.

3 The COM Sub-Committee further noted a report of CCIR IWP 8/14 to CCIR IWP 8/15 (COM 36/8/1, annex), which has prepared the technical bases for the mobile and mobile satellite service for WARC-92, on the potential interference from wind profiler radars to the COSPAS–SARSAT system. The report analyses the possible problem and concludes that particular attention should be given to the need to protect the COSPAS–SARSAT system.

4 The COM Sub-Committee noted information from CCIR concerning a CCIR study on this matter and concurred with the conclusions of CCIR IWP 8/15 (COM 36/WP.11, annex 5).

5 The Sub-Committee was of the opinion that all Administrations should disallow the operation of any additional wind profiler radars in the 402–406 MHz frequency band until such time as the CCIR completes its study and makes its recommendation(s).

6 The Maritime Safety Committee (MSC) concurred with the opinion of the Sub-Committee (MSC 59/33, paragraphs 9.21 and 9.22) and instructed the Secretariat to bring above opinion to the attention of Member Governments and WMO by MSC Circular.

7 Member Governments are invited to bring to the attention of their meteorological services the harmful interference caused by wind profiler radars and to ensure, as far as possible, that appropriate studies are undertaken in response to CCIR Question 102/8.

Annex 7-2
USE AND APPLICATION OF COMPUTERS
[MSC/Circ.610 (07.07.93)]

1 The Maritime Safety Committee, at its sixty-second session (24 to 28 May 1993), endorsed the following recommendations of the COM Sub-Committee on computer virus protection (COM 38/27, paragraph 10.3) and instructed the Secretariat to bring them to the attention of Governments, CIRM, IEC, ICS and others concerned:

.1 Member Governments having knowledge of occurrences of computer viruses which have affected the GMDSS or other communications equipment are recommended to advise the Organization of the circumstances;

.2 CIRM is alerted to the possibility of computer viruses and organizations such as IEC and others are encouraged to join in an effort to identify GMDSS potential problem areas and work toward resolution of any problems identified and anti-virus protection of the GMDSS; and

.3 as a general precaution, GMDSS equipment should not be used for computer games and any external software should be checked for viruses before being used on ships, RCC, radio station or coast earth station computer equipment.

2 Member Governments, CIRM, IEC, ICS and all others concerned are invited to take account of the above recommendations when applying and using relevant computers in GMDSS communication/computer and navigation equipment at sea or ashore.

Annex 7-3
INTERNATIONAL SAFETYNET SERVICE
[MSC/Circ.640 (27.05.94)]

1 The Maritime Safety Committee, at its sixty-third session (16–25 May 1994), noted that, in response to the Organization's request, Inmarsat is considering problems associated with registration and access procedures to Coast Earth Stations (CESs). In an effort to improve SafetyNET system integrity and resolve some of the shortcomings, Inmarsat is developing a system, based on the X.400 protocol, which may be used to interconnect Inmarsat-C CESs and provide, *inter alia*, the following features:

.1 automatic forwarding of messages ''on hand'' to any other CES in the same ocean region, in the event of temporary CES non-availability;

.2 continuing recognition of Registered Information Providers, through the two-stage access procedure, throughout a period of CES failure, thereby allowing uninterrupted access to the Inmarsat network via the usual routeing arrangements; and

.3 continuity of charging arrangements through continuity of access.

2 With these arrangements Inmarsat expects to preserve the funcionality of the Inmarsat network in relation to the International SafetyNET service under all foreseeable conditions, thereby meeting the requirements for fully fail-safe operation. However, X.400 interconnection will take some time to implement and Registered Information Providers are advised to approach their chosen CES operator to set up alternative arrangements until the new system is in place.

3 The Committee also noted that participation in the X.400 network may not be mandatory for all CES operators. In view of the undoubted advantages to be obtained from such CES interconnection, the Committee recommends that Member Governments liaise with CES operators, as appropriate, to encourage their full participation in the X.400 interconnection system. The Committee also noted that this facility is unlikely to solve the issue of automatic forwarding of messages from one ocean region to another.

4 The Committee further noted the steps taken by Inmarsat to resolve the difficulties caused by automatic scanning of Inmarsat-C terminals. In this regard Inmarsat informed the Committee of draft changes to the Inmarsat-C System Definition Manual requiring that future maritime Inmarsat-C terminals do not scan automatically but only do so after intervention by the terminal operator. Since these changes will not necessarily affect existing terminals, Inmarsat was requested to advise operators of terminals currently at sea of the effects of automatic scanning and means of alleviating the problem. Inmarsat was also requested to bring these difficulties to the attention of Inmarsat-C terminal manufacturers with a recommendation that suppression of automatic scanning be included in future software upgrades for existing maritime terminals where possible.

5 Member Governments and interested organizations are requested to note the above information and bring it to the attention of their Registered Information Providers.

Annex 7-4
PROPER USE OF LANYARDS ATTACHED TO SATELLITE EPIRBs
[MSC/Circ.660 (12.01.95)]

1 The Maritime Safety Committee, at its sixty-fourth session (5 to 9 December 1994), noted that there have been cases of lanyards attached to satellite EPIRBs by securing them to the ship. The buoyant lanyard is only to be used by survivors for securing the EPRIB to a liferaft, lifeboat or person in the water.

2 The Committee recommended that appropriate attention should be given by the responsible authorities to prevent improper use of lanyards attached to satellite EPIRBs.

3 Member Governments are invited to bring the above recommendation to the attention of seafarers, ship-owners and all others involved with installing and maintenance of satellite EPIRBs.

Annex 7-5
IMPLEMENTATION OF THE GLOBAL MARITIME DISTRESS AND SAFETY SYSTEM (GMDSS) ON BOARD ALL SHIPS [MSC/Circ.682 (22.05.95)]

1 The Maritime Safety Committee, at its sixty-fifth session (9 to 17 May 1995), considered the matter of implementation of the GMDSS on board all ships.

2 The Committee, noting that corresponding requirements of the 1993 Torremolinos Protocol will apply to existing fishing vessels on 1 February 1999 or the date of the entry into force of the Protocol, whichever occurs later, recognized that non-compliance of existing fishing vessels and non-SOLAS ships with the relevant GMDSS requirements would create, in terms of safety, an undesirable difference between such ships on one hand and new fishing vessels and SOLAS ships on the other.

3 The Committee urged all Governments to assist in enhancing the safety of all ships and their crew at sea by encouraging all ships not subject to the 1974 SOLAS Convention or the 1993 Torremolinos Protocol to the 1977 Safety of Fishing Vessels Convention to be fitted for the GMDSS as soon as possible.

Annex 7-6
PRESENT HOMING CAPABILITY OF SATELLITE EPIRBs
[MSC/Circ.683 (22.05.95)]

1 The Maritime Safety Committee, at its sixty-fifth session (9 to 17 May 1995), noting that satellite EPIRBs operate either through the Inmarsat or COSPAS/SARSAT systems, recalled that Inmarsat L-Band EPIRBs use the GPS-NAVSTAR system or may use a search and rescue transponder (SART) to provide a locating function and that COSPAS–SARSAT 406 MHz satellite EPIRBs use 121.5 MHz homing signals for this purpose. Both types of satellite EPIRBs are intended to operate in conjunction with the ships' SARTs to supplement the locating function they provide.

2 The Committee also recalled that ships' radar can detect SARTs, but ships do not normally have the capability of homing on the frequency 121.5 MHz, whereas many SAR aircraft cannot home on SARTs but can home on 121.5 MHz transmissions.

3 Taking into account the above, the Committee recommended that Governments should make their shipping community aware that in remote areas (areas with low shipping density) where aircraft may be the only available or capable SAR units, in the event of a distress alert being received by a SAR authority via an Inmarsat L-Band EPRIB, the detection of survivors may be delayed. Ships operating in such remote areas should therefore be encouraged to carry, in addition to the equipment required for the GMDSS, means for transmitting location signals on the frequency 121.5 MHz.

Annex 7-7
IMPLEMENTATION OF THE GLOBAL MARITIME DISTRESS AND SAFETY SYSTEM (GMDSS) [MSC/Circ.748 (13.06.96)]

Introduction

1 The Sub-Committee on Radiocommunications, at its fortieth session (16 to 20 January 1995), noted that investigations had shown that only a minor proportion of ships had converted to the GMDSS. In response, the Sub-Committee issued COM/Circ.121 which invited Administrations "to strongly recommend to their shipowners and ship operators to take early action to ensure that equipment meeting GMDSS carriage requirements is fitted on their ships well in advance of 1 February 1999".

2 The Sub-Committee on Radiocommunications and Search and Rescue (COMSAR), at its first session (19 to 23 February 1996), noted that the situation had not improved and that only a small percentage of the world's fleet had converted to the GMDSS.

3 The Sub-Committee also noted that manufacturers continue to advise that they will be unable to meet a large surge in demand in 1998 and that early conversion to the GMDSS should be sought.

Phased installation of the GMDSS

4 The Sub-Committee has been advised that in order to assist shipowners and ship operators, some Administrations have developed schemes whereby shipowners and ship operators can adopt a phased programme for the installation of GMDSS equipment. The equipment will be installed and commissioned, but will then be immobilized until the ship is ready to change to the new system.

5 These schemes allow shipowners and ship operators to arrange installation work to coincide with a ship's scheduled stay in port, at the same time spreading the financial burden of equipment purchase, and allowing the manufacturers to spread their manufacturing load over a reasonable period.

6 The GMDSS equipment will not be subject to survey during the period that the ship continues to operate under the old distress system. During this phased installation period, the operation of the ship station must be in accordance with non-GMDSS requirements and not be operationally impaired in any way by the new equipment.

7 During the conversion process, Administrations are advised to issue to the ship documentation explaining the status of the radio installation and the type of certificates carried by the ship and the radio operators

GMDSS radio operator training

8 Shipowners and ship operators are reminded that in accordance with SOLAS regulation IV/16, every ship shall carry personnel qualified for distress and safety radiocommunication purposes to the satisfaction of the Administration. These personnel shall be holders of certificates specified in the Radio Regulations as appropriate, any one of whom shall be designated to have primary responsibility for radiocommunications during distress incidents.

9 Administrations are also reminded that resolution A.769(18) provides procedures and arrangements for issuing GMDSS certificates to holders of non-GMDSS certificates by "limited GMDSS examination". In order to encourage a timely conversion of existing non-GMDSS certificates, it should be borne in mind that the arrangements for "limited GMDSS examination" should cease on 1 February 1997. After this date all candidates should be required to pass the full GMDSS examination.

10 New entrants, or those not wishing to do the "limited GMDSS examination", should be required to pass a full GMDSS General Operator's Certificate (GOC) examination. Purpose-designed training courses which incorporate at least the content identified in the IMO GOC model training course should be made available to prepare the candidate for the GOC examination.

11 A significant problem experienced thus far with the implementation of the GMDSS has been the extremely high occurrence of false distress alerts, with the majority of these false alerts attributed to operator incompetence. The lack of adequate mandatory training could be the primary cause of this problem. The STCW Convention was revised in 1995 to increase the minimum standards of competence for the GMDSS GOC and it is extremely important that Administrations implement at least these standards as soon as possible in their examinations for the GOC.

Conclusions

12 Therefore, the Maritime Safety Committee, in considering the above matters at its sixty-sixth session (28 May to 6 June 1996), recognized that:

.1 there is a need to urgently install GMDSS equipment on ships and to train sufficient radio personnel as GMDSS operators;

.2 shipowners and ship operators should be made aware that Administrations will not grant exemptions from the carriage of GMDSS equipment, other than those provided for under regulation 3 of SOLAS chapter IV, after 1 February 1999; and

.3 if ships have not installed GMDSS equipment and do not have a Passenger Ship Safety Certificate and a Form P or a Cargo Ship Safety Radio Certificate and a Form R valid for the GMDSS or appropriately certificated radio personnel after 1 February 1999, then such ships could experience considerable delay awaiting the supply of GMDSS equipment and the inability to trade because of non-compliance with the SOLAS or STCW Conventions, or both.

13 Member Governments are invited to bring this circular to the attention of all concerned for information and action, as appropriate.

Annex 7-8
PARTICIPATION OF NON-SOLAS SHIPS IN THE GLOBAL MARITIME DISTRESS AND SAFETY SYSTEM (GMDSS) [MSC/Circ.803 (09.06.97)]

1 In the context of MSC/Circ.682 on Implementation of the Global Maritime Distress and Safety System (GMDSS) on board all ships, the Maritime Safety Committee, at its sixty-eighth session (28 May to 6 June 1997), approved:

.1 Guidelines for the Participation of Non-SOLAS Ships in the GMDSS, given in annex 1; and

.2 Guidance on the Development of Training Materials for GMDSS Operators on Non-SOLAS Ships, given in annex 2.

2 The Guidelines are intended to assist Administrations which may wish to develop national measures aimed at providing a link between the GMDSS and ships to which chapter IV of the 1974 SOLAS Convention, as amended in 1988, and chapter IV of the 1978 STCW Convention, as amended in 1995, do not apply (herein referred to as "non-SOLAS ships").

3 Member Governments are invited to apply the Guidelines, given in annex 1, to non-SOLAS ships in so far as they deem them reasonable and practicable.

4 Member Governments are also invited to take into consideration the Guidance, given in annex 2, for developing training materials for GMDSS operators on non-SOLAS ships.

Annex 1

GUIDELINES FOR THE PARTICIPATION OF NON-SOLAS SHIPS IN THE GMDSS

1 It should be noted that until the full implementation of the GMDSS on 1 February 1999, SOLAS ships should:

– maintain a continuous watch on the radiotelephone distress frequencies 2,182 kHz and 156.8 MHz; and

– maintain a capability to transmit the radiotelephone alarm signal on 2,182 kHz.

2 The following functional requirements of the GMDSS are considered appropriate to allow effective participation of non-SOLAS ships in the GMDSS with respect to distress and safety communications:

.1 to provide safety for own ship:

.1.1 performing ship-to-shore distress alerting;

.1.2 transmitting ship-to-ship distress alerting;

.1.3 transmitting and receiving on-scene communications including appropriate SAR co-ordinating communications; and

.1.4 transmitting locating signals;

.2 to assist other ships in distress:

.2.1 receiving shore-to-ship distress alerting; and

.2.2 receiving ship-to-ship distress alerting.

3 If a non-SOLAS ship carries voluntarily, for its own particular reasons, DSC equipment with a radiotelephone capability operating on GMDSS frequencies or an Inmarsat ship earth station (SES), such equipment can be utilized to perform most of the functions described above.

4 The use of cellular telephones is not recommended as an alternative to marine radiotelephones for distress and safety communications. Cellular telephones do not have an all-stations capability to establish communications with nearby ships. Also, RCCs will be unable to call ships in the vicinity of a casualty. Furthermore, coverage limitations could well lead to a breakdown in communications in a distress situation.

5 It is recommended that non-SOLAS ships operating in high sea areas should carry a satellite EPIRB which could be free-floating or manually activated.

6 It is further recommended that non-SOLAS ships should carry equipment for general radiotelephone communications operating in radio systems appropriate to their areas of operation.*

7 In performing the functional requirement of transmitting locating signals, note should be taken that the 9 GHz SAR radar transponder will be the main means to fulfill this requirement in the GMDSS.

8 Provision should be made for the reception of navigational warnings and meteorological forecasts and warnings and urgent safety information, depending on the sea area in which the ship is sailing* and the services available in that area, e.g. NAVTEX, SafetyNET and radiotelephony broadcasts.

9 Ship Identities (MMSI, Call Sign, Serial Number, etc.) for non-SOLAS ships should be reported to the ITU, if appropriate, and maintained in a registration database available on a 24-hour basis.

Annex 2

GUIDANCE ON THE DEVELOPMENT OF TRAINING MATERIALS FOR GMDSS OPERATORS ON NON-SOLAS SHIPS

1 The following guidance for the development of training materials for GMDSS operations is offered to:

.1 promote the development and availability of training materials for operators on ships not subject to SOLAS or other IMO Conventions using the GMDSS;

.2 encourage operators to use these materials to become familiar with the GMDSS, proper operation of the relevant sub-systems and means to avoid inadvertent activation of distress alerts; and

.3 encourage the use of existing materials developed for training operators aboard GMDSS ships as well as computer-based training aids where available.

Manufacturers

2 In general, the manufacturer of radio equipment is best suited to develop effective general operating instructions for its own equipment. These are usually contained in an operating manual or technical manual packaged with the equipment. Professional communicators using this equipment for the first time need only a few hints to attain skill in using the new equipment; however, other users may need to study the manual carefully and still may not attain skill until having practised with the equipment, or having been shown how to operate the radio by another mariner who has experience with that equipment. Manufacturers should ensure that manuals prepared for GMDSS sub-system equipment have sufficient information to permit non-professional communication users to be able to operate the equipment effectively and to avoid inadvertent activation of distress alerts.

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* *Sea area A1* – an area within the radiotelephone coverage of at least one VHF coast station in which continuous digital selective calling (DSC) alerting is available, as may be defined by a Contracting Government;

Sea area A2 – an area, excluding sea area A1, within the radiotelephone coverage of at least one MF coast station in which continuous DSC alerting is available, as may be defined by a Contracting Government;

Sea area A3 – an area, excluding sea areas A1 and A2, within the coverage of an Inmarsat geostationary satellite in which continuous alerting is available; and

Sea area A4 – an area outside sea areas A1, A2 and A3.

Sales and service facilities

3 Manufacturer's representatives should, as necessary, help to provide the user with basic instruction. One way is to have the customer view a video showing proper operation of the equipment which should be developed by the manufacturer. Another is to have a mock-up or actual installation available for the customer to use with supervision. Both of these could give the potential GMDSS user sufficient familiarity and confidence with using the equipment to avoid misuse.

Voluntary organizations

4 Sailing clubs, coastguard auxiliary and other maritime volunteer organizations in co-operation with competent authorities should develop seminars on the GMDSS sub-systems as part of regularly scheduled events. These should highlight the general concepts of the GMDSS and the importance to maritime safety of proper operation. They could also highlight examples of misuses and focus on do's and don'ts for ensuring their safety while at sea.

Regulatory authorities

5 Authorities responsible for maritime safety, search and rescue and licensing of the GMDSS radio sub-systems should strongly advocate the following measures in order to preserve the integrity of the GMDSS and enhance its effectiveness in meeting the safety needs of non-Convention ships:

.1 promote the development of short, affordable and easy to understand training materials, including videos, posters, short manuals and information on detailed GMDSS training materials;

.2 ensure, in so far as possible, that every operator of the GMDSS sub-systems has adequate training and skills for the proper use of the equipment by advocating suitable training, including competency testing, prior to use of the equipment;

.3 advocate that continuous watch be maintained on the GMDSS sub-systems while under way; and

.4 advocate that two-way GMDSS sub-systems capable of transmitting an automatic alert including position ensure that the position is current by using an integral or connected electronic position-fixing equipment or manually updating the position at frequent intervals.

Equipment applicable to non-SOLAS ships and pleasure craft on domestic coastal voyages

Satellite EPIRBs

6 A minimal description of what happens when this device is activated should be covered as well as some common failures which have been noted, e.g., improper use of lanyards, etc. Training should include proper installation for floating free (in cases where non-float-free units are installed, it must be pointed out that accessibility and ease of removal are critical) and measures to avoid false alerts. It should also emphasize that the EPIRB is the system of last resort and should only be activated when all other systems fail. Testing procedures should be covered and finally, the importance of registering the beacon should be emphasized. Two possible systems are approved for use in the GMDSS, the COSPAS–SARSAT polar-orbiting satellite system operating on 406 MHz and the Inmarsat-E geostationary satellite system operating in L-band. The features of each system should be covered even if a vessel only has one of the systems.

VHF-DSC

7 Correct calling procedures to nearby vessels, shore stations for public correspondence, and to coast guard or other rescue authorities should be explained. Cautions should be explained and correct procedures emphasized relating to acknowledgement of alerts from other ships. The importance should also be emphasized of having the vessel's identification registered with the responsible authorities and having its navigation equipment (if available) interfaced to the DSC so that an accurate position is part of any distress or safety call. Administrations should consider requiring a minimum DSC capability for all VHF radios as part of their type approval and type acceptance requirements. As DSC shore installations are sparse in most of the world, this system has not been widely implemented by non-Convention ships. However, this is one of the vital systems for ship-to-ship alerting. Therefore, since many ships will either need to call another ship or be called to assist another ship, it is critical that

they be familiar with the use of this system. Topics to cover should be basic operation of the VHF radio and how DSC acts as an automated watch. The importance of maintaining the watch (keeping the radio on and tuned to channel 70) should be emphasized.

NAVTEX

8 This system is designed to provide marine safety broadcasts and distress information relevant to a limited area, generally less than 300 NM from the NAVTEX coast station. Messages are numbered and repeated for several subsequent broadcast periods. Stations maintain a co-ordinated broadcast schedule and broadcast priority information such as distress information on an urgent basis. The receiver will ignore repetitions of broadcasts which it has already copied. The receiver is also designed to sound an alarm upon receipt of an urgent transmission. This is perhaps the most useful and affordable of all the GMDSS sub-systems to non-SOLAS ships. Users must be taught how to avoid receiving duplications of old messages, how to limit the area of concern and the importance of keeping the receiver turned on. They must be familiar with basic information on how the system works, its intended function and proper operation to take maximum advantage of this system.

Equipment applicable to non-SOLAS ships and pleasure craft operating on deep sea voyages

Inmarsat or other satellite ship earth station

9 Many non-SOLAS ships are voluntarily fitting terminals of Inmarsat-C and -M systems. In some areas alternative mobile-satellite systems are offering services to non-Convention ships using the GMDSS frequencies, although on a limited and restricted basis. Users of these systems must know how best to use them for effective and efficient communication, including during distress incidents. As a minimum, users should know how GMDSS services are provided to meet marine safety information dissemination requirements, distress alerting and communication in the ship-to-shore and shore-to-ship directions. Many small commercial vessels and, to a greater extent, pleasure yachts are fitting satellite communication equipment including Inmarsat-C and -M systems. Users of this equipment should understand the limitations of its use for distress and safety and be encouraged to follow up any distress alert message with additional information, particularly information concerning the severity of the situation, best known location, number of persons on board, visual description and shore contact person. Vessels fitting Inmarsat-C with EGC can receive SafetyNET broadcasts and limit the receipt of this type of information to relevant sea areas of immediate concern.

Other Inmarsat systems: Inmarsat-A and -B

10 Users of Inmarsat-A and -B systems need only a minimum of training and practice to become proficient as these two systems are nearly equivalent to the shore-side public telephone systems. After initial log-on, the user simply dials a telephone number. In distress situations, a priority mode is available which rings through directly to the rescue authority associated with the coast earth station. When the call is answered, a voice communication is established. Topics to cover are the basic operation, distress alerting and communication procedures and cautions against inadvertent activation of the priority mode to prevent false alerts.

HF and MF DSC

11 Most small commercial and pleasure craft will probably not need these systems except in rare cases. Nonetheless, some basic operational instructions should be available, including how these are to be used for distress alerting (ship-to-shore), establishing a voice or NBDP circuit, and receiving notifications of distress situations in their immediate vicinity. The frequencies for distress alerting, distress voice traffic and NBDP traffic should be covered as well as the necessity to guard the distress alerting channel in the 8 MHz band.

Annex 7-9
CLARIFICATIONS OF CERTAIN REQUIREMENTS IN IMO PERFORMANCE STANDARDS FOR GMDSS EQUIPMENT [MSC/Circ.862 (22.05.98)]

1 The Maritime Safety Committee, at its sixty-ninth session (11 to 20 May 1998), approved the following clarifications of certain requirements in IMO performance standards for GMDSS equipment, developed by the Sub-Committee on Radiocommunications and Search and Rescue (COMSAR), at its third session (23 to 27 February 1998), with a view to reducing the number of false distress alerts. The Committee was of the opinion that such clarifications would assist Member Governments in deciding whether equipment installed on or after 1 February 1999 meets these requirements.

.1 "Dedicated distress button"

This button should not be any key of an ITU-T input panel or an ISO keyboard associated with the equipment and should be physically separated from functional buttons/keys used for normal operation. This button should be a single button for no other purpose than to initiate a distress alert.

.2 "Clearly identified"

The distress button should be red in colour and marked "DISTRESS". Where a non-transparent protective lid or cover is used, it should also be marked "DISTRESS".

.3 "Protected against inadvertent activation"

The required protection of the distress button should consist of a spring-loaded lid or cover permanently attached to the equipment by, e.g., hinges. It should not be necessary for the user to remove additional seals or to break the lid or cover in order to operate the distress button.

The operation of the distress button should generate a visible and audible indication. The distress button should be kept pressed for at least 3 seconds. A flashing light and an intermittent accoustic signal should start immediately. After the 3 seconds, the transmission of the distress alert is initiated and the indication should become steady.

.4 "At least two independent actions"

Lifting of the protective lid or cover is considered as the first action. Pressing the distress button as specified above is considered as the second independent action.

.5 "Interrupting the distress alert at any time"

It should be possible to interrupt repetitive transmissions of distress messages. Such operation should not interrupt the transmission of a distress alert or distress message in progress but should prevent repetitive transmissions of a distress message.

2 Member Governments are invited to bring the above clarifications to the attention of radio equipment manufacturers, shipowners, seafarers and all others concerned.

Annex 7-10
RECOMMENDATION ON PREVENTION OF HARMFUL INTERFERENCE TO 406 MHz EPIRBs OPERATING WITH THE COSPAS–SARSAT SYSTEM [MSC/Circ.863 (22.05.98)]

1 The Maritime Safety Committee, at its sixty-ninth session (11 to 20 May 1998), being concerned with the harmful interference to 406 MHz EPIRBs operating with the COSPAS–SARSAT system, noted the information provided by COSPAS–SARSAT on the 406 MHz interference sources. Accordingly, the Committee approved the following recommendations which would assist Member Governments to prevent harmful interference to 406 MHz EPIRBs.

2 The COSPAS–SARSAT search and rescue satellite system is a multi-national system using low earth orbiting and geostationary satellites and ground receiving stations to locate 406 MHz emergency position indicating radio beacons (EPIRBs) activated in distress situations. The system has contributed to saving over 7,000 lives since it became operational in 1982.

3 The 406 MHz EPIRBs are very important parts of international search and rescue. They are mandatorily carried on ships under the International Convention for the Safety of Life at Sea (SOLAS) as part of the global maritime distress and safety system. Additionally, carriage of EPIRBs on small vessels is mandated by various national Administrations. The life-saving mission of these beacons must not be interfered with.

4 Transmissions from ground-based emitters cause harmful interference to distress signals from 406 MHz satellite EPIRBs. A major cause of harmful interference is due to unwanted emissions from radars and other wide-band transmitters operating within 30 MHz of the 406–406.1 MHz allocated bandwidth for satellite EPIRBs.

5 ITU regulations prohibit interference in the 406 to 406.1 MHz band; however, the maximum permitted emission limits for the bands within 30 MHz of the 406 MHz distress band are not adequately defined to comply with the harmful interference limits described in ITU Recommendation SM.1051.

6 Member Governments are invited to bring the problem described above to the attention of their radio spectrum management authorities and request them to assure that new equipment designs will not interfere with the COSPAS–SARSAT system; and also to notify owners of existing equipment operating within 30 MHz of 406 MHz of the potential for interfering with the COSPAS–SARSAT system.

Annex 7-11
GUIDELINES ON ANNUAL TESTING OF 406 MHz SATELLITE EPIRBs [MSC/Circ.882 (14.12.98)]

1 The Maritime Safety Committee, at its seventieth session (7 to 11 December 1998), approved the following guidelines on annual testing of 406 MHz satellite EPIRBs on board ships, as required by new SOLAS regulation IV/15.9.

2 The testing should be carried out using suitable test equipment capable of performing all the relevant measurements required in these guidelines.

3 The examination of the installed 406 MHz satellite EPIRB should include:

.1 checking position and mounting for float-free operation;

.2 carrying out visual inspection for defects;

.3 carrying out the self-test routine;

.4 checking that the EPIRB identification (ID) is clearly marked on the outside of the equipment and decoding the EPIRB identity number and other information from the transmitted signal;

.5 checking the battery expiry date;

.6 if provided, checking the hydrostatic release and its expiry date;

.7 checking the frequency of the 406 MHz signal without transmission of a distress call to the satellites;

.8 if possible, checking frequency of the 121.5 MHz homing signal without activating the satellite system;

.9 checking that the EPIRB has been maintained by an approved testing or servicing station; and

.10 after the test, remounting the EPIRB in its bracket, checking that no transmission has been started.

4 Member Governments are invited to bring these guidelines to the attention of shipping companies, shipowners, ship operators, equipment manufacturers, classification societies, shipmasters and all other parties concerned.

Annex 7-12
MARITIME SAFETY AND INMARSAT SHIP EARTH STATION BARRING PROCEDURES
[MSC/Circ.883 (14.12.98)]

1 The Sub-Committee on Radiocommunications and Search and Rescue (COMSAR) at its first, second and third sessions (1996 to 1998) considered issues relating to the use of satellite services as an integral part of ship communications and, in particular, in the context of the impending implementation date of 1 February 1999 for the global maritime distress and safety system (GMDSS), as mandated by SOLAS chapter IV.

2 During this period, the Organization was informed by Inmarsat of the increasing number of Inmarsat Ship Earth Station (SES) owners who have failed their obligation to pay for services provided in respect of chargeable communications emanating from SESs.

3 The Organization was also informed by Inmarsat that respective terminals may be barred from using the applicable satellite services provided by Inmarsat and of the special arrangements that have been put in place to minimize disruption to safety-related communications from any SES concerned.

4 The Maritime Safety Committee, at its sixty-ninth session (11–20 May 1998), being informed by the COMSAR Sub-Committee that Inmarsat SESs, which serve as the main GMDSS equipment, may be barred from using all Inmarsat communication services, including those related to the GMDSS, with the exception of distress priority communications, under such circumstances, expressed serious concern for the safety of such a ship if it were to sail whilst the terminal is barred.

5 The Committee, at its seventieth session (7–11 December 1998), noting that information on barred terminals may be made available by Inmarsat to appropriate national authorities, invited Member Governments to encourage national authorities to confirm the operational status of Inmarsat terminals appearing on a relevant safety certificate when undertaking inspections, as appropriate.

6 Member Governments are also invited to take all necessary actions to ensure that any such ship will be prevented from sailing if its seaworthiness is affected, particularly with regard to non-compliance with SOLAS chapter IV, by the non-availability of the satellite terminal(s) necessary for it to perform the required communication services.

Annex 7-13
GUIDELINES FOR THE ON-BOARD USE AND APPLICATION OF COMPUTERS [MSC/Circ.891 (21.12.98)]

1 The Maritime Safety Committee, at its seventieth session (7 to 11 December 1998), approved the Guidelines for the On-board Use and Application of Computers given in the annex. Also, the Committee, at its sixty-ninth session (11 to 20 May 1998), approved MSC/Circ.854 on Guidelines for shipboard loading and stability computer programs and instructed the Secretariat to annex them to the aforementioned Guidelines for the on-board use and application of computers, once approved. The former have, therefore, been attached to the latter and are set out in the appendix to the annex.

2 The advent of inexpensive personal computers has resulted in rapidly-growing usage aboard merchant marine vessels for many shipboard applications, including cargo loading and trim and stability calculations. To the extent that these programs rely upon human input of data and interpretation of output, they are potentially vulnerable to human factor errors. Although such errors will most likely emerge in the user, such as shipboard officers, the actual roots of the errors might be found in other shoreside sectors; software developers who might not anticipate human factor needs, or shipping company management.

3 Requirements as to the performance of such software will depend on the person/organization involved as follows:

.1 *For users (ship officers)*: greater consistency among programs from different vendors, which will make familiarization and proficiency easier and faster to achieve;

.2 *For ship owners/operators*: availability of well-conceived software products that include appropriate materials for training and also documentation for revising program or data when necessary, for instance to reflect any changes in the ship's weight and moment characteristics;

.3 *For software developers*: the benefit of a broader experience base than just their own corporate experience, and a consistent uniform standard reflecting customer expectations; and

.4 *For Administrations*: assurance that sophisticated programs are developed and introduced into service and that they will reflect human factor considerations and minimize chances for human error.

4 These Guidelines for the on-board use and application of computers have been developed to provide an international standard for the design, approval and testing of such systems and should be construed as supplementary to the relevant regulations of the SOLAS Convention. However, it should be noted that certain applications of computers are defined in Performance Standards adopted by the Organization which take precedence over these Guidelines.

5 Taking into account that the number and types of computer-based systems available for on-board use is strongly increasing, that such systems are under fast development and the fact that they have considerable effect on the safety at sea, the international harmonization should be beneficial to manufacturers, ship builders, ship owners and ship operators, maritime Administrations and organizations acting on their behalf, seafarers, passengers and other users of marine services.

6 The Guidelines are not intended to prohibit the use of any existing computer-based systems on board existing ships if such systems do not fully comply with these Guidelines. Many existing ships have operated their computer-based systems successfully and safely for a long period of time, and their operating history should be considered in evaluating their suitability to continue contributing to their safe operation.

7 For existing systems, the Guidelines should be made applicable to a reasonable extent when major modifications are carried out.

8 Where these Guidelines refer to the Administration, this is the flag State Administration or a recognized organization authorized to act on its behalf in accordance with SOLAS regulation XI/1.

9 Member Governments, CIRM, IEC, IACS, ICS and all other interested parties are requested to bring the attached Guidelines to the attention of all concerned.

Annex

GUIDELINES FOR THE ON-BOARD USE AND APPLICATION OF COMPUTERS

1 Scope

1.1 These Guidelines are applicable where computer-based systems are used to perform essential functions, such as:

(a) – propulsion, steering and manoeuvring
– navigation and communication
– cargo loading, discharging and control
– safety of passengers and crew (e.g. fire safety systems and general alarm); and

(b) essential calculations, such as ship's stability and loading.

1.2 The Guidelines are not applicable to equipment or systems for which relevant specific Performance Standards of the Organization exist.

1.3 The Guidelines should also be applied to non-essential functions where loss of control could result in serious damage to the ship or its machinery, or serious injury to personnel, e.g. explosion of domestic water boilers.

2 Definitions

In addition to the definitions in the SOLAS Convention, the following are necessary for these guidelines:

2.1 *Computer:* A programmable electronic device for storing and processing data, making calculations, or performing control.

Notes:

1. For the purposes of this document the term ''computer'' means a ''digital computer''.
2. A computer may consist of a stand-alone unit or may consist of several interconnected units and includes any programmable electronic system (PES), including main-frame, mini-computer or micro-computer.

2.2 *Computer-based system:* A system of one or more computers, associated software, peripherals and interfaces.

2.3 *Integrated system:* A combination of computer-based systems which are interconnected in order to allow centralised access to sensor information and/or command/control.

Notes:

Integrated systems may, for example, perform one or more of the following operations:
– passage execution (e.g. steering, speed control, traffic surveillance, voyage planning);
– communications (e.g. radiotelephone, radiotelex, GMDSS);
– machinery (e.g. power management, machinery monitoring, fuel oil/lubrication oil transfer);
– cargo (e.g. cargo monitoring, inert gas generation, loading/discharging);
– safety and security (e.g. fire detection, fire pump control, watertight doors).

2.4 *Interface:* A transfer point at which information is exchanged.

Note:

Examples of interfaces include:
– Input/output interface (used for interconnection with sensors and actuators);
– Man/machine interface (e.g. visual display units, keyboards, tracker-balls, and dedicated controls and instruments used for communication between the operator and the computer);

– Communications interface (used to enable serial communications/networking with other computers or peripherals).

2.5 *Node:* A point of interconnection to a data communication link.

2.6 *Peripheral:* A device performing an auxiliary action in the system, e.g. printer, data storage device.

2.7 *Software:* Programs, data and documentation associated with the operation of a computer-based system.

3 General requirements

3.1 General

3.1.1 Computer-based systems should fulfill the functional requirements of the system under control for all operating conditions, including emergency conditions, taking into account:

– Danger to persons

– Environmental impact

– Damage to equipment

– Usability

– Operability of non-computer devices and systems, etc.

3.1.2 If process times for functions of the system are shorter than the reaction times of the operator and therefore damage cannot be prevented by manual intervention, means of automatic intervention should be provided.

3.1.3 A computer-based system should have sufficient capability to:

– perform necessary autonomous operations,

– accept user commands,

– inform the user correctly,

under all operating conditions including emergency.

3.1.4 System capability should provide adequate response times for all functions, taking into consideration the maximum load and maximum number of simultaneous tasks, including network communication speed, under normal and abnormal process conditions.

3.1.5 Computer-based systems should be designed in such a way that they can be used without special previous knowledge, otherwise appropriate assistance should be provided for the user, as specified in section 6 – Training.

3.1.6 Computer-based systems should be protected against unintentional or unauthorized modification of programs and data.

3.2 Hardware

3.2.1 Hardware should be suitably designed to withstand supply voltage variations and transients, ambient temperature changes, vibration, humidity, electromagnetic interference and corrosion normally encountered in ships.

3.2.2 The design of the hardware should ensure ease of access to interchangeable parts for repairs and maintenance.

3.2.3 Each replaceable part should be simple to replace and should be constructed for easy and safe handling. All replaceable parts should be so arranged that it is not possible to connect them incorrectly or to use incorrect replacements. Where this is not practicable, the replaceable parts, including their means of electrical connection, should be clearly marked.

3.3 Software

3.3.1 Systematic procedures should be followed during all phases of the software life cycle (development, installation and subsequent modification).

3.3.2 System tests should be specified, performed and documented. These tests should include all software functions and important combinations of functions, performance, dependability and usability requirements under all modes of operation, including emergency conditions, and behaviour under failure conditions.

3.3.3 Modifications of program contents and data, as well as a change of version, should be documented.

Note: ISO 9000-3 gives guidelines for the application of ISO 9001 to the development, supply and maintenance of software.

4 System configuration

4.1 General

4.1.1 The hardware and software should be of a modular, hierarchical design in order to maximise the fault tolerance of the system.

4.1.2 The selection of the computer equipment should be consistent with safe operation of the system under control.

4.2 Self-test

4.2.1 Computer-based systems should be monitored for correct operation and an alarm should be given for an abnormal condition.

4.3 Power supply

4.3.1 The power supply should be monitored for failure and should give an alarm in the event of an abnormal condition.

4.3.2 Program and data held in the system should be protected from corruption by loss of power.

4.3.3 Redundant systems should be selectively fed and separately protected against short circuits and overloads.

4.4 Installation

4.4.1 Equipment and its associated cabling should be installed in accordance with an appropriate code of practice to minimize electromagnetic interference between the equipment concerned and other equipment on board.

4.5 Cables

4.5.1 Cables used for data communication should be of adequate mechanical strength, suitably supported and also protected from mechanical damage.

4.6 Data communication

4.6.1 The data communication link should be continuously self-checking, for detecting failures on the link itself and data communication failure on nodes, and should give an alarm in the event of an abnormal condition.

4.6.2 When the same data communication link is used for two or more essential functions, this link should be redundant. Redundant data communication links should be routed with as much separation as practical.

4.6.3 Switching between redundant links should not disturb data communication or continuous operation of functions.

4.6.4 To ensure that data can be exchanged between various systems, standardized interfaces should be used.

4.7 Failure to safety

4.7.1 In the event of a failure of a computer-based system, that system should automatically revert to the least hazardous condition.

4.7.2 The failure and restarting of computer-based systems should not cause processes to enter undefined or critical states.

4.7.3 Control, alarm and safety functions should be arranged such that a single failure will not affect more than one of these functions.

4.8 Integration of systems

4.8.1 Operation with an integrated system should be at least as effective as it would be with individual, stand-alone equipment. Where multifunction displays and controls are used, they should be duplicated and interchangeable.

4.8.2 Failure of one part (individual module, equipment or subsystem) of the integrated system should not affect the functionality of other parts, except for those functions directly dependent upon information from the defective part.

4.8.3 A complete failure in connectivity between parts should not affect their independent functionality.

4.8.4 An alternative means of operation, independent of the integration, should be available for all essential functions.

4.8.5 When systems under control are required to be duplicated and in separate compartments, this should also be applied to computer-based systems.

5 User interface

5.1 General

5.1.1 Computer-based systems should be designed for ease of handling and user-friendliness and should follow ergonomic principles.

5.1.2 The operational status of a computer-based system should be easily recognizable.

5.1.3 A user guide should be provided. This user guide should describe, for example:

- function keys
- menu displays
- computer-guided dialogue steps, etc.

5.1.4 An alarm should be displayed at relevant operator stations for failure or shutdown of a subsystem.

5.2 Input devices

5.2.1 Input devices should have clearly definable functions, be reliable in use and operate safely under all conditions. The acknowledgement of the instruction given should be recognizable.

5.2.2 Dedicated function keys should be provided for frequently recurring commands and for commands which must be available for rapid execution. If multiple functions are assigned to keys, it should be possible to recognize which of the assigned functions is active.

5.2.3 Control panels on the bridge should be provided with separate lighting. The level of lighting and the brightness of visual display units should be controllable.

5.2.4 Where equipment operations or functions may be changed via keyboards, appropriate measures should be employed so as to limit access of such operations to authorized personnel only.

5.2.5 If the operation of a key is able to cause dangerous operating conditions, measures should be taken to prevent the instruction in question from being executed by a single action, such as:

– use of a special key lock,

– use of two or more keys.

5.2.6 Conflicting control interventions should be prevented by means of interlocks or warnings. The active control status should be recognizable.

5.2.7 The operation of input devices should be logical and correspond to the direction of action of the controlled equipment.

5.3 Output devices

5.3.1 The size, colour and density of text and graphic information displayed on a visual display unit should be such that it may be easily read from the normal operator position under all operational lighting conditions. The brightness and contrast should be capable of being adjusted to the prevailing ambient conditions.

5.3.2 Information should be displayed in a logical priority.

5.3.3 If alarm messages are displayed on colour monitors, the distinctions in the alarm status should be ensured even in the event of failure of a primary colour.

5.4 Graphical user interface

5.4.1 Information should be presented clearly and intelligibly according to its functional significance and association. Screen contents should be logically structured and their representation should be restricted to the data which is directly relevant for the user.

5.4.2 When using general-purpose graphical user interfaces, only the functions necessary for the respective process should be available.

5.4.3 Alarms should be visually and audibly presented with priority over other information in every operating mode of the system; they should be clearly distinguishable from other information.

5.4.4 All display and control functions in control stations operated by the same operators should adopt a consistent user interface. Particular attention should be paid to:

– symbols;

– colours;

– controls;

– information priorities;

– layout.

6 Training

6.1 Training should be provided at a level required to effectively operate and maintain the system and should cover normal, abnormal and emergency conditions. The user interface for training should correspond with the real system.

6.2 Documentation should be provided to support the training and should be available for repeated use on board.

6.3 Where a training mode is incorporated in a computer-based system, it should be clearly indicated when the training mode is active.

6.4 Whilst in the training mode, the operation of the system should not be impaired, and neither should any system alarms or indications be inhibited.

7 Testing

7.1 Evidence should be furnished to the satisfaction of the Administration that the installed computer-based systems have been designed, manufactured and tested in accordance with these Guidelines.* In the case of any integrated systems, such evidence should be furnished by a single party responsible for the integration.

7.2 In addition to these Guidelines, manufacturers should ensure by means of a quality-control system that their products meet with their specifications.

7.3 Tests and inspections should be carried out with the aim of establishing the correct operation and the quality of a product (see also 3.3.2).

7.4 Modifications of program contents and data, as well as a change of version, should be tested (see also 3.3.3).

Appendix

GUIDELINES FOR SHIPBOARD LOADING AND STABILITY COMPUTER PROGRAMS

1 Scope

These guidelines may be applied where computer-based systems are used to perform functions such as:

- predicting draughts and trim and verifying that limiting stability parameters, such as "required GM_T", are met;
- tank instrumentation systems used to provide direct electronic input of liquid loads (cargo, fuel, ballast, etc.) into the computer, bypassing the human measurement and data-entry steps;
- operators of containerships may want to verify that over-the-bow bridge visibility requirements are met;
- operators of chemical parcel tankers may want to integrate chemical compatibility data to create voyage-specific/cargo-specific loading plans, thereby optimizing cargo flexibility;
- similarly, OBO operators may want a system which can accommodate multiple bulk cargoes of different densities and compute bending stresses with more precision;
- a program system could be used to monitor real-time hull bending stresses during loading/discharging operations, or due to sea conditions while under way via sensor systems that provide direct input to the computer; and
- calculating damage stability conditions, integrating loading data and flooded compartment characteristics.

2 General requirements

2.1 *Units:* Basic stability calculations are performed using weights, typically Ltons or Mtons. However, some cargoes are more commonly measured in short tons, TEUs, or barrels. Other liquid loads (fuel and ballast) might be initially measured as soundings or ullages. The program developer may wish to make its program more convenient for the user to enter data in these alternate units. If so, the program should minimize chances for unit confusion and, wherever possible, weight conversions should be calculated by the computer. Screen displays and print-outs should then present both the entered value and the computational weight value side-by-side.

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* Reference is also made to the following International Electrotechnical Commission (IEC) Publications:
92 – *Electrical Installation in Ships*
533 – *Electromagnetic compatibility of electrical and electronic installation in ships.*
945 – *Marine navigational equipment – General requirements – Methods of testing and required results.*

2.2 *Data and program protection:* Although the program should be flexible enough to allow the user to override default data, certain data, such as lightship characteristics, allowable bending stress, required GM, as well as the program itself, should be protected against user revision. This could be achieved by furnishing the ship with compiled or read-only versions.

2.3 *Back-up of data:* Copies of all constant data residing in computer files, such as ship geometry and tables, should be available on independent storage units, such as tape or floppy disks. The number of such copies should not be less than two.

3 User interface

3.1 *"Home" screen:* The program should have a simple command (keystroke/icon) that returns the user directly to a familiar "home" screen from any of the loading screens. This allows a "lost" user (who may have got disoriented among various loading screens) to quickly re-establish their orientation.

3.2 *"Help" functions*: The program should have easily-accessed "help" functions such as designated function keys, or an on-screen menu bar.

3.3 *Default loading:* A default loading condition should reflect any special loading or operating requirements imposed by the ship's stability booklet (such as locked-in ballast requirements).

3.4 *Input and output data screening*: The program should check data entered by the user for reasonableness in order to screen out possible input errors, for example, a cargo tank entry which exceeds the capacity of the tank. The program should not reject the entry as there may be special loading scenarios where unusual data must be entered, but it should clearly indicate to the user that the entry is out of expected bounds. Similarly, the program should alert the user if an output parameter such as "predicted GM" is out of expected bounds.

3.5 *Alerts:* The system should alert the user if an output indicates a critical, or possibly dangerous, situation. Alerts should, when possible, be augmented by audio signals. It is recommended that the graphical presentation and audio signals are different in case of critical events and user errors.

3.6 *Extra loading entry lines:* In most cases, load entries will be of the fixed-location type where LCGs, VCGs, etc., are pre-displayed and the user only needs to enter a weight value. However, the program should include several extra blank lines to allow additional non-fixed load entries where the user can enter VCG, LCG, TCG, etc. Examples of non-fixed load entries might be an unusual deck cargo, temporary ballast or damaged stability calculations (where a flooded compartment could be entered as if it were a tank).

3.7 *Print-outs:* Each loading condition print-out should automatically contain the name of the ship and the date of print-out; the user should be prompted to enter a title for the condition as well. This information should be repeated on each page of the print-out.

4 Training and documentation

4.1 *User training*: Training/tutorial material should be provided, as appropriate, for the sophistication of the program. This may range from formal classroom sessions to tutorial videotapes and/or self-study lesson plans.

4.2 *Documentation:* The software should be accompanied by a user's manual and a programmer's manual.

4.2.1 The user's manual should be written for the direct user (ship's officers) and should include the following elements:

.1 *Identification*: the manual should have a unique identification number that matches an on-screen ID number in the program. It should also clearly identify the stability booklet from which the lightship data is taken.

2 *System requirements:* identifies computer system hardware and software requirements such as compatible computers, operating system, memory requirements and other special requirements, such as video graphics, mouse, printer, etc.

.3 *File management:* a list of all relevant software files, giving name, size, date and a brief description of each. The manual should also explain how any user-generated files, such as saved loading conditions, are named. These measures should allow the user to review the disk directory and verify that the correct current files are present.

.4 *Instructions:* a clear explanation of how to install, use, and troubleshoot the program. The instructions should be user-friendly, recognizing that the user is a ship officer.

.5 *Information sources:* a list of all ship-specific plans, drawings, tables, other documents, etc., which provided information used in the program. In most cases, this information will probably come from the ship's approved stability booklet; however, other sources should be clearly identified. Ideally, all such information sources should themselves be annotated to the effect that they were used in developing the program (so that future revisions to the drawing will also prompt a review of the program).

4.2.2 *The programmer's manual* is not expected to be furnished to the ship; it is for use by select persons familiar with programming (but who may not necessarily be the original program writers) when it becomes necessary to revise the program as a consequence of changes to the ship. The programmer's manual should carefully document the program's workings, and include a flowchart and an annotated program listing. This manual should explain how to edit the program, especially to revise ship-specific data (lightship data, hydrostatic characteristics, weight and moment data, tank capacities, etc.).

4.3 *Program and documentation control:* A careful procedure should be established so that revisions to the program are properly tracked and forwarded to the ship. Each revision delivered to the ship should include change pages to the user's manual and instructions on how to delete obsolete files and install replacement (revised) files. The process should include an ''action complete'' report back to shoreside management.

5 Program functionality

A manner for independently verifying the program's functioning should be provided. Ideally, the opening screen (when the program is first brought up) should present a self-diagnostic report on program functioning. Alternatively, a range of sample loading conditions can be furnished (on paper) which can be manually entered into the program for comparison with correct draughts, trim and available GM. The sample conditions may be the same as found in the ship's approved stability booklet, or separate samples included in the program's user manual.

Annex 8
COM and COMSAR Circulars relevant to the GMDSS

Annex 8-1	–	COM/Circ.100 16.05.88	Use of frequency 4209.5 kHz for promulgation of maritime safety information (MSI)
Annex 8-2	–	COM/Circ.103 31.05.90	Design and installation guidelines for Inmarsat Standard-C ship earth stations and enhanced group call (EGC) receivers
Annex 8-3	–	COM/Circ.105 16.07.91 + Corr.1 21.08.92	Clarification of certain provisions of the 1988 SOLAS amendments for the GMDSS
Annex 8-4	–	COM/Circ.106 06.08.91	Testing of MF digital selective calling equipment installed for distress and safety by ships and coast stations
Annex 8-5	–	COM/Circ.108 23.01.92	GMDSS operating guidance for masters of ships in distress situations
Annex 8-6	–	COM/Circ.110 08.02.93 + Corr.1 16.03.93	Clarification of SOLAS regulations IV/6.1, IV/6.2.2 and IV/10.1.1.3
Annex 8-7	–	COM/Circ.112 10.02.93	Implementation of maritime safety information (MSI) broadcasts via SafetyNET in areas not covered by NAVTEX
Annex 8-8	–	COM/Circ.115 10.02.93	Discontinuation of Morse code services in the MF radiotelegraphy band
Annex 8-9	–	COM/Circ.116 11.01.94	Provision of GMDSS radio installations with position-updating facility
Annex 8-10	–	COM/Circ.117 10.01.94	Clarification of the application of certain provisions of chapter IV of the SOLAS Convention
Annex 8-11	–	COM/Circ.120 31.01.94	Notification of maritime mobile service identities (MMSIs) assigned to ships
Annex 8-12	–	COM/Circ.122 14.02.95	Selection of more than one fixed area in the Inmarsat-C system
Annex 8-13	–	COM/Circ.125 20.02.95	Recommendations on the use of batteries for two-way VHF radiotelephone apparatus
Annex 8-14	–	COM/Circ.128 22.05.95	Guidelines for use in evaluating regional mobile satellite systems
Annex 8-15	–	COMSAR/Circ.3 19.04.96	Relations between NAVAREA co-ordinators and rescue co-ordination centres
Annex 8-16	–	COMSAR/Circ.6 19.04.96	Recommendation on prevention of harmful interference on the 8, 12 and 16 MHz GMDSS distress and safety simplex frequencies
Annex 8-17	–	COMSAR/Circ.7 7.10.96	Importance of correct formatting of transmissions on NAVTEX system

Annex 8-18	–	COMSAR/Circ.9 12.03.97	Requirements for notification to the International Telecommunication Union (ITU) of GMDSS ships' identities, for inclusion in the Maritime Mobile Access and Retrieval System (MARS)
Annex 8-19	–	COMSAR/Circ.11 04.03.97 (amended)	List of coast earth station (CES) operation co-ordinators in Inmarsat system
Annex 8-20	–	COMSAR/Circ.13 06.03.98	Shore-to-ship communications during a distress
Annex 8-21	–	COMSAR/Circ.15 09.03.98	Joint IMO/IHO/WMO Manual on Maritime Safety Information (MSI)
Annex 8-22	–	COMSAR/Circ.16 04.03.98	Guidelines on the configuration of the reserve source or sources of energy used to supply radio installations on GMDSS ships
Annex 8-23	–	COMSAR/Circ.17 09.03.98	Recommendation on use of GMDSS equipment for non-safety communications
Annex 8-24	–	COMSAR/Circ.18 11.03.98	Guidance on minimum communication needs of maritime rescue co-ordination centres (MRCC)
Annex 8-25	–	COMSAR/Circ.19 11.05.99	Distress priority communications for RCC from shore to ship via Inmarsat
Annex 8-26	–	COMSAR/Circ.22 20.06.00	Guidance on data fields for SAR databases
Annex 8-27	–	COMSAR/Circ.23 20.06.00	Guidance for central alerting posts (CAPs)
Annex 8-28	–	COMSAR/Circ.24 10.01.01	List of NAVAREA co-ordinators
Annex 8-29	–	COMSAR/Circ.25 15.03.01	Procedure for responding to DSC distress alerts by ships

Annex 8-1
USE OF FREQUENCY 4209.5 kHz FOR PROMULGATION OF MARITIME SAFETY INFORMATION (MSI) [COM/Circ.100 (16.05.88)]

1 The World Administrative Radio Conference for the Mobile Services, 1987 (WARC Mob-87) has designated the frequency 4209.5 kHz for promulgation of MSI (meteorological and navigational warnings and urgent information to ships) by means of narrow-band direct-printing telegraphy (NBDP) in a predominantly ground-wave mode.

2 The Sub-Committee on Radiocommunications at its thirty-fourth session (COM 34/14, paragraph 5.2.8) decided that the operational co-ordination of NAVTEX type transmissions using NBDP techniques on 4209.5 kHz is likely to be required, and could be carried out most effectively, by the NAVTEX Co-ordinating Panel which has been established to perform this function for the frequency 518 kHz.

3 The Maritime Safety Committee at its fifty-fifth session (MSC 55/25, paragraph 3.1.2.17) noted the actions taken by WARC Mob-87 and Sub-Committee on Radiocommunications.

4 Member Governments are invited to inform the Organization of their intended use of frequency 4209.5 kHz for promulgation of MSI.

Annex 8-2
DESIGN AND INSTALLATION GUIDELINES FOR INMARSAT STANDARD-C SHIP EARTH STATIONS AND ENHANCED GROUP CALL (EGC) RECEIVERS
[COM/Circ.103 (31.05.90)]

The Maritime Safety Committee at its fifty-eighth session (MSC 58/25, paragraph 9.21) approved for circulation to Member Governments for information the Design and Installation Guidelines for Inmarsat Standard-C Ship Earth Stations and Enhanced Group Call (EGC) Receivers, attached.

Annex

DESIGN AND INSTALLATION GUIDELINES FOR STANDARD-C SHIP EARTH STATIONS

PURPOSE AND SCOPE

Mandatory and optional specifications for Standard-C ship earth stations are defined in the Technical Requirements for Inmarsat Standard-C Ship Earth Stations hereby referred to as the TRD (Standard-C System Definition Manual, Module 4). This is published by Inmarsat with a view to ensuring that ship earth stations will perform adequately and not endanger the integrity of the system operation.

These Guidelines provide general information on design and installation of ship earth stations as well as on safety aspects and electromagnetic compatibility with other equipment.

The Guidelines are arranged in two parts.

The text of Part A reflects performance standards that have been adopted by the International Maritime Organization (IMO) in two of their documents:

> General Requirements for Shipborne Radio Equipment Forming Part of the Future Global Maritime Distress and Safety System, IMO resolution A.569(14);* and
>
> Performance Standards for Inmarsat Standard-C Ship Earth Stations capable of Transmitting and Receiving Direct-Printing Communications, IMO Assembly resolution A.663(16).†

These IMO documents will form the basis for national licensing requirements for those ship earth stations which are used to satisfy the carriage requirements of the SOLAS Convention.

For all other ship earth stations, both Part A and Part B should be interpreted as suggested guidelines with the following qualifications:

(a) Inmarsat makes type-approval a mandatory condition of access to the Inmarsat system (refer to section A1.1);

(b) the additional ship motion conditions for a stabilized antenna specified in the TRD for optional capabilities are non-mandatory recommendations from Inmarsat's point of view. Alternative or restricted ranges of environmental conditions may be appropriate for particular applications (refer to section A1.1); and

(c) the Inmarsat TRD does not specify the capability to initiate distress calls from locations other than the position at which the ship earth station is normally operated, as a mandatory requirement (refer to paragraph A3.1).

Part B contains supplementary guidelines on design and installation aspects.

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* Resolution A.569(14) has been superseded by A.694(17) (see annex 3-1-1).

† Resolution A.663(16) has been superseded by A.807(19) (see annex 3-4-2).

PART A DESIGN AND INSTALLATION ASPECTS

A1 TECHNICAL REQUIREMENTS

A1.1 The ship earth station should be type-approved by Inmarsat and should comply with the environmental conditions specified in the Inmarsat technical requirements for Standard-C ship earth stations.

A1.2 Where equipment provides a facility which is additional to the minimum requirements of Part A, the operation and, as far as is reasonably practicable, any malfunction of such an additional facility should not prevent the equipment from complying with Part A.

A1.3 The performance of any enhanced group call facility provided by the ship earth station should be in accordance with the Design and Installation Guidelines for Enhanced Group Call receivers.

A2 CONTROLS

A2.1 The number of operational controls, their design and manner of function, location, arrangement and size, should provide for simple, quick and effective operation. The controls should be arranged in a manner which minimizes the chance of inadvertent operation.

A2.2 All operational controls should permit normal adjustments to be performed easily and should be easy to identify from the position at which the equipment is normally operated. Controls not required for normal operation should not be readily accessible.

A2.3 The design of the equipment should be such that misuse of the controls should not cause damage to the equipment or injury to personnel.

A2.4 No control external to the equipment should be available for alteration of the ship earth station identity.

A2.5 Where a digital input panel with the digits "0" to "9" is provided, the digits should be arranged to conform with the relevant CCITT Recommendations.*

A3 OPERATION

A3.1 It should be possible to initiate and make distress calls from the position at which the ship is normally navigated and from at least one other position designated for distress alerting. The means for initiating a distress call should be easy to operate and protected against inadvertent activation.

A3.2 Adequate illumination should be provided in the equipment or in the ship to enable identification of controls and facilitate reading of indicators at all times. Where appropriate, means should be provided for dimming the output of any equipment light source which is capable of interfering with navigation.

A4 POWER SUPPLY

A4.1 The ship earth station should normally be powered from the ship's main source of electrical energy. In addition, it should be possible to operate the ship earth station and all equipment necessary for its normal functioning, including the antenna tracking system, where provided, from an alternative source of energy.

A4.2 If provision is made for operating equipment from more than one source of electrical energy, arrangements for rapidly changing from one source to the other should be provided but not necessarily incorporated in the equipment.

A4.3 Changing from one source of supply to another or any interruption up to 60 seconds duration of the supply of electrical energy should not require the equipment to be manually re-initialized and should not lose received messages stored in the memory.

A4.4 Equipment should continue to operate in accordance with these Guidelines in the presence of variations of power supply normally to be expected in a ship.

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* CCITT Recommendations E.161/Q.11.

A4.5 Means should be incorporated for the protection of equipment from the effects of excessive current, voltage, transients and accidental reversal of the power supply polarity.

A5 INTERFERENCE AND COMPATIBILITY

A5.1 All reasonable and practicable steps should be taken to ensure electromagnetic compatibility between the equipment concerned and other radiocommunication and navigational equipment carried on board in compliance with the relevant requirements of chapter IV and chapter V of the 1974 SOLAS Convention.*

A5.2 Mechanical noise from all units should be limited so as not to prejudice the hearing of sounds on which the safety of the ship might depend.

A.5.3 Each unit of equipment normally to be installed in the vicinity of a standard or a steering magnetic compass should be clearly marked with the minimum safe distance at which it may be mounted from such compasses.

A5.4 If any equipment is connected to one or more devices, the performance of each should be maintained.

A6 SAFETY PRECAUTIONS

A6.1 All steps should be taken to ensure that electromagnetic radio-frequency energy radiated from the equipment shall not be a hazard to personnel.

A6.2 As far as is practicable, accidental access to dangerous voltages should be prevented. All parts and wiring in which the direct or alternating voltages or both (other than radio-frequency voltages) combine to give a peak voltage greater than 55 volts should be protected against accidental access and should be isolated automatically from all sources of electrical energy when the protective covers are removed. Alternatively, the equipment should be so constructed that access to such voltages may only be gained after having used a tool for this purpose, such as a spanner or screwdriver, and warning labels should be prominently displayed both within the equipment and on protective covers.

A6.3 Means should be provided for earthing exposed metallic parts of the equipment but this should not cause any terminal of the source of electrical energy to be earthed.

A6.4 In order to permit a warning of potential radiation hazards to be displayed in appropriate locations, a label should be attached to the radome indicating the distances external to the radome at which radiation levels of 100 W/m^2, 23 W/m^2 and 10 W/m^2 exist. However, the distances which are within a radome need not be indicated.

A6.5 Equipment containing elements such as vacuum tubes which are likely to cause X-radiation should comply with the following requirements:

(a) external X-radiation from the equipment in its normal working conditions should not exceed the limits laid down by the Administration concerned;

(b) when X-radiation can be generated inside the equipment above the levels laid down by the Administration, a prominent warning should be fixed inside the equipment. The precautions to be taken when working on the equipment should be included in the equipment manual; and

(c) if malfunction of any part of the equipment can cause an increase in X-radiation, adequate advice should be included in the information about the equipment. It should warn of the circumstances that could cause the increase and state the precautions that should be taken.

A7 MAINTENANCE

A7.1 The equipment should be so designed that the main units can be replaced readily, without elaborate recalibration or readjustment.

A7.2 Equipment should be so constructed and installed that it is readily accessible for inspection and maintenance.

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* IEC Publication 533, *Electromagnetic Compatibility of Electrical and Electronic Installations in Ships*.

A7.3 Adequate information should be provided to enable the equipment to be properly operated and maintained:

(a) in the case of equipment so designed that fault diagnosis and repair is practicable down to component level, it should include full circuit diagrams, component layouts and a components parts list; and

(b) in the case of equipment containing complex modules in which fault diagnosis and repair down to component level is not practicable, it should contain sufficient information to enable a defective complex module to be located, identified and replaced. The requirements of (a) above should be met in respect of other modules and those discrete components which do not form part of modules.

A8 MARKING AND IDENTIFICATION

Each unit of the equipment should be externally marked with the following information which should be clearly visible in the normal installed position:

(a) identification of the manufacturer;

(b) equipment type/number or model identification under which it was type tested; and

(c) serial number of the unit.

A9 DURABILITY AND RESISTANCE TO ENVIRONMENT

Equipment should be capable of continuous operation under the conditions of various sea states, ship's motion, vibration, humidity and temperature likely to be experienced in ships.*

A10 INSTALLATION

Equipment should be installed in such a manner that it can operate in accordance with these Guidelines.

A11 ANTENNA SITING

A11.1 Where an omnidirectional antenna is used, it should, if practicable, be sited in such a position that no obstacle, likely to degrade significantly the performance of the equipment, appears in the fore and aft directions down to –5° and in the port and starboard directions down to –15°.

For omnidirectional antennas, objects, especially those within 1 m of the antenna, which cause a shadow sector of greater than 2°, are likely to degrade significantly the performance of the equipment.

A11.2 Where a stabilized directive antenna is used, it should, if practicable, be sited in such a position that no obstacle, likely to degrade significantly the performance of the equipment, appears in any azimuth down to –5°.

For directive antennas with a gain of approximately 20 dBi, objects, especially those within 10 m of the antenna, which cause a shadow sector of greater than 6°, are likely to degrade significantly the performance of the equipment.

CROSS-INDEX BETWEEN IMO DOCUMENTS AND INMARSAT DESIGN AND INSTALLATION GUIDELINES, PART A

1 **General requirements for shipborne radio equipment forming part of the Future Global Maritime Distress and Safety System.** IMO resolution A.569(14) †adopted on 20 November 1985.

The table below enables each paragraph of the IMO document to be related to the corresponding paragraphs of the Inmarsat Design and Installation Guidelines.

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* IEC Standard Publication 92-101, *Electrical Installations in Ships.*

† Resolution A.569(14) has been superseded by A.694(17) (see annex 3-1-1).

IMO Document	Inmarsat Part A DIG
1.1	*See note 1*
1.2	A1.2
2	A10
3.1	A2.1
3.2	A.2.2
3.3	A3.2
3.4	A2.3
3.5	A5.4
3.6	A2.5
4.1	A4.4
4.2	A4.5
4.3	A4.2
5	A9
6.1	A5.1
6.2	A5.2
6.3	A5.3
7.1	A6.2
7.2	A6.3
7.3	A6.1
7.4	A6.5
7.4.1	A6.5a
7.4.2	A6.5b
7.4.3	A6.5c
8.1	A7.1
8.2	A7.2
8.3	A7.3
8.3.1	A7.3a
8.3.2	A7.3b
9	A8
9.1	A8a
9.2	A8b
9.3	A8c

Note 1: References to the applicability of General Requirements and Performance Standards are covered by the introductory section of the Design and Installation Guidelines, entitled ‘‘Purpose and Scope’’.

2 **Performance Standards for Inmarsat Standard-C Earth Stations capable of transmitting and receiving direct-printing communications.** IMO Assembly resolution A.663(16).*

The table below enables each paragraph of the IMO document to be related to the corresponding paragraphs of the Inmarsat Design and Installation Guidelines.

IMO Document	Inmarsat Part A DIG
1.1	*See note 1*
1.2	A1.3
2	A1.1
3.1	A2.4
3.2	A3.1
4	A6.4
5.1	A4.1
5.2	A4.3
6.1	A11.1
6.2	A11.2

Note 1: References to the applicability of General Requirements and Performance Standards are covered by the introductory section of the Design and Installation Guidelines, entitled ‘‘Purpose and Scope’’.

* Resolution A.663(16) has been superseded by A.807(19) (see annex 3-4-2).

3 **Inmarsat Design and Installation Guidelines**

The table below enables each paragraph to be related to the corresponding paragraphs of the IMO documents.

Inmarsat	**IMO Documents**	
Part A DIG	**SRE***	**SES†**
Note 1	1.1	1.1
A1.1	–	2
A1.2	1.2	–
A1.3	–	1.2
A2.1	3.1	–
A2.2	3.2	–
A2.3	3.4	–
A2.4	–	3.1
A2.5	3.6	–
A3.1	–	3.2
A3.2	3.3	–
A4.1	–	5.1
A4.2	4.3	–
A4.3	–	5.2
A4.4	4.1	–
A4.5	4.2	–
A5.1	6.1	–
A5.2	6.2	–
A5.3	6.3	–
A5.4	3.5	–
A6.1	7.3	–
A6.2	7.1	–
A6.3	7.2	–
A6.4	–	4
A6.5	7.4	–
A6.5a	7.4.1	–
A6.5b	7.4.2	–
A6.5c	7.4.3	–
A7.1	8.1	–
A7.2	8.2	–
A7.3	8.3	–
A7.3a	8.3.1	–
A7.3b	8.3.2	–
A8	9	–
A8a	9.1	–
A8b	9.2	–
A8c	9.3	–
A9	5	–
A10	2	–
A11.1	–	6.1
A11.2	–	6.2

Note 1: References to the applicability of General Requirements and Performance Standards are covered by the introductory section of the Design and Installation Guidelines, entitled "Purpose and Scope".

PART B SUPPLEMENTARY GUIDELINES

B1 CONSTRUCTION

B1.1 In all respects, the mechanical and electrical design, construction and the finish of the equipment should conform to good standards of engineering practice, particularly with regard to reliability and safety. The equipment should be suitable for use on board ships at sea (for instance: IEC Publication 92-101 *Electrical Installations in Ships*).

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* General Requirements for Shipborne Radio Equipment Forming Part of the Future Global Maritime Distress and Safety System: IMO resolution A.569(14) adopted on 20 November 1985. This has been superseded by A.694(17) (see annex 3-1-1).

† Performance Standards for Inmarsat Standard-C Ship Earth Stations capable of transmitting and receiving direct-printing communications: IMO Assembly resolution A.663(16) adopted on 19 October 1989. This has been superseded by A.807(19) (see annex 3-4-2).

B1.2 In view of possible operation of Inmarsat ship earth stations in ports while loading and unloading hazardous fuels or gases, the use of components that may, under normal operating conditions, produce arcs or sparks (motors using brushes, uncapsulated relays, switches) or produce excessive heat (electric heaters) should be avoided. Where such equipment is included in the Externally Mounted Equipment, clear reference to this fact should be included in the manufacturer's description.

B1.3 The ship earth station equipment and facilities should be capable of operating satisfactorily in a marine environment. All metal surfaces, including cabinets, racks, panels or enclosures, should be resistant to or suitably treated against corrosion.

B2 LABELLING

B2.1 The power supply or supplies from which the equipment is intended to operate should also be clearly indicated.

B2.2 The possibility of labelling the 9-digit ITU ship earth station identity should be provided. Such labelling should take into account changes in the ship earth station identity.

B3 TESTING

B3.1 The equipment should be designed with attention to equipment reliability and ease of maintenance.

B3.2 It would be an advantage if the design were to include self-diagnostic facilities with measuring points and indicators for quick fault finding.

B4 OPERATION

It would be an advantage if the design were to include the capability of use from remote locations. Remote indication(s) of incoming calls should be included when using remote locations.

B5 SAFETY PRECAUTIONS

B5.1 Provision should be made for protecting the equipment from excessive rise of temperature in any part of it due to failure in any cooling system associated with the equipment.

B5.2 Means should be provided for reducing the level of acoustic alarms.

B5.3 Radio-frequency signals at high radiation levels are known to be hazardous to health. Since safety regulations may vary from country to country and the actual field distribution around the antenna may be different for the various antenna designs, a single value for the ''safe'' distance to the antenna cannot be given.

Preferably, the radiation levels in the vicinity of the antenna should be measured. The distances from the antenna which result in radiation levels of 100 W/m^2, 25 W/m^2 and 10 W/m^2 should be recorded.

A label displaying these distances should be attached to the antenna system and should be clearly visible in the normal operating position. Warning labels should be installed at appropriate locations so as to warn personnel against entering the hazardous area.

If measured information is not available, the radiation levels outside the radome can be assessed by using the graph as shown in figure B5.1.

B6 ANTENNA LOCATIONS

Preferably, the antenna should be located high enough and in such a position that no obstacles appear in any azimuth directions down to –15° elevation as shown in figure B6.1.

In practice, the presence of some metallic objects in the propagation path between the antenna and the satellite is difficult to avoid for all azimuth directions. Preferably, all obstructions within 3 m of the antenna should be avoided. In general, obstructions less than 15 cm in diameter can be ignored beyond this distance.

Particular directions, which result in obstruction, should be recorded and retained with the ship. This will enable a prediction of a particular ship's locations and headings where degradation in performance may be expected.

B7 RELATION TO OTHER ANTENNAS

Locations at the same level as the ship's radar antenna or other ship earth stations should be avoided.

B8 OTHER GENERAL PRECAUTIONS

Avoid locations:

(a) where ship personnel may be exposed to hazardous radiation;

(b) near to the funnel or other locations which are subject to much dust and smoke, since contamination of the radome may result in signal degradation;

(c) where the antenna might be exposed to extremely high temperatures;

(d) affected by severe vibration and shock; and

(e) near to loading points of hazardous liquids or gases in view of explosion hazards.

Avoid in particular those locations affected by continuous vibration induced by engine/propeller operation whilst at sea.

B9 MOUNTING OF THE EXTERNALLY MOUNTED EQUIPMENT

B9.1 **Strength**

The strength should be sufficient to withstand:

(a) the joint weight of Externally Mounted Equipment and covering ice and snow; and

(b) the bending moment caused by the maximum values of roll, pitch and wind pressure to be expected (taking the gust factor also into account).

Resonance frequencies near to those of the Externally Mounted Equipment should be avoided. Manufacturers should provide the relevant resonance frequency information to enable this requirement to be met.

B9.2 **Access**

The Externally Mounted Equipment should be provided a safe and easy means of access.

Care should be taken to avoid accidental activation of the transmitter whilst personnel are within the hazardous zone of the Externally Mounted Equipment, if activation poses a threat to their safety.

As a source of general information concerning the safety of people working aboard ships, either aloft or with radio and electrical equipment, see for instance: Code of Safe Working Practices for Merchant Seamen – British Department of Trade.

B9.3 **Earthing**

Means should be provided to enable the Externally Mounted Equipment to be earthed to the hull of the ship.

FIG. B5.1: LEVEL OF RADIATION OUTSIDE THE RADOME

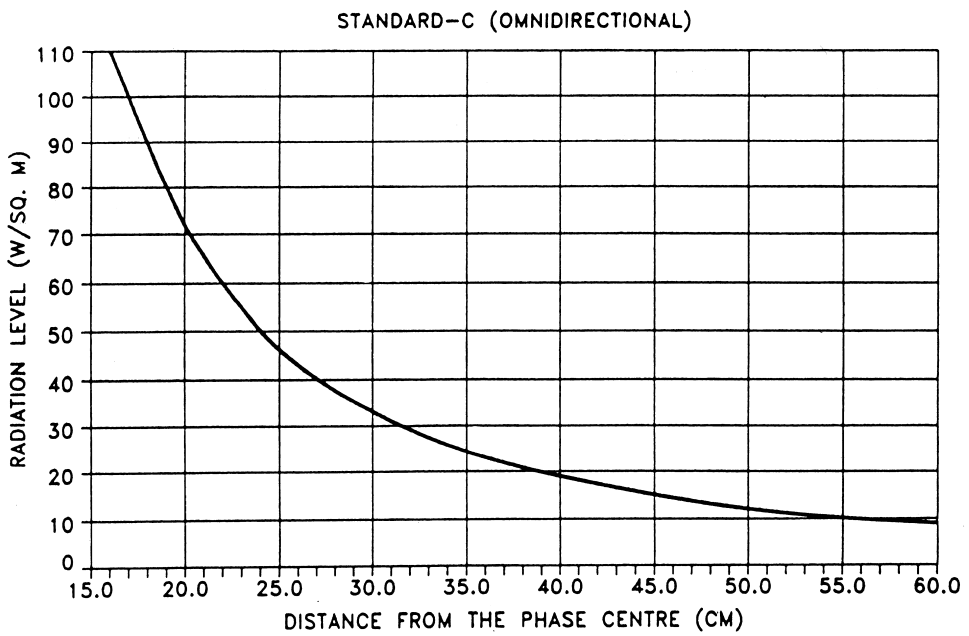
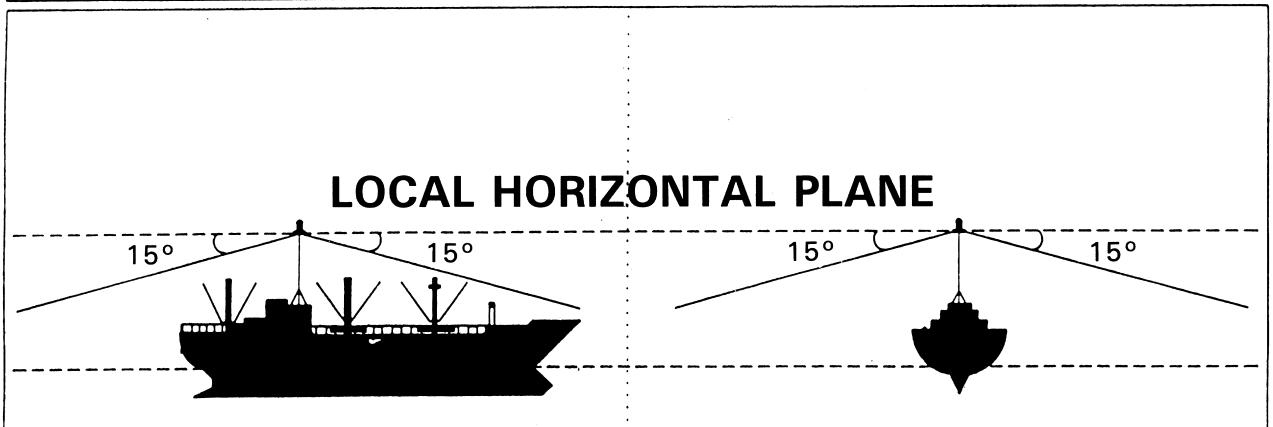


FIG. B6.1: ANTENNA LOCATION STANDARD-C (OMNIDIRECTIONAL)



THE SHIP IS ON AN EVEN KEEL:
PITCH AMPLITUDE – 0°;
ROLL AMPLITUDE – 0°

DESIGN AND INSTALLATION GUIDELINES FOR ENHANCED GROUP CALL RECEIVERS

PURPOSE AND SCOPE

Mandatory and optional specifications for enhanced group call receivers are defined in the Technical Requirements for Inmarsat Enhanced Group Call Receivers. This is published by Inmarsat with a view to ensuring that enhanced group call receivers will perform adequately in the Inmarsat system.

These Guidelines provide general information on design and installation of dedicated or non-dedicated receivers, the antenna, antenna amplifier and downconverter of the Inmarsat type-approved ship earth stations that can be shared for the reception of enhanced group call messages.

These Guidelines also provide general information on safety aspects and electromagnetic compatibility with other equipment.

The Guidelines are arranged in two parts.

The text of Part A reflects performance standards that have been adopted by the International Maritime Organization in two of their documents:

> General Requirements for Shipborne Radio Equipment Forming Part of the Future Global Maritime Distress and Safety System, IMO resolution A.569(14);* and
>
> Performance Standards for Enhanced Group Call Equipment, IMO Assembly resolution A.664(16).†

These IMO documents will form the basis for national licensing requirements for enhanced group call receivers which are used to satisfy the carriage requirements of the SOLAS Convention.

For all other enhanced group call receivers, both Part A and Part B should be interpreted as suggested guidelines with the following qualification:

> Inmarsat makes type-approval a mandatory condition of access to the Inmarsat system (refer to section A1.1).

Part B contains supplementary guidelines on design and installation aspects.

PART A DESIGN AND INSTALLATION ASPECTS

A1 TECHNICAL REQUIREMENTS

A1.1 The enhanced group call receiver should be type-approved by Inmarsat and should comply with the environmental conditions specified in the Inmarsat technical requirements for the enhanced group call receiver.

A1.2 Where equipment provides a facility which is additional to the minimum requirements of Part A, the operation and, as far as is reasonably practicable, any malfunction of such an additional facility should not prevent the equipment from complying with Part A.

A1.3 The equipment should be capable of producing a printed copy of received information. Received EGC messages may be stored, with indication that the message has been received, for later printing except vital messages referred to in paragraphs A3.2 and A3.5, which should be printed out upon receipt.

A1.4 The enhanced group call installation may be either separate or be combined with other installations.

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* Resolution A.569(14) has been superseded by A.694(17) (see annex 3-1-1).

† See annex 3-5-2.

A2 CONTROLS

A2.1 The number of operational controls, their design and manner of function, location, arrangement and size, should provide for simple, quick and effective operation. The controls should be arranged in a manner which minimizes the chance of inadvertent operation.

A2.2 All operational controls should permit normal adjustments to be performed easily and should be easy to identify from the position at which the equipment is normally operated. Controls not required for normal operation should not be readily accessible.

A2.3 The design of the equipment should be such that misuse of the controls should not cause damage to the equipment or injury to personnel.

A2.4 Means should be provided to enter the ship's position and area code manually so that area group calls can be received. Automatic entry of the ship's position from the navigational equipment and automatic translation from the ship's position to its area code may be performed optionally.

A2.5 Where a digital input panel with the digits "0" to "9" is provided, the digits should be arranged to conform with the relevant CCITT Recommendations.*

A3 OPERATION

A3.1 Provisions should be made for a specific aural alarm and visual indication at the position from which the ship is normally navigated to indicate receipt of a distress or urgency call or a call having a distress category. It should not be possible to disable this alarm. It should be possible only to reset this alarm manually.

A3.2 Adequate illumination should be provided in the equipment or in the ship to enable identification of controls and facilitate reading of indicators at all times. Where appropriate, means should be provided for dimming the output of any equipment light source which is capable of interfering with navigation.

A3.3 The equipment should indicate when it is not correctly tuned or synchronized to the enhanced group call carrier.

A3.4 Any message should be printed regardless of the character error rate of its reception. The equipment should print a low line mark if a character is received mutilated.

A3.5 Acceptance or rejection of service codes† should be under the operator's control except that equipment should be unable to reject relevant navigational warnings, meteorological warnings, search and rescue information and certain special warnings, which are directed to a geographical area within which the ship is operating.

A3.6 Means should be provided not to print the same message after the message has been received without errors.

A3.7 The printing device should be capable of printing at least the Standard IA Number 5 character set. Other character sets are optionally used according to ISO 2022 or CCITT Recommendation T.61.

A3.8 The printing device should be able to print at least 40 characters per line.

A3.9 The signal processor and printing device should ensure that if a word cannot be accommodated in full on its line it should be transferred to the next line. The printing device should automatically feed 5 lines after completing the printed messages.

A4 POWER SUPPLY

A4.1 The enhanced group call receiver should normally be powered from the ship's main source of electrical energy. In addition, it should be possible to operate the enhanced group call receiver, and all other equipment necessary for its normal functioning, including the antenna tracking system, where provided, from an alternative source of energy.

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* CCITT Recommendation E.161/Q11.

† The meaning of the service codes is the same as for the NAVTEX system (Recommendation ITU-R M.540 and the NAVTEX Manual).

A4.2 If provision is made for operating equipment from more than one source of electrical energy, arrangements for rapidly changing from one source to the other should be provided but not necessarily incorporated in the equipment.

A4.3 Changing from one source of supply to another or any interruption up to 60 seconds duration of the electrical energy should not require the equipment to be manually re-initialized and should not lose received messages stored in the memory.

A4.4 Equipment should continue to operate in accordance with these Guidelines in the presence of variation of power supply normally to be expected in a ship.

A4.5 Means should be incorporated for the protection of equipment from the effects of excessive current, voltage, transients and accidental reversal of the power supply polarity.

A5 INTERFACE AND COMPATIBILITY

A5.1 All reasonable and practicable steps should be taken to ensure electromagnetic compatibility between the equipment concerned and other radiocommunication and navigational equipment carried on board in compliance with the relevant requirements of the SOLAS Convention.*

A5.2 Mechanical noise from all units should be limited so as not to prejudice the hearing of sounds on which the safety of the ship might depend.

A5.3 Each unit of equipment normally to be installed in the vicinity of a standard or a steering magnetic compass should be clearly marked with the minimum safe distance at which it may be mounted from such compasses.

A5.4 If any equipment is connected to one or more other devices the performance of each should be maintained.

A6 SAFETY PRECAUTIONS

A6.1 All steps should be taken to ensure that electromagnetic radio-frequency energy radiated from the equipment shall not be a hazard to personnel.

A6.2 As far as is practicable, accidental access to dangerous voltages should be prevented. All parts and wiring in which the direct or alternating voltages or both (other than radio-frequency voltages) combine to give a peak voltage greater than 55 volts should be protected against accidental access and should be isolated automatically from all sources of electrical energy when the protective covers are removed. Alternatively, the equipment should be so constructed that access to such voltages may only be gained after having used a tool for this purpose, such as a spanner or screwdriver, and warning labels should be prominently displayed both within the equipment and on protective covers.

A6.3 Means should be provided for earthing exposed metallic parts of the equipment but this should not cause any terminal of the source of electrical energy to be earthed.

A6.4 Equipment containing elements such as vacuum tubes which are likely to cause X-radiation should comply with the following requirements:

(a) external X-radiation from the equipment in its normal working condition should not exceed the limits laid down by the Administration concerned;

(b) when X-radiation can be generated inside the equipment above the levels laid down by the Administration, a prominent warning should be fixed inside the equipment. The precautions to be taken when working on the equipment should be included in the equipment manual; and

(c) if malfunction of any part of the equipment can cause an increase in X-radiation, adequate advice should be included in the information about the equipment. It should warn of the circumstances that could cause the increase and state the precautions that should be taken.

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* IEC Publication 533, *Electromagnetic Compatibility of Electrical and Electronic Installations in Ships.*

A7 MAINTENANCE

A7.1 The equipment should be so designed that the main units can be replaced readily, without elaborate recalibration or readjustment.

A7.2 Equipment should be so constructed and installed that it is readily accessible for inspection and maintenance.

A7.3 Adequate information should be provided to enable the equipment to be properly operated and maintained:

(a) in the case of equipment so designed that fault diagnosis and repair is practicable down to component level, it should include full circuit diagrams, component layouts and a components parts list; and

(b) in the case of equipment containing complex modules in which fault diagnosis and repair down to component level is not practicable, it should contain sufficient information to enable a defective complex module to be located, identified and replaced. The requirements of (a) above should be met in respect of other modules and those discrete components which do not form part of modules.

A8 MARKING AND IDENTIFICATION

Each unit of the equipment should be externally marked with the following information which should be clearly visible in the normal installed position:

(a) identification of the manufacturer;

(b) equipment type/number of model identification under which it was type tested; and

(c) serial number of the unit.

A9 DURABILITY AND RESISTANCE TO ENVIRONMENT

Equipment should be capable of continuous operation under the conditions of various sea states, ship's motion, vibration, humidity and temperature likely to be experienced in ships.*

A10 INSTALLATION

Equipment should be installed in such a manner that it can operate in accordance with these Guidelines.

A11 ANTENNA SITING

A11.1 Where an omnidirectional antenna is used, it should, if practicable, be sited in such a position that no obstacle, likely to degrade significantly the performance of the equipment, appears in the fore and aft directions down to –5° and in the port and starboard directions down to –15°.

For omnidirectional antennas, objects, especially those within 1 m of the antenna, which cause a shadow sector of greater than 2°, are likely to degrade significantly the performance of the equipment.

A11.2 Where a stabilized directive antenna is used, it should, if practicable, be sited in such a position that no obstacle, likely to degrade significantly the performance of the equipment, appears in any azimuth down to –5°.

For directive antennas with a gain of approximately 20 dBi, objects, especially those within 10 m of the antenna, which cause a shadow sector of greater than 6°, are likely to degrade significantly the performance of the equipment.

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* IEC Standard Publication 92-101, *Electrical Installations in Ships*.

CROSS-INDEX BETWEEN IMO DOCUMENTS AND INMARSAT DESIGN AND INSTALLATION GUIDELINES, PART A

1 **General requirements for shipborne radio equipment forming part of the Future Global Maritime Distress and Safety System.** IMO resolution A.569(14)* adopted on 20 November 1985.

The table below enables each paragraph of the IMO document to be related to the corresponding paragraphs of the Inmarsat Design and Installation Guidelines.

IMO Document	Inmarsat DIG, Part A	IMO Document	Inmarsat DIG, Part A
1.1	*See note 1*	7.1	A6.2
1.2	A1.2	7.2	A6.3
2	A10	7.3	A6.1
3.1	A2.1	7.4	A6.4
3.2	A2.2	7.4.1	A6.5a
3.3	A3.2	7.4.2	A6.5b
3.4	A2.3	7.4.3	A6.5c
3.5	A5.4	8.1	A7.1
3.6	A2.5	8.2	A7.2
4.1	A4.4	8.3	A7.3
4.2	A4.5	8.3.1	A7.3a
4.3	A4.2	8.3.2	A7.3b
5	A9	9	A8
6.1	A5.1	9.1	A8a
6.2	A5.2	9.2	A8b
6.3	A5.3	9.3	A8c

Note 1: References to the applicability of General Requirements and Performance Standards are covered by the introductory section of the Design and Installation Guidelines, entitled "Purpose and Scope".

2 **Performance standards for Enhanced Group Call Equipment.** IMO Assembly resolution A.664(16).†

The table below enables each paragraph of the IMO document to be related to the corresponding paragraphs of the Inmarsat Design and Installation Guidelines.

IMO Document	Inmarsat DIG, Part A	IMO Document	Inmarsat DIG, Part A
1	*See note 1*	3.6	A3.6
1.2	A1.3	3.7	A3.7
1.3	A1.4	3.8	A3.8
2	A1.1	3.9	A3.9
3.1	A2.4	3.10	A3.10
3.2	A3.1	4.1	A4.1
3.3	A3.3	4.2	A4.3
3.4	A3.4	5.1	A11.1
3.5	A3.5	5.2	A11.2

Note 1: References to the applicability of General Requirements and Performance Standards are covered by the introductory section of the Design and Installation Guidelines, entitled "Purpose and Scope".

* Resolution A.569(14) has been superseded by A.694(17) (see annex 3-1-1).
† See annex 3-5-2.

3 Inmarsat Design and Installation Guidelines

The table below enables each paragraph to be related to the corresponding paragraphs of the IMO documents.

Inmarsat DIG,	**IMO Documents**	
Part A	**SRE***	SES†
Note 1	1.1	1
A1.1	–	2
A1.2	1.2	–
A1.3	–	1.2
A1.4	–	1.3
A2.1	3.1	–
A2.2	3.2	–
A2.3	3.4	–
A2.4	–	3.1
A2.5	3.6	–
A3.1	–	3.2
A3.2	3.3	–
A3.3	–	3.3
A3.4	–	3.4
A3.5	–	3.5
A3.6	–	3.6
A3.7	–	3.7
A3.8	–	3.8
A3.9	–	3.9
A3.10	–	3.10
A4.1	–	4.1
A4.2	4.3	–
A4.3	–	4.2
A4.4	4.1	–
A4.5	4.2	–
A5.1	6.1	–
A5.2	6.2	–
A5.3	6.3	–
A5.4	3.5	–
A6.1	7.3	–
A6.2	7.1	–
A6.3	7.2	–
A6.4	7.4	–
A6.5a	7.4.1	–
A6.5b	7.4.2	–
A6.5c	7.4.3	–
A7.1	8.1	–
A7.2	8.2	–
A7.3	8.3	–
A7.3a	8.3.1	–
A7.3b	8.3.2	–
A8	9	–
A8a	9.1	–
A8b	9.2	–
A8c	9.3	–
A9	5	–
A10	2	–
A11.1	–	5.1
A11.2	–	5.2

Note 1: References to the applicability of General Requirements and Performance Standards are covered by the introductory section of the Design and Installation Guidelines, entitled "Purpose and Scope".

* General Requirements for Shipborne Radio Equipment Forming Part of the Future Global Maritime Distress and Safety System: IMO resolution A.569(14) adopted on 20 November 1985. This has been superseded by A.694(17) (see annex 3-1-1).

† Performance Standards for Enhanced Group Call Equipment: IMO Assembly resolution A.664(16) (see annex 3-5-2).

PART B SUPPLEMENTARY GUIDELINES

B1 CONSTRUCTION

B1.1 In all respects, the mechanical and electrical design, construction and the finish of the equipment should conform to good standards of engineering practice, particularly with regard to reliability and safety. The equipment should be suitable for use on board ships at sea (for instance: IEC Publication 92-101 *Electrical Installations in Ships).*

B1.2 In view of possible operation of Inmarsat ship earth stations in ports while loading and unloading hazardous fuels or gases, the use of components that may, under normal operating conditions, produce arcs or sparks (motors using brushes, uncapsulated relays, switches) or produce excessive heat (electric heaters) should be avoided. Where such equipment is included in the ADE, clear reference to this fact should be included in the manufacturer's description.

B1.3 The enhanced group call receiver and facilities should be capable of operating satisfactorily in a marine environment. All metal surfaces should be resistant to or suitably treated against corrosion.

B2 LABELLING

B2.1 The power supply or supplies from which the equipment is intended to operate should also be clearly indicated.

B3 TESTING

B3.1 The equipment should be designed with attention to equipment reliability and ease of maintenance.

B3.2 It would be an advantage if the design were to include self-diagnostic facilities with measuring points and indicators for quick fault finding.

B4 OPERATION

It would be an advantage if the design were to include the capability of use from remote locations. Remote indication(s) of incoming calls should be included when using remote locations.

B5 SAFETY PRECAUTIONS

B5.1 Provision should be made for protecting the equipment from excessive rise of temperature in any part of it due to failure in any cooling system associated with the equipment.

B5.2 Means should be provided for reducing the level of acoustic alarms.

B6 ANTENNA LOCATIONS

Preferably, the antenna should be located high enough and in such a position that no obstacle appears in all azimuth directions down to the lowest elevation angle limited by the minimum *G/T* profile at which a reliable link operation is performed with a satellite at 5° elevation and expected pitch and roll amplitudes.

In practice, the presence of some metallic objects in the propagation path between the antenna and the satellite is difficult to avoid for all azimuth directions. Preferably, all obstructions within 3 m of the antenna should be avoided. In general, obstructions less than 15 cm in diameter can be ignored beyond this distance.

Particular directions, which result in obstruction, should be recorded and retained with the ship. This will enable a prediction of a particular ship's locations and headings where degradation in performance may be expected.

B7 RELATION TO OTHER ANTENNAS

Locations at the same level as the ship's radar antenna or of other ship earth stations should be avoided.

B8 OTHER GENERAL PRECAUTIONS

Avoid locations:

(a) near to the funnel or other locations subject to much dust and smoke, since contamination of the radome may result in signal degradation;

(b) where the antenna might be exposed to extremely high temperatures; and

(c) affected by severe vibration and shock.

Avoid in particular those locations affected by continuous vibration induced by engine/propeller operation whilst at sea.

B9 MOUNTING OF THE ABOVE-DECK EQUIPMENT

Any elements of an Inmarsat ship earth station which are shared by the EGC receiver should adhere to the design and installation guidelines for the shared SES equipment.

B9.1 **Strength**

The strength should be sufficient to withstand:

(a) the joint weight of Above-Deck Equipment and covering ice and snow; and

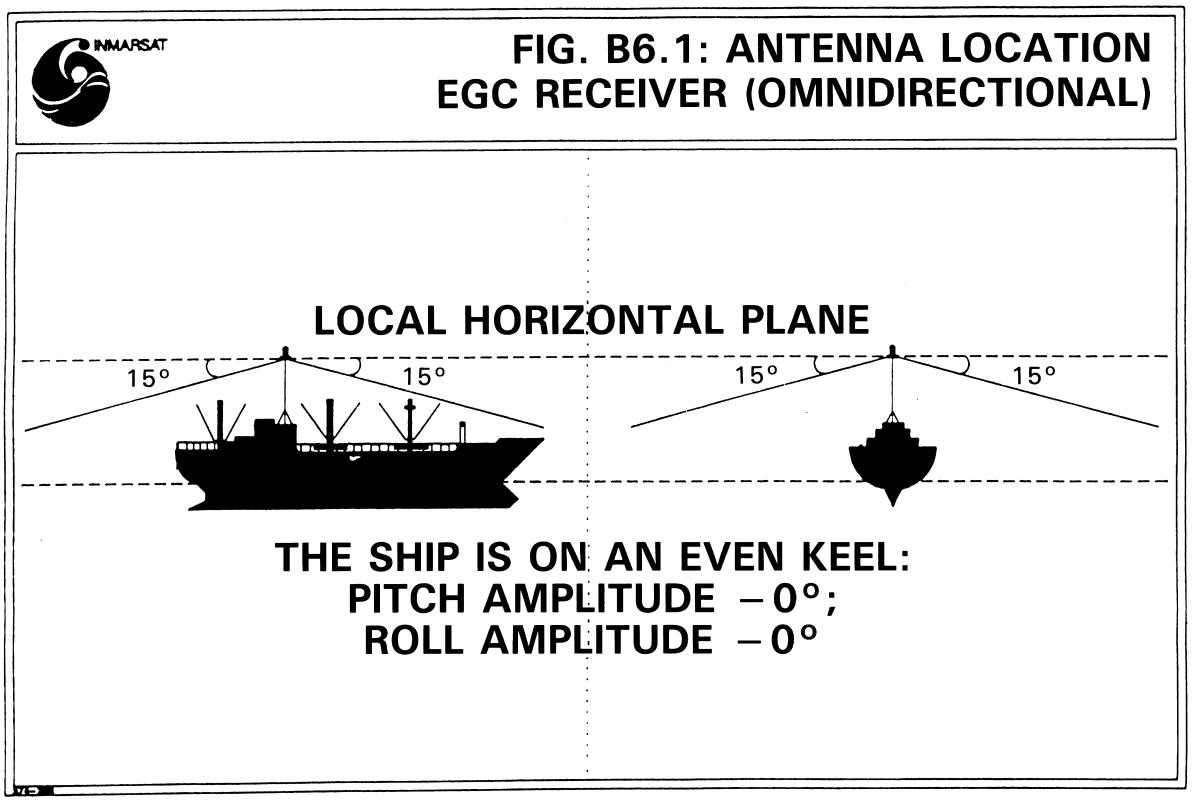
(b) the bending moment caused by the maximum values of roll, pitch and wind pressure to be expected (taking the gust factor also into account).

B9.2 **Access**

As a source of general information concerning the safety of people working aboard ships, either aloft or with radio and electrical equipment, see for instance: Code of Safe Working Practices for Merchant Seamen – British Department of Trade.

B9.3 **Earthing**

Means should be provided to enable the Above-Deck Equipment to be earthed to the hull of the ship.



Annex 8-3
CLARIFICATION OF CERTAIN PROVISIONS OF THE 1988 SOLAS AMENDMENTS FOR THE GMDSS [COM/Circ.105 (16.07.91) as corrected (21.08.92)]

The Sub-Committee on Radiocommunications (COM 37/17 paragraph 3.33) at its thirty-seventh session agreed the clarifications of certain provisions of the 1988 SOLAS Amendments for the GMDSS attached, and pending consideration of the proposed clarifications by the Committee, instructed the Secretariat to bring them to the attention of the Member Governments as advance information.

Member Governments are advised that equipment which has already been approved by an Administration should not be required to be replaced because of these clarifications.

Annex

CLARIFICATIONS OF CERTAIN PROVISIONS OF 1988 SOLAS AMENDMENTS FOR THE GMDSS

1 **Position from which the ship is normally navigated**

This is commonly the navigating bridge.

2 **VHF DSC watchkeeping facility** (regulation IV/7.1.2)

This requirement can be met by:

- a separate VHF channel 70 watch receiver; or
- a dedicated VHF channel 70 watch receiver combined with the VHF radiotelephone; or
- a standard VHF radiotelephone permanently locked on channel 70 for reception and transmission of DSC calls only.

3 **VHF radiocommunications from the wings of the navigating bridge for navigational safety** (regulation IV/6.3)

This requirement can be met by:

- a standard VHF radiotelephone; or
- a facility consisting of a loudspeaker and a microphone with channel selector; or
- a facility consisting of a loudspeaker and a microphone (in this case the channel selector will be convenient to the conning position); or
- a portable VHF equipment with channel selector (it may be the equipment required by regulation III/6.2.1).

4 **MF DSC watchkeeping facility** (regulations IV/9.1.2 and 10.1.3)

This requirement can be met by:

- a separate MF DSC watch receiver locked on 2,187.5 kHz; or
- a dedicated MF DSC watch receiver combined with the MF radiotelephone.

If DSC operation is desirable on other frequencies, an additional scanning receiver shall be provided.

A single DSC decoder may be used to serve both the DSC watch and the additional scanning receiver only if continuous watch for distress and safety calls can be maintained.

5 **MF/HF DSC watchkeeping facility** (regulation IV/10.2.2)

This requirement can be met by:

- a separate MF/HF DSC scanning watch receiver for distress and safety DSC frequencies only; or
- a dedicated MF/HF DSC scanning watch receiver for distress and safety DSC frequencies only combined with the MF/HF radiotelephone.

If DSC operation is desirable on other frequencies, an additional scanning receiver should be provided.

A single DSC decoder may be used to serve both the DSC distress and safety frequency scanning receiver and the additional scanning receiver only if continuous watch for distress and safety calls can be maintained.

6 **Reception of MSI by HF** (regulation IV/7.1.5)

This requirement can be met by:

- a separate HF-MSI receiver; or
- the receiver of the MF/HF radio installation.

7 **NAVTEX Receiver** (regulation IV/7.1.4)

The NAVTEX receiver shall receive on the frequency 518 kHz as a minimum. Manual switching to receive on frequency 490 kHz is permissible. The capability to receive on 4,209.5 kHz is recommended. Combined equipment, e.g. with weather facsimile, can be accepted, if receiving and printing of all selected NAVTEX information have priority.

8 **Means of initiating the transmission of ship-to-shore distress alerts by a separate and independent system** (regulations IV/8.1, 9.1.3, 10.1.4 and 10.2.3)

The satellite EPIRB required by regulation IV/7.1.6 can be accepted if it is installed in the vicinity of the bridge, e.g. in the wings, on top of the wheelhouse, if accessible by stairs, or if its activation is possible by remote control from the position from which the ship is normally navigated. Where intended for remote activation, the EPIRB should be installed so that it has unobstructed hemispherical line of sight to the satellites.

Another possibility is to install another satellite EPIRB in the navigating bridge.

The requirement for transmitting ship-to-shore distress alert on HF using DSC can be met by installing an MF/HF radio installation in lieu of the MF radio installation required by regulation IV/10.1.2. This MF/HF radio installation does not have to operate direct-printing telegraphy nor maintain a DSC watch on other frequencies than 2,187.5 kHz.

9 **Telex communications** (regulation IV/10.2.1.3)

Automatic reception of shore-to-ship direct-printing telegraphy is not necessary. The communication connection may be set up manually after announcement via DSC.

10 **Initiation of distress alerts on VHF channel 70** (regulation IV/7.1.1.1)

The requirement to initiate the transmission of distress alerts on channel 70 from the position from which the ship is normally navigated can be met by:

- the VHF radio installation which is installed on the navigating bridge; or
- the remotely installed VHF radio installation which can be switched to channel 70 and readily activated from the navigating bridge; or
- the remotely installed VHF radio installation which is locked to channel 70 and can be readily activated from the navigating bridge.

11 **Initiation of distress alerts by the MF radio installation** (regulations IV/9.2 and 10.3)

The requirement to initiate the transmission of the distress alerts by the MF radio installation from the position from which the ship is normally navigated can be met by:

- the MF radio installation which is installed on the navigating bridge; or
- the remotely installed MF radio installation which can be switched to the frequency 2,187.5 kHz and readily activated from the navigating bridge; or
- the remotely installed MF radio installation which is locked on the frequency 2,187.5 kHz and can be readily activated from the navigating bridge.

If the transmitting antenna is not connected continuously to the transmitter it shall be connected automatically in case of initiation of distress alerts.

12 **Initiation of distress alerts by the MF/HF radio installation** (regulation IV/10.3)

The requirement to initiate the transmission of the distress alerts by the MF/HF radio installation from the position from which the ship is normally navigated can be met by:

- the MF/HF radio installation which is installed on the navigating bridge; or
- the remotely installed MF/HF radio installation which can be switched to any MF/HF DSC distress frequency and readily activated from the navigating bridge.

If the transmitting antenna is not connected continuously to the transmitter it shall be connected automatically in case of initiation of distress alerts.

13 **Radio installations on the navigating bridge where a separate radio room exists**

On ships complying with the GMDSS provisions and which do not have all radio installations on the navigating bridge, at least:

i) the permanent monitoring of the distress and safety frequencies, including maritime safety information;

ii) the means to conduct the radiocommunications for navigational safety; and

iii) the initiation of distress alerts

should be possible from the navigating bridge. Remote control facilities for distress and safety communications could be placed at the navigating bridge.

Annex 8-4
TESTING OF MF DIGITAL SELECTIVE CALLING EQUIPMENT INSTALLED FOR DISTRESS AND SAFETY BY SHIPS AND COAST STATIONS [COM/Circ.106 (06.08.91)]

1 The CCIR, recognizing the need for a means of testing the MF DSC system without either initiating a commercial call or generating a false alarm, have introduced a special ''test'' call, which enables a safety category message to be generated by a vessel and acknowledged by a coast station.

2 The Sub-Committee on Radiocommunications at its thirty-seventh session (COM 37/17 paragraphs 3.38 and 3.39):

> recognizing that many ship installations may not have been used since they were commissioned and ship and coast station operators would benefit from experience of operating procedures,
>
> bearing in mind the provision of regulation N3068 of the ITU Radio Regulations which prescribes that ''test transmissions shall be kept to a minimum'' and ''should be co-ordinated with a competent authority, as necessary'', in order not to overload the distress channel,

recommended that adjacent Administrations introduce a regular daily exchange of MF DSC ''test/safety'' messages between their coast stations and that ships periodically exchange MF DSC test messages with their nearest coast station either prior to entering harbour or prior to departure.

3 Administrations are further advised that the publication of a list of coast stations equipped with MF DSC equipment, stating which stations can accept and reply to DSC test calls, would be helpful to shipmasters.

Annex 8-5
GMDSS OPERATING GUIDANCE FOR MASTERS OF SHIPS IN DISTRESS SITUATIONS [COM/Circ.108 (23.01.92)]

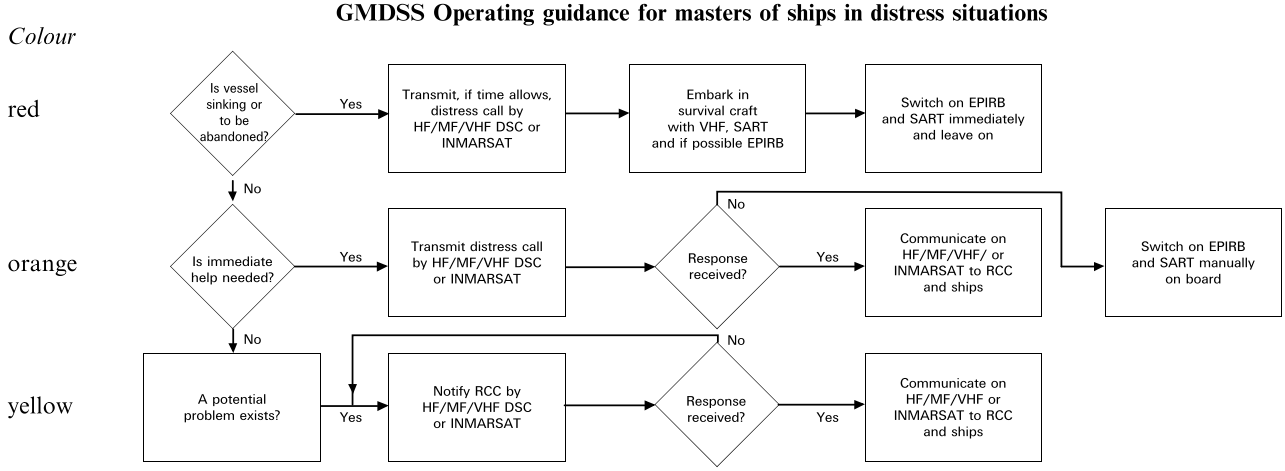
1 The Sub-Committee on Radiocommunications (COM), at its thirty-seventh session (COM 37/17, paragraph 3.43), prepared the GMDSS Operating Guidance for Masters of Ships in Distress Situations and brought it to the attention of the Sub-Committee on Life-Saving, Search and Rescue (LSR), recommending that it be displayed on the ship's bridge as an A4 size poster.

2 The LSR Sub-Committee at its twenty-third session (LSR 23/21, paragraph 6.2) endorsed the text, given at annex, prepared by the COM Sub-Committee.

3 Member Governments are invited to bring the GMDSS Operating Guidance to the attention of seafarers and all others concerned.

Annex

GMDSS Operating guidance for masters of ships in distress situations



1 EPIRB should float free and activate automatically if it cannot be taken into survival craft.

2 Where necessary, ships should use any appropriate means to alert other ships.

3 Nothing above is intended to preclude the use of any and all available means of distress alerting.

RADIO DISTRESS COMMUNICATIONS

	Digital selective calling (DSC)	Radiotelephone	Radiotelex
VHF	Channel 70	Channel 16	
MF	2187.5 kHz	2182 kHz	2174.5 kHz
HF4	4207.5 kHz	4125 kHz	4177.5 kHz
HF6	6312 kHz	6215 kHz	6268 kHz
HF8	8414.5 kHz	8291 kHz	8376.5 kHz
HF12	12577 kHz	12290 kHz	12520 kHz
HF16	16804.5 kHz	16420 kHz	16695 kHz

Annex 8-6
CLARIFICATION OF SOLAS REGULATIONS IV/6.1, IV/6.2.2 AND IV/10.1.1.3 [COM/Circ.110 (08.02.93) as corrected (16.03.93)]

The Sub-Committee on Radiocommunications (COM 38/27, paragraphs 3.5 and 3.6) at its thirty-eighth session agreed the clarifications of SOLAS regulations IV/6.1, IV/6.2.2 and IV/10.1.1.3 attached, and, pending consideration of the proposed clarifications by the Committee, instructed the Secretariat to bring them to the attention of the Member Governments as advance information.

Member Governments are advised that equipment which has already been approved by an Administration should not be required to be replaced because of these clarifications.

Annex

Clarification of SOLAS regulations IV/6.1 and IV/6.2.2

Ancillary equipment, such as scramblers and automatic telephone equipment, etc., may be connected to the required GMDSS equipment, provided that any such connection is made in such a way that the prescribed GMDSS functions will be fully restored immediately at the normal or abnormal termination of the operation of the connected anciliary equipment.

Clarification of SOLAS regulation IV/10.1.1.3

In determining the capability of a ship for maintaining watch for shore-to-ship distress alerts directed to specifically defined geographical areas, ships that operate exclusively within range of NAVTEX stations and which can be alerted by individual calling should not need to carry a separate EGC receiver in order to comply with regulation IV/10.1.1.3.

Annex 8-7
IMPLEMENTATION OF MARITIME SAFETY INFORMATION (MSI) BROADCASTS VIA SAFETYNET IN AREAS NOT COVERED BY NAVTEX [COM/Circ.112 (10.02.93)]

1 The Sub-Committee on Radiocommunications, at its thirty-eighth session (18–22 January 1993), noted with concern that there is only one country, among those whose coasts are not covered by NAVTEX, which is currently providing broadcasts of coastal MSI via SafetyNET.

In this regard, the Sub-Committee recalled that the Organization has adopted, by means of the 1988 amendments to the 1974 SOLAS Convention concerning radiocommunications for the GMDSS and resolution A.705(17) – Promulgation of MSI, the International SafetyNET Service for transmission of MSI to ships in coastal waters not covered by NAVTEX.

The Sub-Committee noted that the carriage of a NAVTEX receiver becomes mandatory on 1 August 1993 for ships subject to the 1974 SOLAS Convention, which implies that Administrations should implement planned NAVTEX services by that date.

Governments are urged to implement broadcasts of MSI via the International SafetyNET Service in areas not covered by NAVTEX and to inform the Organization of their intentions in this regard.

Annex 8-8
DISCONTINUATION OF MORSE CODE SERVICES IN THE MF RADIOTELEGRAPHY BAND [COM/Circ.115 (10.02.93)]

1 The Sub-Committee on Radiocommunications, at its thirty-eighth session (18 to 22 January 1993), was informed by the United States' delegation that, as from 1 August 1993, all United States Coast Guard communication stations and cutters will discontinue watchkeeping on the distress frequency 500 kHz and will cease all Morse code services in the MF radiotelegraphy band. More efficient telecommunication systems are now available to provide the mariners with options for initiating or relaying distress alerts and passing and receiving MSI.

2 These options include Inmarsat, radio telex (SITOR), MF/HF single-sideband and VHF radiotelephone and satellite EPIRBs (for distress alerts and telecommunications), and Inmarsat SafetyNET, NAVTEX and HF NAVTEX (SITOR) (for MSI). NAVTEX broadcasts include the same notices to mariners, weather, search and rescue and fixed fishing gear location products that have been provided by the MF Morse broadcasts. Distress and other calls to any United States Coast Guard communications station can also be made on any of the following HF single-sideband radiotelephone channels: 424 (4134 kHz), 601 (6,200 kHz), 816 (8,240 kHz) or 1,205 (12,245 kHz). Meteorological broadcasts are also made on these channels.

3 The United States was of the opinion that these options provide sufficient redundancy to ensure that adequate distress and safety communication capabilities are available.

4 Questions or comments regarding discontinuance of MF Morse telegraphy services can be sent to any Coast Guard communications station or direct to the United States Coast Guard Headquarters:

Commandant (G-TTM)
United States Coast Guard
Washington, D.C. 20593
Telex: 892427 (COASTGUARDWSH)
Telefax: (202) 267-4106 or 267-4662

5 Member Governments are invited to note the above information and bring it to the attention of all those concerned.

Annex 8-9
PROVISION OF GMDSS RADIO INSTALLATIONS WITH POSITION-UPDATING FACILITY
[COM/Circ.116 (11.01.94)]

1 The Sub-Committee on Radiocommmunications, at its thirty-ninth session (29 November to 3 December 1993), agreed on the importance of including the ship's position in any distress alert and for ships to be able to receive shore-to-ship distress alerts directed to specifically defined geographical areas. To this effect, the Sub-Committee recommended that Members provide, where possible, GMDSS radio installations with the facility to automatically update the ship's position from a suitable electronic position-fixing aid.

2 To expedite the above recommendation, manufacturers and standardization entities are requested to ensure than all relevant shipborne radio equipment forming part of the GMDSS and electronic navigational aids are fitted with a suitable interfacing facility for the exchange of data which, to ensure technical compatibility between all equipment, should conform to an appropriate international standard*.

3 However, recognizing that it may not be practicable to provide existing equipment with the facility to update the ship's position automatically, the Sub-Committee urged Members to recommend all ships to endeavour to enter the ship's position into relevant equipment forming part of a GMDSS radio installation at intervals not exceeding 4 hours whenever under way.

4 Furthermore, to assist ships' crews, manufacturers are urged to incorporate an alarm into all GMDSS radio equipment, if used to generate distress alerts containing the ship's position, to be activated when no revised position date are entered within a pre-determined period.

* Reference is made to IEC 1162.

Annex 8-10
CLARIFICATION OF THE APPLICATION OF CERTAIN PROVISIONS OF CHAPTER IV OF THE SOLAS CONVENTION

SOLAS Regulations IV/15.5, IV/15.6 and IV/15.7 [COM/Circ.117 (10.01.94)]

1 The Sub-Committee on Radiocommunications, being informed, at its thirty-ninth session, that some Administrations interpret SOLAS regulations IV/15.5, IV/15.6 and IV/15.7 in conjunction with Assembly resolution A.702(17) – Radio Maintenance Guidelines, to mean a mandatory requirement for shipowners to have a service agreement with a shore-based maintenance (SBM) provider or providers, could not agree with such an interpretation. The Sub-Committee was of the view that the production of a valid SOLAS certificate by an Administration is sufficient proof that the Administration is satisfied that adequate maintenance arrangements have been made by the shipowner.

2 Member Governments are invited to take account of this clarification when carrying out Port State control procedures.

Annex 8-11
NOTIFICATION OF MARITIME MOBILE SERVICE IDENTITIES (MMSIs) ASSIGNED TO SHIPS [COM/Circ.120 (31.01.94)]

1 The Sub-Committee on Radiocommunications, at its thirty-ninth session (29 November to 3 December 1993), noted that the International Telecommunication Union (ITU) listing of maritime mobile service identities (MMSIs) is not up to date and that, consquently, rescue co-ordination centres (RCCs) have difficulty in identifying vessels who have transmitted distress alerts. The Sub-Committee noted that apparently some Administrations have not kept the ITU informed of the changes in their MMSI assignments at all. The ITU observer noted that Administrations were required to provide these updates under Article 25 of the Radio Regulations (RR 2237).

2 The Sub-Committee urged Administrations to notify the ITU, through their telecommunication authorities, when MMSIs are assigned to ships and other changes are made, noting that delays could degrade an RCC's ability to assist ships in distress.

3 Member Governments are invited to bring this circular to the attention of their MMSI issuing authorities as a matter of urgency.

Annex 8-12
SELECTION OF MORE THAN ONE FIXED AREA IN THE INMARSAT-C SYSTEM [COM/Circ.122 (14.02.95)]

1 The Sub-Committee on Radiocommunications, at its fortieth session (16 to 20 January 1995), noted that Inmarsat had proposed a change to the Inmarsat-C System Definition Manual (SDM) that would enable Enhanced Group Call (EGC) receivers to monitor "more than four" areas compared with the current requirement of "more than one (minimum two)" areas. It was also emphasized that this requirement applies to coastal warning service areas as well as to the NAVAREA/METAREA concerned.

2 The Sub-Committee was also advised by Inmarsat that this change would not be retroactive and, therefore, the owners/operators of existing EGC receivers would not be required to apply this upgraded software in their system.

3 In this regard, the Sub-Committee understood that changes are being made to the software of Inmarsat-C terminals from time to time which correct or improve the functional performance of the terminals for distress and safety communications. However, terminals already fitted in ships do not automatically have their software upgraded.

4 The Sub-Committee urged Administrations to encourage ships under their jurisdiction to always use the latest version of the manufacturer's software in their Inmarsat-C terminals so as to take advantage of the improved functionality it provides.

5 Member Governments are invited to bring this circular to the attention of all concerned.

Annex 8-13
RECOMMENDATIONS ON THE USE OF BATTERIES FOR TWO-WAY VHF RADIOTELEPHONE APPARATUS [COM/Circ.125 (20.02.95)]

1 The Sub-Committee on Radiocommunications, at its fortieth session (16 to 20 January 1995), considered the use of rechargeable batteries in GMDSS equipment, particularly in two-way VHF telephone apparatus.

2 From practical experience in the use of portable radiotelephone apparatus and associated battery packs, the following points were noted:

.1 NiCd rechargeable batteries, assembled in battery packs, are in widespread use to power portable radiotelephone apparatus. They comply with the environmental requirements on board ships. Battery packs can easily be replaced and charged independently or when attached to the portable radiotelephone apparatus;

.2 battery chargers on the market are suitable to recharge NiCd batteries within acceptable time periods. For portable radiotelephone apparatus extensively used, more than one battery pack would be required. NiCd batteries regularly discharged and recharged will require renewal, as a rule of thumb, after one to three years of use;

.3 while rechargeable NiCd batteries will satisfy the operational requirement for portable radiotelephone appartus during their life-cycle, there are no easy means available to verify their charging state and capacity when fully charged. Additionally, rechargeable batteries, when not in use, cannot be maintained at a fully charged condition and a specified power capacity for a prolonged period; and

.4 rechargeable NiCd batteries, when in use, cannot comply with a requirement for a specified power capacity at any given instance. On the other hand, primary batteries can retain their power capacity for a designated lifetime when not in use. However, when in use the remaining power capacity cannot be easily determined. Battery packs for portable radiotelephone apparatus are not standardized but designed to comply with the requirements of the associated radiotelephone. Battery packs not attached to the portable radiotelephone apparatus should be stored, ready for use, adjacent to the portable radiotelephone apparatus.

3 The following recommendations apply to the use of batteries in survival craft two-way VHF radiotelephone apparatus:

.1 Radiotelephone apparatus should have an attached battery pack as its independent source of energy which may consist of primary or secondary (rechargeable) batteries.

.2 Each survival craft two-way VHF radiotelephone apparatus should be provided with an additional (reserve) battery pack equipped with primary batteries located adjacent to the radiotelephone apparatus for use in an emergency. The primary batteries should have a shelf life of at least two years.

.3 All primary battery packs provided for survival craft two-way VHF radiotelephone apparatus should have the minimum power capacity to comply with the power supply requirements of Assembly resolution A.762(18),* as may be amended – Performance Standards for Survival Craft Two-way VHF Radiotelephone Apparatus – and to ensure 8 h operation at its highest rated power.

4 Member Governments are requested to bring this circular to the attention of organizations, shipowners and seafarers and all others concerned.

* Resolution A.762(18) has been superseded by resolution A.809(19) (see annex 3-6-2).

Annex 8-14
GUIDELINES FOR USE IN EVALUATING REGIONAL MOBILE SATELLITE SYSTEMS [COM/Circ.128 (22.05.95)]

1 The Sub-Committee on Radiocommunications, at its fortieth session (16 to 20 January 1995), noted that the International Convention for the Safety of Life at Sea (SOLAS), 1974, does not prevent the use, by any ship, survival craft or person in distress, of any means at their disposal to attract attention, make known their position and obtain help. The Sub-Committee agreed that, for the above purpose, the use of equipment operating in regional mobile satellite systems may be considered. However, Governments should ensure that equipment operating in radiocommunication services required by SOLAS chapter IV to be used in the global maritime distress and safety system (GMDSS) is provided on ships subject to the SOLAS Convention, and on other ships wishing to participate in the GMDSS, both to enhance the safety of the ships concerned and to enable them to receive distress alerts and communicate with other ships, survival craft and persons in distress.

2 To assist Administrations in evaluating regional mobile satellite systems, which may be used for maritime distress and safety radiocommunication purposes, the Sub-Committee developed the Guidelines annexed hereto.

Annex

GUIDELINES FOR ADMINISTRATIONS IN THE EVALUATION OF REGIONAL MOBILE SATELLITE SYSTEMS

1 INTRODUCTION

1.1 Some regional mobile satellite systems may offer facilities for maritime distress and safety communications. Careful consideration is needed when evaluating these systems for this purpose.

2 DEFINITIONS

2.1 *GMDSS radio systems* means the radio systems forming part of the global maritime distress and safety system (GMDSS) are those set out in chapter IV, regulation 5 of the International Convention for the Safety of Life at Sea (SOLAS 74), 1974, as amended in 1988.

2.2 *Regional mobile satellite system* means a satellite system providing a service to a limited area or region.

3 CONSIDERATIONS IN EVALUATING REGIONAL SATELLITE SYSTEMS FOR MARITIME DISTRESS AND SAFETY COMMUNICATIONS

3.1 The responsibility for evaluating regional mobile satellite systems to provide maritime distress and safety communications rests with the Administration concerned. This evaluation should be based on a thorough testing of the system.

3.2 In this evaluation Administrations should take account of all the principles laid down by the Organization. In addition, regional mobile satellite systems should operate in accordance with the provisions of the ITU Radio Regulations and fulfil the technical and operational requirements of the Organization, including priority arrangements for maritime distress and safety radiocommunications.

3.3 The Administration should consider the need of preserving the safety for all ships, including those not equipped for the regional mobile satellite system. In this regard, it should be noted that mobile satellite systems can only perform some of the GMDSS radiocommunication functions; see also paragraph 3.9.

3.4 Ship earth stations operating in regional mobile satellite systems should conform to performance standards not inferior to those adopted by the Organization.

3.5 The Administrations should ensure that users are fully aware of the capabilities and limitations of regional mobile satellite systems.

3.6 The need of preserving the global uniformity of the radiocommunication processes within the GMDSS framework and the importance of efficient, unambiguous and fast ship-to-shore, shore-to-ship and ship-to-ship distress and safety communication processes must be borne in mind when evaluating regional mobile satellite systems.

3.7 The Administration should ensure that a current database of mobile earth station identities for ships using regional mobile satellite systems is made available to rescue co-ordination centres (RCCs).

3.8 Regardless of the use made of regional mobile satellite systems, the Administration should ensure that all relevant information concerning distress alerts, distress communications, search and rescue communications and maritime safety information is immediately transmitted to other ships via the appropriate GMDSS radio systems.

3.9 Regional mobile satellite systems cannot perform the functional requirements set out in regulations 4.1.3, 4.1.5, 4.1.6, and 4.1.9 of chapter IV of SOLAS 74, as amended in 1988; see Appendix.

3.10 An Administration permitting use of such regional mobile satellite systems on board their ships should ensure that these ships are fully equipped for all GMDSS functions.

3.11 All ships fitted with a mobile earth station operating in a regional mobile satellite system should be provided with adequate documentation stating clearly the service area of the system and listing the equipment installed.

3.12 The Administration should ensure that the radio personnel of such ships are:

.1 educated in the use of the mobile earth station for distress and safety purposes and certified to that effect; and

.2 instructed on the importance of using the radiocommunication functions of the GMDSS, especially the ship-to-ship distress and safety functions, as these functions are not covered by regional mobile satellite systems; see Appendix.

3.13 Ships fitted for the GMDSS in accordance with the relevant provisions of chapter IV of SOLAS 74 Convention, as amended in 1988, are not required to be fitted with equipment for regional mobile satellite systems.

Appendix

GMDSS function	Remarks
Ship-to-shore alert	See Note 1
Shore-to-ship alert	See Note 2
Ship-to-ship alerting	Regional mobile satellite systems cannot substitute the relevant GMDSS radio system
SAR communication ship-to-shore	See Note 1
SAR communication shore-to-ship	See Note 2
On-scene communication	Regional mobile satellite systems cannot substitute the relevant GMDSS radio system
Ship transmit locating signal	Regional mobile satellite systems cannot substitute the relevant GMDSS radio system
Ship receive locating signal	As above
Ship transmit MSI to shore	See Note 1
Ship receive MSI from shore	See Note 2
Ship-to-ship MSI	Regional mobile satellite systems cannot substitute the relevant GMDSS radio system
General com. ship-to-shore	Regional mobile satellite systems may be used
General com. shore-to-ship	Regional mobile satellite systems may be used
General com. ship-to-ship	Regional mobile satellite systems may be used between ships fitted for that system
Bridge-to-bridge com.	Regional mobile satellite systems cannot substitute the relevant GMDSS radio system

Note 1: Regional mobile satellite systems may be used for this purpose, provided that the responsible shore authority immediately relays the same or all relevant information to other ships in the area via the relevant GMDSS radio system(s).

Note 2: Regional mobile satellite systems may be used for this purpose, provided that the same or all relevant information is also transmitted immediately to other ships in the area via the relevant GMDSS radio system(s).

Annex 8-15
RELATIONS BETWEEN NAVAREA CO-ORDINATORS AND RESCUE CO-ORDINATION CENTRES [COMSAR/Circ.3 (19.04.96)]

1 The Sub-Committee on Radiocommunications and Search and Rescue (COMSAR), at its first session (19 to 23 February 1996), agreed (COMSAR 1/30, paragraph 5.5) that it was necessary that messages concerning search and rescue (SAR) operations only be accepted by a NAVAREA Co-ordinator for broadcast if they have been received from an authorized SAR authority in accordance with the provisions of paragraph 4.2.1.3.7 of resolution A.706(17) on the World-Wide Navigational Warning Service. It, therefore, prepared the guidance on relations between NAVAREA Co-ordinators and rescue co-ordination centres, given at annex.

2 Member Governments are invited to bring the annex to the attention of their SAR authorities and, where applicable (see COMSAR/Circ.5*), to their NAVAREA Co-ordinator.

Annex

RELATIONS BETWEEN NAVAREA CO-ORDINATORS AND RESCUE CO-ORDINATION CENTRES

1 The co-ordinating RCC is responsible for distress alert relay and SAR co-ordinating communications.

2 Therefore, the RCC concerned needs to be able to originate SafetyNET broadcasts and have a direct arrangement with a CES.

3 Only after SAR operations have been stood down after a fruitless search, or after failing to find a ship alongside in a port search, or when a ship is several days overdue and contact cannot be established, should an RCC consider requesting the NAVAREA Co-ordinator to broadcast a NAVAREA warning.

4 Under these circumstances, the NAVAREA Co-ordinator has discretion as to whether to broadcast a SAR NAVAREA warning or not. However, any SAR NAVAREA warning that is broadcast should always be self-cancelling after 48 hours.

5 The RCC must always keep the NAVAREA Co-ordinator informed of any subsequent information he may receive concerning the ship or ships referred to in the SAR NAVAREA warning broadcast.

* COMSAR/Circ.5 has been superseded by COMSAR/Circ.24 of 10 January 2001 (see annex 8-28).

Annex 8-16
RECOMMENDATION ON PREVENTION OF HARMFUL INTERFERENCE ON THE 8, 12 AND 16 MHz GMDSS DISTRESS AND SAFETY SIMPLEX FREQUENCIES [COMSAR/Circ.6 (19.04.96)])

1 The Sub-Committee on Radiocommunications and Search and Rescue (COMSAR), at its first session (19 to 23 February 1996), reiterated its concern at the harmful interference being caused on HF simplex GMDSS distress and safety frequencies, which, if not stopped, would seriously affect GMDSS communications. The Sub-Committee noted that this issue was also addressed at COM 39; however, the situation continues to be unacceptable.

2 To address the issue, the Sub-Committee again drew attention to the recommendation on prevention of harmful interference on the 8, 12 and 16 MHz simplex GMDSS distress and safety frequencies, given in the annex.

3 Member Governments are invited to draw the problem, highlighted above, to the attention of their telecommunication authorities, urging them to take co-ordinated action to prevent this serious interference.

4 This circular supersedes COM/Circ.119.

Annex

RECOMMENDATION ON PREVENTION OF HARMFUL INTERFERENCE ON THE 8, 12 AND 16 MHz GMDSS DISTRESS AND SAFETY SIMPLEX FREQUENCIES

There is at present considerable man-made disruption to the GMDSS distress and safety radiotelephone frequencies 8291, 12290 and 16420 kHz. This interference severely degrades the effectiveness of these new distress and safety frequencies and therefore is considered "harmful" as defined in Article 22 of the Radio Regulations (RR) and requires urgent action by Administrations in accordance with RR 1957.

There is an apparent anomaly in the RRs (Nos. 4375 and 4376 refer), whereby the ship transmit frequencies of international radiotelephone channels 1121 (ship transmit 12290 kHz, ship receive 13137 kHz) and 1621 (ship transmit 16420 kHz, ship receive 17302 kHz) are also allocated as GMDSS radiotelephony distress and safety channels.

In accordance with the RR 4375 and 4376, ship stations may use 12290 kHz and 16420 kHz for distress and safety traffic. These frequencies are, however, paired with 13137 kHz and 17302 kHz which are used by coast stations. The details of the frequency plan are given in the Table of Single-Sideband Transmitting Frequencies for Duplex (Two-frequency) Operation in Section A of Appendix 16 of the RR. RR 4375.3 further authorizes the frequencies 12290 kHz and 16420 kHz for common use by coast and ship stations for single-sideband radiotelephony on a simplex basis for distress and safety traffic.

As a result, considerable interference during search and rescue communications is experienced due to ships being unable to monitor their transmit frequency in the duplex mode.

To overcome this problem, Administrations are urgently requested, where relevant, to move their coast radio stations calling frequencies from channels 1221 and 1621 in these bands to any other suitable channel. This would then allow the channels on carrier frequencies 12290 kHz and 16420 kHz as allowed in ITU regulations RR 4375 and RR 4376 to be used exclusively for distress and safety traffic by radio telephony on simplex basis.

It is further recommended that Administrations propose, through their telecommunications authorities, to the ITU that the channels 12290 kHz and 16420 kHz shall be used on an exclusive basis for this purpose, as is the case for the 8291 kHz frequency (RRs N3001 and N3067 refer).

Administrations are urged to monitor the frequencies 8291, 12290 and 16420 kHz, and to report cases of harmful interferences as prescribed by Article 22 of the ITU RR.

Annex 8-17
IMPORTANCE OF CORRECT FORMATTING OF TRANSMISSIONS ON NAVTEX SYSTEM [COMSAR/Circ.7 (7.10.96)]

1 Due to the importance of the prompt receipt of maritime safety information by ships, this circular is being issued following consultations between the Chairman of the COMSAR Sub-Committee, the Chairman of the NAVTEX Co-ordinating Panel and the Secretariat,who considered this to be an urgent matter which should be brought to the attention of Member Governments without delay. The second session of the COMSAR Sub-Committee will be invited to endorse this action.

2 A recent incident in the United Kingdom has highlighted the importance of strict adherence to the operational and technical characteristics of the NAVTEX system.

3 Modern microprocessor-controlled NAVTEX receivers may reject any messages which do not conform **EXACTLY** with the technical format of the transmission as contained in Annex II to Recommandation ITU-R M.540-2 which is given in the annex. For example, the addition of a **SECOND** space between the "ZCZC" and the "$B_1B_2B_3B_4$" characters may be sufficient for the whole message to be lost.

4 It is strongly recommended that all NAVTEX Co-ordinators continuously monitor messages transmitted using the NAVTEX system to ensure that all conform precisely with the technical format given in the annex.

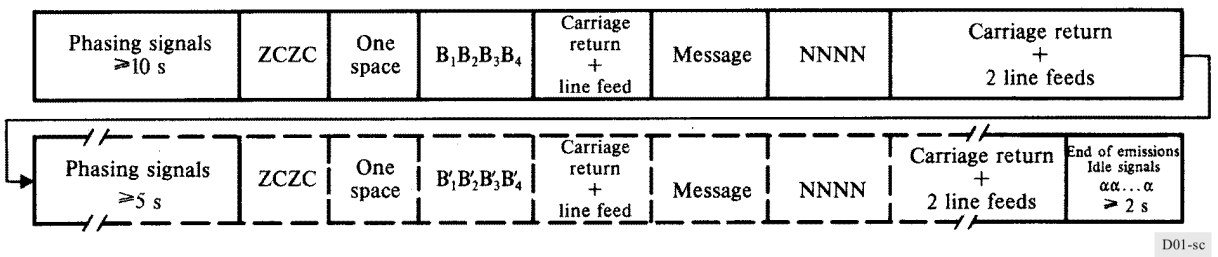
5 Member Governments are invited to bring this information to the attention of those involved in the promulgation of maritime safety information using the NAVTEX system.

Annex

ANNEX II (RECOMMENDATION ITU-R M.540-2) TECHNICAL CHARACTERISTICS

1 The signals transmitted should be in conformity with the collective B-mode of the direct-printing system specified in Recommendations 476 and 625.

2 The technical format of the transmission should be as follows:



in which

ZCZC defines the end of the phasing period.

the B_1 character is a letter (A–Z) identifying the transmitter coverage area.

the B_2 character is a letter (A–Z) for each type of message.

2.1 Both the B_1 characters identifying the different transmitter coverage areas and the B_2 characters identifying the different types of messages are defined by IMO and chosen from Table 1 of Recommendations 476 and 625, combination numbers 1–26.

2.1.1 Ship equipment should be capable of automatically rejecting unwanted information using character B_1.

2.1.2 Ship equipment should be capable of disabling print-out of selected types of messages using character B_2 with the exception of messages with B_2 characters A, B and D (see also § 2.1).

2.1.3 If any facility is rejected or disabled as described in §2.1.1 and 2.1.2 above, the extent of any such limitation must be clearly indicated to the user.

2.2 B_3B_4 is a two-character serial number for each B_2, starting with 01 except in special cases where the serial number 00 is used (see §6 below).

2.3 The characters ZCZC $B_1B_2B_3B_4$ need not be printed.

3 The printer should only be activated if the preamble $B_1 - B_4$ is received without errors.

4 Facilities should be provided to avoid printing of the same message several times on the same ship, when such a message has already been satisfactorily received.

5 The necessary information for the measures under §4 above should be deduced from the sequence $B_1B_2B_3B_4$ and from the message.

6 A message should always be printed if $B_3B_4 = 00$.

7 Extra (redundant) letter and figure shifts should be used in the message to reduce garbling.

8 In case a message is repeated by another transmitting station (e.g. for better coverage) the original preamble $B_1 - B_4$ should be used.

9 The equipment on board ships should be neither unduly complex nor expensive.

10 The transmitter frequency tolerance for the mark and the space signals should be better than ± 10 Hz.

Annex 8-18
REQUIREMENTS FOR NOTIFICATION TO THE INTERNATIONAL TELECOMMUNICATION UNION (ITU) OF GMDSS SHIPS' IDENTITIES, FOR INCLUSION IN THE MARITIME MOBILE ACCESS AND RETRIEVAL SYSTEM (MARS) [COMSAR/Circ.9 (12.03.97)]

1 The Sub-Committee on Radiocommunications and Search and Rescue (COMSAR), at its second session (27 to 31 January 1997), noted that the ITU 24-hour available electronic database, including the Maritime Mobile Service Identities (MMSIs), named the Maritime Mobile Access and Retrieval System (MARS) is not up to date and that, consequently, rescue co-ordination centres (RCCs) have difficulty in identifying ships who have transmitted distress alerts. The Sub-Committee also noted that the MARS, by means of a personal computer through X.25 connection, is useful in the SAR activities if the ships are registered. The Sub-Committee further noted that, in accordance with Article S 20 of the Simplified Radio Regulations, Administrations shall take all appropriate measures to notify the ITU immediately of any changes to, or new, GMDSS identities assigned to their ships (S 20.16).

2 The Sub-Committee urged Administrations to notify the ITU Radiocommunication Bureau, through their telecommunication authorities, of the relevant information on their GMDSS ships' identities for inclusion in the MARS* as soon as it is available and to keep it updated of any changes, noting that delays could degrade an RCC's ability to assist ships in distress.

3 Member Governments are requested to bring this circular to the attention of their GMDSS ships' identities issuing authorities for appropriate action, as a matter of urgency.

---

* **Note 1:** For queries and/or comments please contact:

Mr. Challo: Tel : +41 22 730 5217
Internet : stephen.challo@itu.ch
X.400 : G=stephen;S=challo;A=arcom;P=itu;C=ch

Mr. Das: Tel : +41 22 730 5007
Internet : mohan.das@itu.ch
X.400 : G=mohan;S=das;A=arcom;P=itu;C=ch

FAX: +41 22 730 5509

Note 2: Registration forms are also available from:

TIES HELPDESK
FAX : +41 22 730 5337
X.400 e-mail : S=helpdesk;A=arcom; P=itu; C=ch
Internet e-mail : helpdesk@itu.ch
Postal mail : ITU TIES, Place des Nations, 1211
Geneva 20, Switzerland

Annex 8-19
LIST OF COAST EARTH STATION (CES) OPERATION CO-ORDINATORS IN INMARSAT SYSTEM [COMSAR/Circ.11 (04.03.97) as amended (04.01)]

1 The Sub-Committee on Radiocommunications and Search and Rescue (COMSAR), at its second session (27 to 31 January 1997), with view to eliminate interruption of communications between a Rescue Co-ordination Centre (RCC) and ships in SAR operations via Inmarsat systems, in the light of experience gained during the *Achille Lauro* incident, decided to issue the list of CES operation co-ordinators, given in the annex, with whom problems with SAR communications could be co-ordinated and rectified.

2 Member Governments are invited to bring the annexed list to the attention of their SAR Authorities and RCCs for use when problems with SAR Inmarsat communications arise.

Annex

LIST OF OPERATION CO-ORDINATORS

Station Name **Tp/Fx/Tx Numbers**

1 ARVI (IOR) – INDIA

Services supported by this Station – A,C, M/B, mM

MR J.P. SINGH
Operations Coordinator
Videsh Sanchar Nigam Limited
Videsh Sanchar Bhavan (3rd Floor)
MG Road
Mumbai 400 001
INDIA

Tel: +91 21 324 2460
Fax: +91 22 262 4806
Telex: (CC:81) 1182429 VSNH IN
Email: jpsingh@bom3.vsnl.net.in
x400:

2. ATA (AOR-E & IOR) – TURKEY

Services supported by this Station – A, C

MR MEHMET C. TOROS
Operations Coordinator
Turk Telekom
Satellite Communications Center
Uydu Haberlesme Merkeze
06839 Golbasi, Ankara
TURKEY

Tel: +90 312 555 6500
Fax: +90 312 499 5115
Telex: (CC:607) 44850 AKYI TR
Email: toros@satcom.gov.tr
x400:

3. AUSSAGUEL (AOR-E & IOR & AOR-W) – FRANCE

Services supported by this Station – C, M/B, M4, Mobman, R, mM

MR FLORENT BOURGEOIS
Operations Coordinator
France Telecom
FTRSI/USM
16 Bd du Mont d'Est
93192 Noisy le Grand
FRANCE

Tel: +33 1 48 15 73 12
Fax: +33 1 48 15 73 08
Telex:
Email: florent.bourgeois@francetelecom.com
x400:

4. BEIJING (IOR & POR) – PEOPLES REPUBLIC OF CHINA

Services supported by this Station – A, C, M/B, mM

MR MO JIANJUN
Operations Coordinator
Beijing Marine Comm & Navigation Co
1 Wai Guan Hou Shen
An Wai
Beijing 100011
PEOPLES REPUBLIC OF CHINA

Tel: +86 10 652 93828
Fax: +86 10 652 93850/624 72819
Telex: (CC:85) 210319 BJCES CN
Email: jianjun_mo@163.net
x400:

5. BOUMEHEN (IOR) – ISLAMIC REPUBLIC OF IRAN

Services supported by this Station – A, C

MR A.A. ARABI
Operations Coordinator
Maintenance Satellite Comm
L.C.T. Bldg, Kordestan Freeway
Behind ASP Buildings
P O Code: 14378 - Tehran
ISLAMIC REPUBLIC OF IRAN

Tel: +98 21 329 3331
Fax: +98 21 329 3328/3511
Telex: (CC:88) 216929
Email: aa-arabi@yahoo.com
x400:

6. BUKIT TIMAH (IOR) – REPUBLIC OF SINGAPORE

Services supported by this Station – C, M/B

MR CHONG CHING LING
Operations Coordinator
Singtel
50 Rifle Range Road
Bukit Timah Satellite Earth Station
Singapore 588397
REPUBLIC OF SINGAPORE

Tel: +65 275 0156/279 1253
Fax: +65 275 0155
Telex: (CC: 87) 39580
Email: chingling@singtel.com
x400:

7. BURUM (AOR-E & AOR-W & IOR) – THE NETHERLANDS

Services supported by this Station – C

MR WITTE DE WIT
Operations Coordinator
Station 12 B.V.
P O Box 30012
2500 GD, The Hague
THE NETHERLANDS

Tel: +31 70 34 36490
Fax: +31 70 34 34211
Telex: (CC: 44) 43200 ST12 NL
Email: j.w.dewit02@kpn.com
x400:

Services supported by this Station – M/B, M4, mM

MR GERTJAN STEKETEE
Operations Coordinator
Station 12 B.V.
P O Box 30012
2500 GD, The Hague
THE NETHERLANDS

Tel: +31 70 34 34254
Fax: +31 70 34 34211
Telex: (CC: 44) 43200 ST12 NL
Email: g.steketee@kpn.com
x400:

Services supported by this Station – A

MR G. STEKETEE
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2500 GD, The Hague
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Tel: +31 70 34 34254
Fax: +31 70 34 34211
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Email: g.steketee@kpn.com
x400:

Services supported by this Station – D

MR GERARD LUURSEMA
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Station 12 B.V.
P O Box 30012
2500 GD, The Hague
THE NETHERLANDS

Tel: +31 70 34 38091
Fax: +31 70 34 34211
Telex: (CC: 44) 43200 ST12 NL
Email: g.w.luursema@kpn.com
x400:

8. CAPE D'AGUILAR (IOR & POR) – HONG KONG

Services supported by this Station – A, M/B

MR KAM-LEUNG YIP
Operations Coordinator
Cable & Wireless HKT Ltd
Stanley Earth Station
c/o P O Box 9896
GPO HONG KONG

Tel: +852 2888 1013
Fax: +852 2813 2224
Telex: (CC: 802) 73782 HKSAT HX
Email: kam-leung.yip@cwhkt.com
x400:

9. COMSAT EURASIA (IOR) – MALAYSIA

Services supported by this Station – M/B, mM

MR CARL HUNT
Operations Coordinator
Coordinator for COMSAT EURASIA
(See Southbury for details)
MALAYSIA

Tel: +1 203 264 4091
Fax: +1 203 264 8217
Telex: (CC: 230) 197800 SCD COMSAT
Email: carl.hunt@comsat.com
x400:

10. EIK (AOR-E & AOR-W & IOR) – NORWAY

Services supported by this Station – A, C, M/B, M4, Mobman, R, mM

MR HENRY KONGEVOLD
Operations Coordinator
Telenor Satellite Services AS
Eik LES
P O Box 74
N-4460 Moi
NORWAY

Tel: +47 51 408070
Fax: +47 51 402240
Telex: (CC: 56) 72666 GENTL N
Email: henry.kongevold@telenor.com
x400:

11. EMEQ HAELA (AOR-E & IOR) – ISRAEL

Services supported by this Station – M/B, M4, mM

MR DAVID FILS
Operations Coordinator
Bezeq The Israel Telecomm. Corp Ltd
132 Petach-Tikva Road, Azrieli Bldg #2
P O Box 62081
Tel-Aviv 61620, ISRAEL

Tel: +972 2 999 5489
Fax: +972 2 999 5490
Telex:
Email: dfils@trendline.co.il
x400:

12. FUCINO (AOR-E & IOR) – ITALY

Services supported by this Station – A, C, M/B, R

MR ADRIANO DE CAMILLIS
Operations Coordinator
Nuova Telespazio
Via Tiburtina 965
00156 Rome
ITALY

Tel: +39 06 4079 3756
Fax: +39 06 4079 3625
Telex: (CC: 43) 620424 SPZROI
Email: adriano_decamillis@telespazio.it
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Services supported by this Station – A,C, M/B, R

MR D. NICOLUCCI
Operations Coordinator
Telecom Italia
Divisione Clienti Privati
Servizi Radiomarittimi
Viale Europa 190, 0144 Rome
ITALY

Tel: +39 06 3687 2827
Fax: +39 06 3687 0774
Telex: (CC: 43) 622346 IAR AI
Email: domenico.nicolucci@telecomitalia.it
x400:

13. GNANGARA (IOR) – USA

Services supported by this Station – A

MR R. PERNICH
Operations Coordinator
Coordinator for Gnangara LES
(see Perth for details)

Tel:
Fax:
Telex:
Email:
x400:

14. GOONHILLY (AOR-E & AOR-W & IOR) – ENGLAND

Services supported by this Station – A, C, E, M/B, M4, Mobman, R, mM

MR P. DYER
Ops Coordinator
Stratos
Hillside
Twelveheads
Truro TR4 8SH
ENGLAND

Tel: +44 07866 312373
Fax:
Telex: (CC: 51) 45577 GNHLY G
Email: paul.j.dyer@btinternet.com
x400:
(FAX NUMBER TO BE ADVISED SHORTLY)

Services supported by this Station – R

MR GRENVILLE NOLAN
Operations Coordinator
Stratos
(Finsbury Square Office)
(THIS IS NOT OPEN YET)

Tel:
Fax:
Telex: (CC: 51) 916554 BTIMR G
Email: grenville_nolan@stratos.ca
x400:

15. HAI PHONG (IOR & POR) – SOCIALIST REPUBLIC OF VIETNAM

Services supported by this Station – B, C, mM

PHAN NGOC QUANG
Operations Coordinator
Vietnam Maritime Communications &
Electronics Company (VISHIPEL)
No 2 Nguyen Thuong Hien Str
Hai Phong City
SOCIALIST REPUBLIC OF VIETNAM

Tel: +84 31 747 204
Fax: +84 31 842 979
Telex: 805 31 1282
Email: vishipel@hn.vnn.vn
x400:

16. JATILUHUR (IOR) – INDONESIA

Services supported by this Station – M/B, M4, Mobman, mM

MR ABDUL ADHIB
Operations Coordinator
PT. INDOSAT
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Purwakarta 41152
INDONESIA

Tel: +62 21 386 9700
Fax: +62 21 386 5651
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Annex 8-20
SHORE-TO-SHIP COMMUNICATIONS DURING A DISTRESS
[COMSAR/Circ.13 (06.03.98)]

1 The Sub-Committee on Radiocommunications and Search and Rescue (COMSAR), at its third session (23 to 27 February 1998), taking into account the need for providing priority for shore-originated distress communications to ships whose SESs are busy with ongoing traffic, prepared the following guidance for RCCs to facilitate shore-to-ship communications during a distress.

2 The techniques outlined below may be used by RCCs to contact ships fitted with Inmarsat Ship Earth Stations (SESs), but which are busy at the time with other traffic.

3 The provision of "immediate access for distress priority calls from a registered RCC to a ship" is complex. For example, Inmarsat ship terminals generally have only one receiver and it is, therefore, impossible to interrupt a call and connect the SES directly to an RCC by intervention from any CES.

4 If the SES is being called from an RCC via another CES from which the ongoing call has been established, then there is no option but to wait until the call has cleared and the SES is idle to set up a priority call.

5 If the SES is being called by an RCC via the same CES which has the ongoing call, then the CES can clear the ongoing call and immediately set up the call from the RCC.

6 With respect to the Inmarsat-C system, if the SES is in communication with a CES, other than the calling CES, then the calling CES has no option other than to wait until the SES is idle and then set up the call. If the SES is being called by an RCC via the same CES there are two options:

.1 to clear the current call and start the distress priority call; or

.2 to wait until the current call has completed and perform the distress priority call from the RCC as a follow-on call.

7 The second option (6.2) is preferable unless the SES is engaged in a long message (most messages last 1–2 minutes) since aborting the call and starting a new one causes the SES to go into idle mode and retune to the NCS. It is likely therefore that option 6.2 would actually be quicker except for very long messages.

8 As SOLAS ships will most likely carry an Inmarsat-C equipment as part of their GMDSS equipment, it would be an option to send a Distress priority message in the shore-to-ship direction asking the ship to clear their Inmarsat voice terminal and contact the RCC immediately. This solution has been used successfully.

9 The facilities and resources available for these RCCs and the nature of the communications link between the RCC and CES are strictly a matter for the country concerned (COMSAR 3/INF.21 of Inmarsat refers).

10 Member Governments are invited to bring this guidance to the attention of telecommunication authorities, shipowners, ship operators, shipmasters, GMDSS training institutions and other interested parties.

Annex 8-21

JOINT IMO/IHO/WMO MANUAL ON MARITIME SAFETY INFORMATION (MSI) [COMSAR/Circ.15 (09.03.98)]

1 The Sub-Committee on Radiocommunications and Search and Rescue (COMSAR), at its third session (23 to 27 February 1998), noted several amendments to the Joint IMO/IHO/WMO Manual on Maritime Safety Information (MSI) prepared by IHO and considered that the revised standardized text, annexed hereto, would be of value to those who draft navigational warnings, meteorological forecasts and warnings as well as to mariners who are expected to use the information they receive. The Sub-Committee was of the opinion that the widest possible use of the Manual should be encouraged.

2 Member Governments are invited to bring the annexed Joint IMO/IHO/WMO Manual to the attention of mariners and those involved in the promulgation of navigational warnings and meteorological forecasts and warnings.

3 This circular supersedes COMSAR/Circ.4.

Annex

JOINT IMO/IHO/WMO MANUAL ON MARITIME SAFETY INFORMATION (MSI) February 1998

TABLE OF CONTENTS

SUBJECT	SECTION	PAGE
PREFACE		3
GENERAL INFORMATION	1	4
PROMULGATION OF MARITIME SAFETY INFORMATION	2	5
RADIO NAVIGATIONAL WARNINGS FOR THE WORLD-WIDE NAVIGATIONAL WARNING SERVICE	3	10
METEOROLOGICAL WARNINGS AND FORECASTS FOR THE HIGH SEAS	4	27
SEARCH AND RESCUE	5	33

PREFACE

SOLAS, chapter IV, Regulation 12 states, in part, that "Every ship, while at sea, shall maintain a radio watch for broadcasts of maritime safety information on the appropriate frequency or frequencies on which such information is broadcasted for the area in which the ship is navigating."

At the request of the Sub-Committee on Radiocommunications, the International Hydrographic Organization (IHO) and the World Meteorological Organization (WMO) produced this joint document on the drafting of maritime safety information broadcasts, which was circulated to IHO Member States with IHB CL 10/1994 and approved by the Sub-Committee on Radiocommunications and Search and Rescue, at its first session (February 1996), and further endorsed by the Maritime Safety Committee at its 66th session (May/June 1996).

The document contains sections from the "IHO/IMO Guide to Drafting Radio Navigational Warnings for the World Wide Navigational Warning Service", and relevant sections of the WMO Publication "Manual on Marine Meteorological Services of the WMO System for the Preparation and Dissemination of Meteorological Forecasts and Warnings for the High Seas under the Global Maritime Distress and Safety System (GMDSS)". It is planned to complete chapter 5 "Search and Rescue" at a later date.

Although this is an IMO publication, it is intended that the responsible organizations will maintain their respective sections of this joint IMO/IHO/WMO document.

1 – GENERAL INFORMATION

This book provides a practical guide for anyone who is concerned with drafting radio navigational warnings or with the issuance of meteorological forecasts and warnings for the high seas under the GMDSS. It is assumed throughout that the navigational warnings are being issued under the auspices of the IHO/IMO World-Wide Navigational Warning Service (WWNWS) and that the meteorological forecasts and warnings are being issued under the patronage of the WMO, and in accordance with the requirements of IMO resolution A.706(17), as amended. The WWNWS includes two major international radio warning services as components: namely, NAVAREA warnings and Coastal warnings.

It is particularly intended to provide the best form of words for use in all types of navigational warnings and meteorological forecasts and warnings in the English language (See Notes 1 and 2). Note has been taken of the Standard Marine Navigational Vocabulary, where appropriate.

This document cannot provide specimen texts for every type of event which may occur. However, the principles illustrated herein may be applied in general to drafting messages for every kind of navigational warning and covering all types of hazards and for the issuance of meteorological forecasts and warnings for the High Seas under the GMDSS.

Notes: 1. See WWNWS Guidance Document, section 5.3, IHO/IMO Special Publication S-53.
2. See WMO Publication "Manual on Marine Meteorological Forecasts and Warnings for the High Seas under the Global Maritime Distress and Safety System (GMDSS)".

2 – PROMULGATION OF MARITIME SAFETY INFORMATION

2.1 INTRODUCTION

2.1.1 The Maritime Safety Information Service is an internationally co-ordinated network of radio broadcasts containing information which is necessary for safe navigation, received on all ships by equipment which automatically monitors the appropriate frequencies and prints out in simple English only that information which is relevant to the ship. This concept is illustrated in Figure 1.

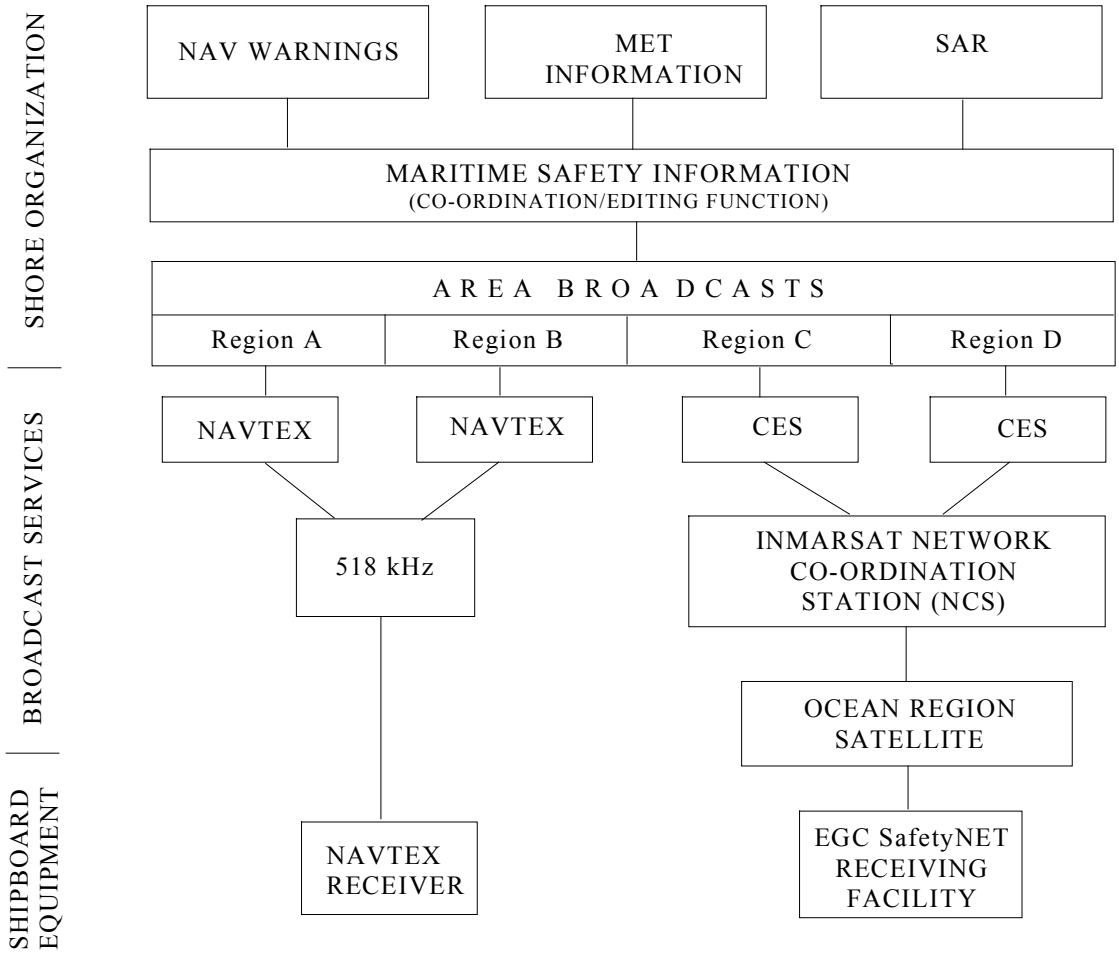


Figure 1 – International Maritime Safety Information Service

2.1.2 Maritime safety information is of vital concern to all vessels. It is therefore essential that common standards are applied to the collection, editing and dissemination of this information. Only by doing so will mariners be assured of receiving the information they need, in a form which they understand, at the earliest possible time.

2.1.3 The purpose of IMO resolution A.705(17) is to set out the organization, standards and methods which should be used for the promulgation and reception of maritime safety information.

2.2 DEFINITIONS

2.2.1 For the purposes of this Recommendation, the following definitions apply to:

.1 Maritime Safety Information – navigational and meteorological warnings, meteorological forecasts and other urgent safety-related messages.

.2 Maritime Safety Information service – the co-ordinated service of navigational and meteorological warnings, meteorological forecasts and distress alerts.

.3 World-Wide Navigational Warning Service (WWNWS) – the internationally co-ordinated service for the promulgation of navigational warnings as set out in IMO resolution A.706(17).

.4 Meteorological information – the marine meteorological warning and forecast information described in regulation V/4(b)(i) and (ii) of the 1974 SOLAS Convention.

.5 NAVAREA/METAREA – a geographical sea area, as shown in figure 2, established for the purpose of co-ordinating the transmission of radio navigational and meteorological warnings. Where appropriate, the term NAVAREA/METAREA, followed by an identifying roman numeral, may be used as a short title. The delimitation of such areas is not related to and shall not prejudice the delimitation of any boundaries between States.

.6 *Distress alert* means the initial shore-to-ship distress message broadcast in accordance with the Radio Regulations.

.7 *NAVTEX* means the system for the broadcast and automatic reception of maritime safety information by means of narrow-band direct-printing telegraphy.

.8 *International NAVTEX Service* means the co-ordinated broadcast and automatic reception on 518 kHz of maritime safety information by means of narrow-band direct-printing telegraphy using the English language, as set out in the NAVTEX Manual (IMO Publication 951).

.9 *National NAVTEX Service* means the broadcast and automatic reception of maritime safety information by means of narrow-band direct-printing telegraphy using frequencies and languages as decided by the Administrations concerned.

.10 *International SafetyNET Service* means the area-addressable global broadcast system, provided by Inmarsat, through the geostationary maritime communication satellite network for promulgation of maritime safety information, as set out in the International SafetyNET Manual (IMO Publication 908).

.11 *Coast Earth Station (CES)* means a fixed terrestrial radio facility acting as a gateway between terrestrial networks and the Inmarsat satellites in the maritime mobile-satellite service.

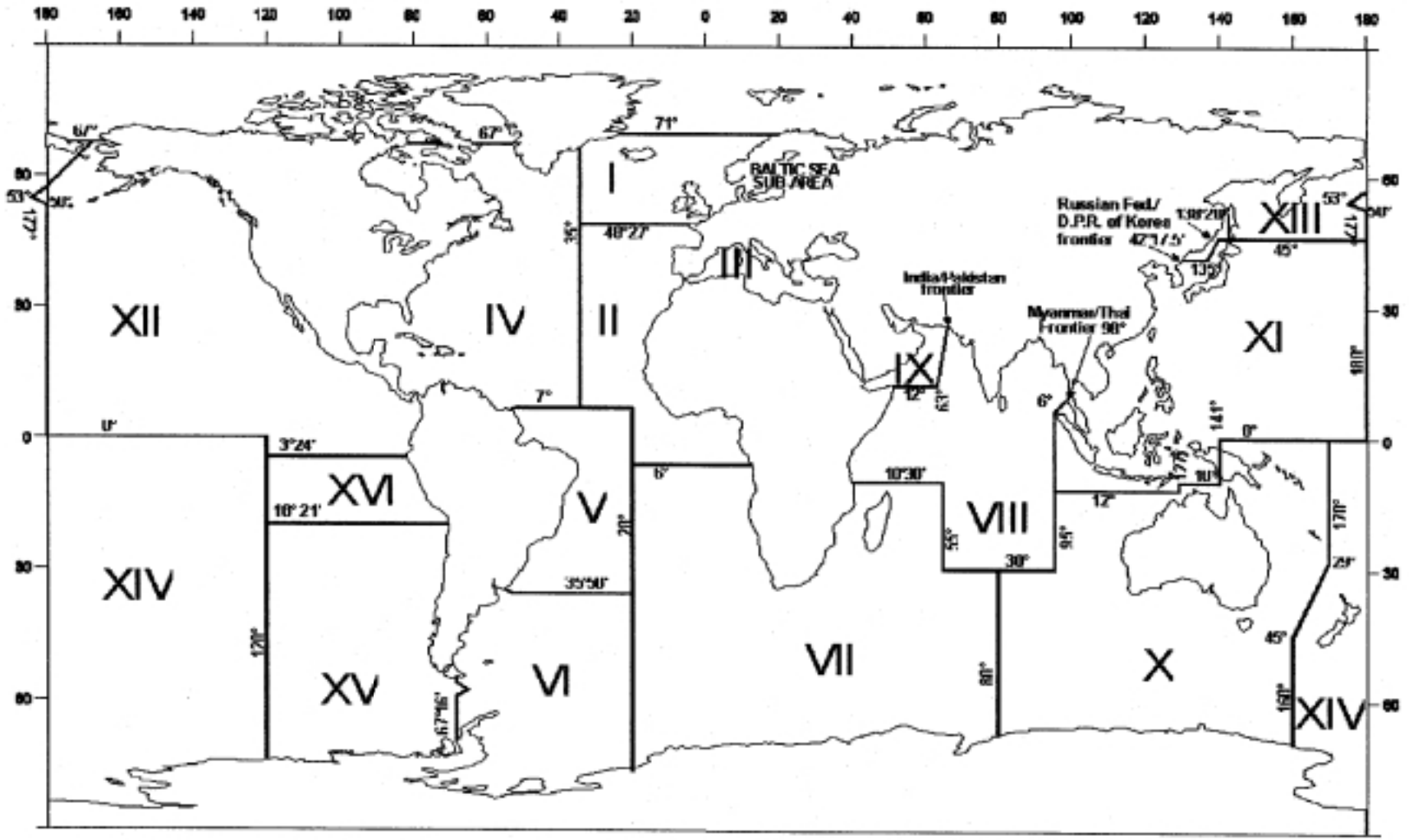


Figure 2
THE DELIMITATION OF SUCH AREAS IS NOT RELATED TO AND SHALL NOT PREJUDICE THE DELIMITATION OF ANY BOUNDARIES BETWEEN STATES.

2.3 BROADCAST SERVICES

2.3.1 Two systems are used for broadcasting maritime safety information. They are provided specifically to serve the requirements of chapter V of the 1974 SOLAS Convention in the areas covered by these systems, as follows:

.1 the International NAVTEX Service transmissions in coastal regions; and

.2 the International SafetyNET Service transmissions which cover all the waters of the globe, except for polar regions.

2.3.2 Information should be provided for unique and precisely defined sea areas, each being served only by the most appropriate of the above systems. Although there will be some duplication to allow a vessel to change from one system to another, the majority of messages will be broadcast on one system.

2.3.3 NAVTEX transmission should be made in accordance with the standards and procedures set out in the NAVTEX Manual. These transmissions are subject to approval by the Maritime Safety Committee. The means of obtaining this approval is described in the NAVTEX Manual.

2.3.4 International SafetyNET Service transmissions should be made in accordance with the standards and procedures set out in the International SafetyNET Manual.

2.3.5 Member Governments may also choose to provide supplementary equivalent broadcasts of maritime safety information in other modes using other frequencies. These may include national NAVTEX services on 4,209.5 kHz and 490 kHz and HF/NBDP broadcasts.

2.4 RECEPTION FACILITIES

2.4.1 Ships are required to be capable of receiving maritime safety information broadcasts for the area in which they operate. This requirement is set out in chapter IV of the 1974 SOLAS Convention, as amended.

2.4.2 The International SafetyNET Service receiving facility should conform to Part A of the Inmarsat Design and Installation Guidelines for EGC SafetyNET Equipment and should meet the performance standards adopted by the Organization by resolution A.664(16).

2.4.3 The NAVTEX receiver should operate in accordance with the technical specifications set out in Recommendation ITU-R M.540-2, and should meet the performance standards adopted by the Organization by resolution A.525(13).

2.5 PROVISION OF INFORMATION

2.5.1 Navigational warnings should be provided in accordance with the standards, organization and procedures of the WWNWS under the functional guidelines of the IHO through its Commission on Promulgation of Radio Navigational Warnings.

2.5.2 Meteorological information should be provided in accordance with the technical regulations and recommendations of the WMO.

2.5.3 Distress alerts should be provided by the various authorities responsible for co-ordinating maritime search and rescue operations in accordance with the standards and procedures established by the Organization.

2.6 CO-ORDINATION PROCEDURES

2.6.1 In order to make the best use of automated reception facilities and to ensure that the mariner receives at least the minimum information necessary for safe navigation, careful co-ordination is required.

2.6.2 In general, this requirement for co-operation and co-ordination will be met by the standard operational procedures of IHO, WMO, ITU and Inmarsat.

2.6.3 Cases of difficulty should be referred, in the first instance, to the most appropriate parent body.

2.6.4 Member States wishing to provide maritime safety information services should nominate a national co-ordinator for each type of information concerned, informing the Organization of such nominations as they are made. The Organization will maintain and, through the Maritime Safety Committee, publish a list of the nominated co-ordinators.

2.6.5 The establishment of transmissions in the international NAVTEX Service is co-ordinated by the Maritime Safety Committee. Detailed guidance on the provision of NAVTEX services is contained in the NAVTEX Manual.

2.6.6 The use of satellite maritime information services is co-ordinated by the Maritime Safety Committee.

2.6.7 The designation of service areas is an important part of the co-ordination process since it is intended that a vessel should be able to obtain all the information relevant to a given area from a single source. Information co-ordinators should, therefore, design their broadcasts to suit a particular service area. The Maritime Safety Committee will designate service areas for the International SafetyNET Service and the International NAVTEX Service. In doing so, the Committee will take full account of the character and volume of information and the pattern of maritime traffic in the region and the advice of IHO and WMO.

3 – RADIO NAVIGATIONAL WARNINGS FOR THE WORLD-WIDE NAVIGATIONAL WARNING SERVICE

3.1 GENERAL CONSIDERATIONS

3.1.1 Radio Navigational Warnings are essentially HAZARD WARNINGS. In accordance with the WWNWS Guidance Document, section 4.2.1.3 (IHO/IMO Special Publication S-53), the following subject areas are considered suitable for transmission as NAVAREA warnings. This list is not exhaustive and should be regarded only as a guideline. Furthermore, it presupposes that sufficiently precise information about the item has not previously been disseminated in Notices to Mariners:

.1 casualties to lights, fog signals and buoys affecting main shipping lanes;

.2 the presence of dangerous wrecks in or near main shipping lanes and, if relevant, their marking;

.3 establishment of major new aids to navigation or significant changes to existing ones when such establishment or change might be misleading to shipping;

.4 the presence of large unwieldy tows in congested waters;

.5 drifting mines;

.6 areas where search and rescue (SAR) and anti-pollution operations are being carried out (for avoidance of such areas);

.7 the presence of newly discovered rocks, shoals, reefs and wrecks likely to constitute a danger to shipping and, if relevant, their marking;

.8 unexpected alteration or suspension of established routes;

.9 cable or pipe-laying activities, the towing of large submerged objects for research or exploration purposes, the employment of manned or unmanned submersibles, or other underwater operations constituting potential dangers in or near shipping lanes;

.10 establishment of offshore structures in or near shipping lanes;

.11 significant malfunctioning of radionavigational service and shore-based maritime safety information radio or satellite services;

.12 information concerning special operations which might affect the safety of shipping, sometimes over wide areas, e.g. naval exercises, missile firings, space missions, nuclear tests, etc. It is important that where the degree of hazard is known, this information is included in the relevant warning. Whenever possible, such warnings should be originated not less than five days in advance of the scheduled event. The warning should remain in force until the event is completed[1]; and

.13 acts of piracy and armed robbery against ships.

Navigational warnings are issued in response to SOLAS regulation V/2.b and carry information

[1] The IMO Maritime Safety Committee is authorized to review the provisions of this paragraph and, if appropriate, to provide for exemptions from this requirement, under special circumstances (NAVTEX Manual, paragraph 4.2.1.3.13).

which may have a direct bearing on the safety of life at sea. It is the fundamental nature of navigational warnings that they will often be based on incomplete or unconfirmed information and mariners will need to take this into account when deciding what reliance to place on the information contained therein.

3.1.2 IMO resolution A.706(17) requires the use of the English language for NAVAREA and Coastal Warnings of the WWNWS. It must always be remembered that the majority of mariners receiving radio navigational warnings are only professional users of English who do not speak or read it naturally. Warnings therefore must be written so as to be easily understood by all mariners.

3.1.3 In order to achieve maximum impact on the mariner it is necessary to present information so that it is CLEAR, UNAMBIGUOUS and BRIEF. This can be ensured by using structured messages which present the text in a standard format with key words to emphasize the most important features of the message.

3.1.4 The resources employed by Administrations and the mariner are extremely limited. Thus only information which is vital to the safe conduct of vessels should be transmitted. Notices to Mariners and other means exist for passing less urgent information to ships after they have reached port. Information of a purely administrative nature should never be broadcasted on the regular international navigational warning schedules.

3.2 THE STRUCTURE OF RADIO NAVIGATIONAL WARNINGS

3.2.1 The minimum information which a mariner requires to avoid danger is:

HAZARD + POSITION

It is usual, however, to include sufficient extra detail to allow some freedom of action in the vicinity of the hazard. This means that the message must give enough extra data for the mariner to be able to RECOGNIZE the hazard and ASSESS its effect upon his navigation. In some cases it will be desirable to include an estimate of the DURATION of the event.

3.2.2 The text of any radio navigational warning will need to contain some or all the STANDARD ELEMENTS, as indicated below:

STANDARD ELEMENTS		NAVAREA	COASTAL	LOCAL
Message ID*	Consecutive No	+	+	
Preamble	1. General area	+		
	2. Locality	+	+	+
	3. Chart number	+	+	
Warning	4. Key subject	+	+	+
	5. Geographical position	+	+	+
	6. Amplifying remarks	+	+	+
Postscript	7. Cancellations	+	+	+

* See WWNWS Guidance Document, Section 5.1 (IHO/IMO Special Publication S-53)

3.2.3 The remainder of this section of the Manual is divided into three sections, which give guidance on the correct way of phrasing each part of the warning to achieve maximum impact with minimum broadcast time, as follows:

Section A - Preamble

Section B - Warning (by type of hazard, as described in detail in the WWNWS Guidance Document, section 4.2.1.3)

Section C - Additional notes on Time and Position

PREAMBLE **A1**

IDENTIFIER, GENERAL AREA, LOCALITY, CHART NUMBER

MESSAGE IDENTIFIER	The first words of the text of every warning message must always be MESSAGE SERIES IDENTIFIER followed by the CONSECUTIVE NUMBER, e.g. NAVAREA THREE 496; NAVAREA SEVEN 042; NITON RADIO WZ 229; OOSTENDE RADIO NAV WING 767. Notes: 1) Message numbers re-start at 001 each year. 2) The Consecutive Number is not the same as the NAVTEX Number B_3B_4.
GENERAL AREA	The General Area should be sufficient to identify which broad sub-division of a NAVAREA the message affects. For instance 'NORTH SEA' or 'MALACCA STRAIT' would be correct; 'NORTH AMERICA, EAST COAST' is too general. NAVAREA-wide events, e.g. GPS warnings, use a NAVAID IDENTIFICATION ACRONYM instead of a General Area (See page B9).
LOCALITY	The Locality should be stated in terms which allow the mariner to identify warnings which affect his passage without having to plot them e.g. 'Thames Estuary' or 'Pinang Approach'. Locality will only need to be stated when it is desirable to refine the General Area.
CHART NUMBER	NAVAREA Warnings normally require reference to an International Chart if one exists. If not, they should preferably reference a chart of the locality (not necessarily the largest scale). The Chart Series should always be quoted, e.g. INT Chart 649, BA Chart 471, etc. ***INTERNATIONAL HYDROGRAPHIC BUREAU WILL provide words for ENC in due course.*** Chart numbers are not normally required for Coastal and Local Warnings which are only broadcasted in the vicinity of the hazard.

LIGHTS – Casualties **B1**

LIGHTHOUSES, BEACONS, LIGHT VESSELS

Key subject	Remarks	Comments
MALABRIGO POINT LIGHT, 24-45N 033-56E SANDETTIE LIGHT VESSEL, 51-14N 002-33E PHILIP SHOAL BEACON, 18-21.5S 046-37.5W	UNLIT	Incorrect Terms include: Out, Extinguished, Not Burning, Not Working.
	LIGHT UNRELIABLE	Incorrect Terms include: Weak, Dim, Low Power, Fixed, Flashing Incorrectly, Out of Character.
	DAMAGED	Use only for major damage, e.g. loss of significant functionality.
	DESTROYED	Temporarily destroyed is incorrect. Note: If temporary buoy established, see WRECKS page for additional phrases.
	FOG SIGNAL INOPERATIVE	Only for major fog signal stations. Generally, fog signal casualties will not need a broadcast

NOTES:
A. Use CHARTED names, not LISTED names.
B. LIGHT LIST number is not required.
C. POSITION normally quoted to nearest whole minute.
D. If the report is unconfirmed, use LIGHT UNRELIABLE. Do NOT use 'REPORTED'.
E. Temporary use of a listed reserve light is to be expected. It is not a change of character.
F. Damage to DAYMARKS is not usually worth a navigational warning.
G. Do not use a navigational warning to request reports on an unwatched light.
H. International Chart Abbreviations for light characters are ONLY suitable for NAVTEX or SafetyNET transmissions. Voice Broadcasts should be drafted using the Table of Equivalents – TABLE B4. This is preferred for NAVTEX and SafetyNET also.

NEW and CHANGED Lights – *see TABLE B2 and B3*.
Light Vessels OFF STATION – *see TABLE B5*.

LIGHTS – Changed **B2**

LIGHTHOUSES, BEACONS, LIGHT VESSELS		
Key subject	**Remarks**	**Comments**
ORFORDNESS LIGHT, 51-30N 000-20E ST. ALBANS HEAD LIGHT, 51-00N 000-16E	CHANGED TO FLASH THREE 20 SECONDS 14 METRES 16 MILES	PERMANENT change of character.
	TEMPORARILY CHANGED TO QUICK FLASH YELLOW 12 MILES.	Temporary change. Do not use for listed reserve light.

NOTES:
A. Always quote FULL LIGHT CHARACTERISTIC to avoid confusion over what has been changed.
B. Use light descriptions as given in table B4.
C. Position is normally quoted to nearest whole minute for existing lights. See table B3 for new or changed positions.

LIGHTS – New, Moved or Re-established **B3**

LIGHTHOUSES, BEACONS, LIGHT VESSELS

Key subject	Remarks	Comments
FLAMBOROUGH HEAD LIGHT, FLASH THREE 20 SECONDS 22 METRES 21 MILES NARESBORO LIGHT VESSEL, FLASH RED 5 SECONDS 14 MILES	ESTABLISHED 21-14.6N 000-16.3W	New light.
	MOVED 0.3 MILES NORTH TO 63-14.8N 022-15.6E	Do not quote former geographical position. Indicate former position by approximate direction and distance.
	RE-ESTABLISHED	For CHARTED or LISTED as DESTROYED. See NOTE A

NOTES:

A. RE-ESTABLISHED is only appropriate for lights which have previously been CHARTED or LISTED AS DESTROYED. Navigational Warnings concerning such lights are merely cancelled when the light is re-established. A new Navigational Warning is only required if the Character or Position is changed. See table B2 or above.

B. Quote accurate CHARTED position; in Degrees, Minutes and Decimal Minutes (maximum 2 decimal places).

C. Distances should be quoted in nautical miles and decimals.

LIGHTS – GLOSSARY OF DESCRIPTIVE TERMS **B4-1**

Class of light	Description for TEXT broadcasts	Description for Voice broadcasts
Fixed (steady light)	F	Fixed
Occulting (total duration of light more than dark)		
Single-occulting	Oc	Occulting
Group-occulting	Oc(2)	Occulting two
Composite group-occulting	Oc(2+3)	Occulting two plus three
Isophase (equal periods light and dark)	ISO	ISO
Flashing (total duration of light less than dark)		
Single-flashing	Fl	Flash
Long-flashing	LFl	Long Flash
Group-flashing	Fl(3)	Flash Three
Composite group-flashing	Fl(2+1)	Flash two plus one
Quick (50 to 79 – usually either 50 or 60 flashes per minute)		
Continuous quick	Q	Quick Flash
Group quick	Q(3)	Quick Flash Three
Interrupted quick	IQ	Interrupted Quick Flash
Very Quick (80 to 159 – usually either 100 or 120 flashes per minute)		
Continuous very quick	VQ	Very Quick Flash
Group very quick	VQ(3)	Very Quick Three
Interrupted very quick	IVQ	Interrupted Very Quick Flash
Ultra Quick (160 or more – usually 240 or 300 flashes per minute)		
Continuous ultra quick	UQ	Ultra Quick Flash
Interrupted ultra quick	IUQ	Interrupted Ultra Quick Flash
Morse Code	Mo(K)	Morse Kilo
Fixed and Flashing	FFl	Fixed and Flashing
Alternating	ALWR	Alternating

LIGHTS – GLOSSARY OF DESCRIPTIVE TERMS **B4-2**

COLOUR	**ELEVATION in METRES or FEET, e.g. 14 METRES, 21 FEET**
White Red Green Yellow Orange Blue Violet	**PERIOD in SECONDS, e.g. 15 SECONDS (NOT Sec or S)**

RANGE in nautical miles		**International abbreviations**	**RANGE for broadcast**
Single range	e.g.	15M	15 MILES
2 ranges	e.g.	14/12M	14 AND 12 MILES
3 or more ranges	e.g.	22/18M	22 TO 18 MILES
			Shortest range only will be sufficient

BUOYS **B5-1**

BUOYS, LANBYS, SUPERBUOYS		
Key subject	**Remarks**	**Comments**
SANDETTIE NORTH BUOY 51-18N 002-05E CORK LANBY 51-56N 001-29E SMITHS KNOLL LIGHT VESSEL	UNLIT	Incorrect terms include: Out, Extinguished, Not Burning, Light Unlit.
	LIGHT UNRELIABLE	Incorrect terms include: Weak, Dim, Low power, Fixed, Out of Character, Irregular, Reduced power.
	DAMAGED	No action for Topmark or Radar Reflectors. Use only for major damage, e.g. loss of significant functionality.
	OFF STATION	Buoys not in charted osition.
	MISSING	Completely absent from position.
EAST CARDINAL BUOY VERY QUICK FLASH THREE SECONDS ESTABLISHED.		New buoy. Quote position to 2 decimal minutes if possible.

NOTES:
A. Do not use 'Reported'.
B. POSITION normally quoted to nearest whole minute.
C. UNLIT may be used to amplify 'DAMAGED' as in 'DAMAGED and UNLIT'.
D. 'LANBY' (Large Automated Navigational Buoy) or 'SUPERBUOY' may be used in lieu of 'BUOY' where appropriate.
E. Do NOT describe the type of buoy, e.g. North Cardinal buoy, Wreck buoy, Port Hand buoy, unless the buoy is unnamed.

FOG SIGNALS – *see table B1*.

GLOSSARY OF BUOYAGE TERMS **B5-2**

IALA BUOYAGE	Comments
PORT, STARBOARD } HAND BUOY	Full description of light and colour not required for IALA standard buoys.
NORTH, EAST, SOUTH, WEST } CARDINAL BUOY	"Lightbuoy" may be used to indicate that the buoy is lit.
ISOLATED DANGER BUOY	
SAFE WATER BUOY	
SPECIAL BUOY	

OTHER BUOYS

COLOURS	PATTERN	SHAPE/TYPE
RED	CHEQUERED	CAN
BLACK	HORIZONTALLY STRIPED	CONICAL (not OGIVAL or NUN)
WHITE	VERTICALLY STRIPED	PILLAR
GREEN		SPAR
YELLOW		SPHERICAL
		WRECK
		CABLE (not Telegraph)
		MOORING
		DANGER ZONE
		ODAS
		SINGLE POINT MOORING (not SPM)

BOTTOM FEATURES **B6**

WRECKS, REEFS, ROCKS	
Key subject	**Comments**
UNCHARTED REEF REPORTED 03-42S 016-21W	Position unconfirmed
DANGEROUS WRECK LOCATED 34-15.2N 014-15.5W	Position confirmed usually by survey.
VOLCANIC ACTIVITY REPORTED _____ _____ CAUTION ADVISED	
ARTHUR ISLAND _____ _____ reported to lie about two miles west of charted position.	

NOTES:
A. These reports may be amplified as follows: "..... marked by south cardinal buoy 0.2 miles southward."
B. Position Approximate (PA) is not appropriate since all "reported" hazards will be of this nature by definition.

DRIFTING HAZARDS **B7**

Key subject	**Comments**
SUPERBUOY ADRIFT IN VICINITY _____ _____ AT 231641 UTC	The time of the position report should ALWAYS be included when known.
HAZARDOUS MINE ADRIFT IN VICINITY _____ _____ AT _____ UTC	
UNLIT DERELICT TANKER ADRIFT IN VICINITY _____ _____ AT _____ UTC	

NOTES:
A. Consideration should be given to cancelling the warning after sufficient time has elapsed for the position to have become degraded.
B. Time is to be UTC. See page C1.

MISCELLANEOUS **B8**

Key Subject	Comments
CABLE OPERATIONS BY CABLESHIP "NAME" IN VICINITY _____ _____ FROM _____ UTC TO _____ UTC. WIDE BERTH REQUESTED.	Use "requested" when wide berth is for benefit of cableship.
CABLE OPERATIONS BY CABLESHIP "NAME" OPERATING WITH SUBMERSIBLE AND GUARDSHIP BETWEEN ____ ____ AND ____ ____ FROM ____ UTC TO ____ UTC. CONTACT VHF CHANNEL 12. WIDE BERTH ADVISED.	Use "advised" when operations create a significant hazard.
LARGE UNWIELDY TOW FROM LE HAVRE ____ ____ TO BOSTON ____ ____. WIDE BERTH REQUESTED.	
FIRING EXERCISES FROM ANDOYA RANGE IN AREA BOUNDED BY ____ ____, ____ ____, ____ ____ AND ____ ____ FROM ____ UTC. VHF CHANNEL 16 BEFORE TRANSITING AREA. CAUTION ADVISED.	
SEISMIC SURVEY BY MV "FOX" TOWING METER ARRAY IN AREA BOUNDED BY ____ ____, ____ ____, ____ ____ AND ____ ____ FROM ____UTC TO ____ UTC. WIDE BERTH REQUESTED.	

ELECTRONIC NAVAIDS **B9**

Key subject	Comments
GPS. SATELLITE PRN 13 UNUSABLE _____ UTC TO _____ UTC. CANCEL THIS MESSAGE _____ UTC.	Messages concerning long-range electronic navaids will not normally need a General Area, Locality or Chart Number.
LORAN. STATION SAINT PAUL ISLAND 9990 MASTER OFF AIR _____ UTC TO_____ UTC. CANCEL THIS MESSAGE _____ UTC.	
DECCA. JAPAN SEA AND EASTERN CHINA SEA. NORTHERN KYUSYU DECCA CHAIN 7C OFF AIR.	
DECCA. NORTHWEST BRITISH CHAIN 3B. RED TRANSMISSION OFF AIR. CANCEL THIS MESSAGE _____ UTC.	Message cancels 1 hour after event completes.
Note: INTERNATIONAL HYDROGRAPHIC OFFICE WILL add VTS and DGPS notes in due course.	

PIRACY/ARMED ROBBERY **B10**

Key subject	Comments
CHART NR. _____ MV ALWAYS SAIL REPORTS ACT OF PIRACY/ARMED ROBBERY IN VICINITY 17-40N 095-06E AT 0600 UTC. TWO ZODIACS CARRYING 3 – 4 MEN EACH APPROACHING FROM ASTERN AT 20 KNOTS AT FIRST LIGHT. ATTEMPTED TO BOARD PORT SIDE AFT. REPELLED. CAUTION ADVISED.	Broadcast as Safety message. Add amplifying information if available.
PIRACY ATTACKS/ARMED ROBBERY CONCENTRATED IN PHILLIP CHANNEL BETWEEN _____ AND _____. REPORTED ATTACKS ALWAYS OCCUR AT NIGHT. VESSELS ADVISED TO MAINTAIN ANTI-PIRACY WATCHES. ALL SUSPICIOUS OR UNEXPLAINED CRAFT MOVEMENTS OR PIRACY ATTACKS SHOULD BE REPORTED IMMEDIATELY TO THE NEAREST RCC, NATIONAL OR REGIONAL PIRACY CENTRE OR THE NEAREST POINT ON THE COAST WITH WHICH THEY CAN COMMUNICATE.	( ), for example, Regional Piracy Centre, KUALA LUMPUR, TEL.: 60 3 2010014 FAX : 60 3 2385769 TELEX: MA 31880.

SHORE-BASED RADIO FACILITIES **B11**

Key subject	Comments
NAVTEX BOSTON STATION OFF AIR	Do not use “Until Further Notice” since the fact that the event is complete will always be apparent from the cancellation message.
RADIO SERVICES. COAST GUARD STATION MIAMI IS OFF AIR. STATION _____ IS ASSUMING RESPONSIBILITY FOR EMERGENCY TRAFFIC AND SHIP REPORTS.	Add in back-up facility if one is available.

CANCELLATIONS **B12**

Key subject	Comments
A. CANCEL 0123/92 AND THIS MESSAGE. B. SELF CANCELLING. CANCEL AUSCOAST 0042. SURVEY COMPLETE. C. (MESSAGE TEXT – EVENT OF KNOWN DURATION). CANCEL THIS MESSAGE _____ UTC. D. CANCEL TALLINN RADIO COAST WARNING 0087/94 ON RECEIPT OF RUSSIAN NOTICE TO MARINERS 520/94; OR E. CANCEL TALLINN RADIO COAST WARNING 0087/94. RUSSIAN NOTICE TO MARINERS 520/94 REFERS.	Stand-alone cancellation messages may be in form A or B. Only include a reason for the cancellation if it can be stated concisely and is not obvious. Choose a time for self-cancelling messages (type C) one hour after the event completes or one day later if time is not accurately known.

BULLETIN **B13**

Key Subject	Comments
NAVAREA XXX WARNINGS IN FORCE. ONLY THOSE ISSUED IN THE LAST 42 DAYS ARE INCLUDED. XXXX XXXX XXXX XXXX XXXX XXXX XXXX XXXX	Normally only includes those issued in previous 42 days.

DATE AND TIME **C1**

Time should always be quoted in UTC. The standard form is DDHHMM UTC MoMoMo YY; e.g. 231642 UTC JUN 92.

POSITION

Position should always be given in Degrees, Minutes and decimal minutes in the form:

DD-MM.mm N or S
DDD-MM.mm E or W

e.g. 1) 32-18.65 S 165-02.81 E 2) 07-08.71 N 039-17.21 W

Note that leading zeros should always be included. Three digits are used for reporting degrees longitude.

Positions should only be quoted to the accuracy required. In many cases this will be less than the known accuracy. For example, it will often be sufficient to quote position to the nearest whole minute of latitude and longitude when indicating the location of a charted feature. The best accuracy available (to a maximum of 0.01 minutes) should be used when broadcasting the position of new hazards.

The same level of accuracy should always be quoted for both latitude and longitude.

4 – METEOROLOGICAL WARNINGS AND FORECASTS FOR THE HIGH SEAS

4.1 PROVISION OF WARNINGS AND WEATHER AND SEA BULLETINS (GMDSS APPLICATION)

Global Maritime Distress and Safety System (GMDSS) application which is compatible with and required by the radiocommunication provisions of the 1988 SOLAS amendments via the NAVTEX, International SafetyNET and HF MSI Services.

Principles

The principles for the preparation and issue of warnings and weather and sea bulletins are as follows:

Principle 1

For a purpose of the preparation and issue of meteorological warnings and the regular preparation and issue of weather and sea bulletins, the oceans and seas are divided into areas for which national Meteorological Services assume responsibility.

Principle 2

The areas of responsibility together provide complete coverage of oceans and seas by meteorological information contained in warnings and weather and sea bulletins for the high seas.

Principle 3

The issue of meteorological warnings and routine weather and sea bulletins for areas not covered by NAVTEX shall be by the International SafetyNET Service for the reception of maritime safety information (MSI) in compliance with SOLAS, chapter IV, "RADIOCOMMUNICATIONS".

Note: In addition, national Meteorological Services may have to prepare and/or issue warnings and routine forecasts for transmission by an HF direct-printing telegraphy maritime safety information service for areas where such a service is provided for ships engaged exclusively on voyages in such areas.

Principle 4

The preparation and issue of warnings and weather and sea bulletins for areas of responsibility are co-ordinated in accordance with the procedures mentioned in the following section.

Principle 5

The efficiency and effectiveness of the provision of warnings and of weather and sea bulletins are monitored by obtaining opinions and reports from marine users.

Principle 6

Maritime Safety Information broadcasts are monitored by the originating Issuing Service to ensure the accuracy and integrity of the broadcast.

4.2 PROCEDURES

Definitions

A "Preparation Service" is a national Meteorological Service which has accepted responsibility for the preparation of forecasts and warnings for parts of, or an entire, designated Maritime Safety Information (MSI) area in the WMO system for the dissemination of meteorological forecasts and warnings to shipping under GMDSS and for their transfer to the relevant Issuing Service for broadcast.

An "Issuing Service" is a national Meteorological Service which has accepted responsibility for ensuring that meteorological forecasts and warnings for shipping are disseminated through the Inmarsat and SafetyNET service to the designated area for which the Service has accepted responsibility under the broadcast requirements of the GMDSS. The Issuing Service is responsible for composing a complete broadcast bulletin on the basis of information input from the relevant Preparation Services, and for inserting the appropriate EGC header, as specified in Annex 4(b) of the International SafetyNET Manual. The Issuing Service is also responsible for monitoring the broadcasts of information to its designated area of responsibility.

Preparation and issue of weather and sea bulletins for the high seas

Weather and sea bulletins for the high seas shall include, in the order given hereafter:

Part I : Storm warnings;

Part II : Synopsis of major features of the surface weather chart and, to the possible extent, significant characteristics of corresponding sea-surface conditions;

Part III : Forecasts.

Weather and sea bulletins for the high seas may, in addition, include the following parts:

Part IV : Analysis and/or prognosis in IAC FLEET code form;

Part V : Selection of reports from sea stations;

Part VI : Selection of reports from land stations.

NOTES: (1) The reports included in Part VI should be for a fixed selection of stations in a fixed order.

(2) Parts IV, V and VI may be issued at a separate, scheduled time.

For area(s) for which an Issuing Service has assumed responsibility, the Service shall select the appropriate CES to service that area.

NOTES: (1) As there are several CESs which can serve an Ocean Region and hence an area of broadcast responsibility, Issuing Services may negotiate directly with the various CES operators to obtain the most favourable tariff (and service) consideration.

(2) In order to ensure reception of unscheduled broadcasts by shipping in an area which is served by more than one satellite and recognizing that the national Meteorological Services will not know to which of these satellites the ship's equipment is tuned, the following procedures shall be adopted by Issuing Services:

For scheduled broadcasts: These shall be issued for broadcast over at least a single nominated satellite, in accordance with a pre-arranged schedule, co-ordinated by WMO.

For unscheduled broadcasts: These shall be issued for broadcast under the SafetyNET Service through all Inmarsat ocean region satellites covering the Issuing Service's area of responsibility.

Weather and sea bulletins shall be prepared and issued at least twice daily.

The issue of the weather and sea bulletins shall be at a scheduled time and be in the following sequence: Part I to be followed immediately by Part II and then Part III. A schedule of transmission start times for these bulletins has been compiled for all MSI areas and the CESs which serve the areas and takes into consideration, *inter alia*, the existing WMO synoptic times for observations, data analysis and forecast production. Additionally, as these broadcast schedules for the International SafetyNET Service have to be co-ordinated, under the aegis of WMO, with other organizations such as IHO, Issuing Services should not independently change or request WMO to arrange frequent alterations to these co-ordinated and published schedules.

Issuing Services must ensure that the correct EGC message addressing formats are adhered to for all warning and forecast messages intended for broadcast by a CES.

Warnings, synopses and forecasts shall be given in plain language.

Warnings, synopses and forecasts intended for the International SafetyNET Service shall be broadcast in English.

NOTE: Additionally, if a national Meteorological Service wishes to issue warnings and forecasts to meet national obligations under SOLAS, broadcasts may be made in other languages. These broadcasts will be a part of a national SafetyNET Service.

In order to ensure the integrity of the warnings and forecasts being received by mariners, it is essential that Issuing Services monitor the broadcasts which they originate. Monitoring is especially important in a highly automated system which is dependent on careful adherence to procedure and format. This may be accomplished by the installation of an EGC receive-capability at the Issuing Service's facility.

NOTE: Each Issuing Service may use the EGC receiver to check the following:

(1) That the message has been broadcast;
(2) That the message is received correctly;
(3) That cancellation messages are properly executed;
(4) Any unexplained delay in the message being broadcast.

The language of the synopsis should be as free as possible from technical phraseology.

The terminology in weather and sea bulletins should be in accordance with the "Multilingual list of terms used in weather and sea bulletins".

NOTE: The multilingual list of terms used in weather and sea bulletins is given in Annex 1-2.A of the Guide to Marine Meteorological Services (WMO-N1 471) and in Appendix II-6 hereto.

4.3 WARNINGS

Warnings shall be given for gales (Beaufort force 8 or 9) and storms (Beaufort force 10 or over), and for tropical cyclones (hurricanes in the North Atlantic and eastern North Pacific, typhoons in the

Western Pacific, cyclones in the Indian Ocean and cyclones of similar nature in other regions). The issue of warnings for near gales (Beaufort force 7) is optional.

Warnings for gales, storms and tropical cyclones should have the following content and order of items:

(a) Type of warning;

(b) Date and time of reference in UTC;

(c) Type of disturbance (e.g. low, hurricane, etc.) with a statement of central pressure in hectopascals;

(d) Location of disturbance in terms of latitude and longitude or with reference to well-known landmarks.

(e) Direction and speed of movement of disturbance;

(f) Extent of affected area;

(g) Wind speed or force and direction in the affected areas;

(h) Sea and swell conditions in the affected area;

(i) Other appropriate information such as future positions of disturbance.

Items (a), (b), (d), (f), and (g) listed above shall always be included in the warnings.

When warnings are included for more than one pressure disturbance or system, the systems should be described in a descending order of threat.

Warnings shall be as brief as possible and, at the same time, clear and complete.

The time of the last location of each tropical cyclone or extra-tropical storm shall be indicated in the warning.

A warning shall be issued immediately the need becomes apparent, and broadcasted immediately on receipt, followed by a repeat after six minutes, when issued as an unscheduled broadcast.

When no warnings for gales, storms or tropical cyclones are to be issued, that fact shall be positively stated in Part I of each weather and sea bulletin.

Warnings shall be updated whenever necessary and then issued immediately.

Warnings shall remain in force until amended or cancelled.

Warnings issued as Part I of a scheduled bulletin do not need to be repeated after 6 minutes.

4.4 SYNOPSES

The synopses given in Part II of weather and sea bulletins shall have the following content and order of items:

(a) Date and time of reference in UTC;

(b) Synopsis of major features of the surface weather chart;

(c) Direction and speed of movement of significant pressure systems and tropical disturbances.

Significant characteristics of corresponding wave conditions (sea and swell) should be included in the synopsis whenever this information is available, as well as characteristics of other sea-surface conditions (drifting ice, currents, etc.) if feasible and significant.

Significant low-pressure systems and tropical disturbances which affect or are expected to affect the area within or near to the valid period of the forecast should be described; the central pressure and/or intensity, location movement and changes of intensity should be given for each system; significant fronts, high-pressure centres, troughs and ridges should be included whenever this helps to clarify the weather situation.

Direction and speed of movement of significant pressure systems and tropical disturbances should be indicated in compass points and metres per second or knots respectively.

Units used for speed of movement of systems shall be indicated.

4.5 FORECASTS

The forecasts given in Part III of weather and sea bulletins shall have the following content and order of items:

(a) The valid period of forecast;

(b) Name or designation of forecast area(s) within the main MSI area; and

(c) A description of:
  (i) Wind speed or force and direction;
  (ii) Visibility when forecast is less than six nautical miles (ten kilometres); and
  (iii) Ice accretion, where applicable.

The forecasts should include expected significant changes during the forecast period, significant meteors such as freezing precipitation, snowfall or rainfall, and an outlook for a period beyond that normally covered by the forecast.

The valid period shall be indicated either in terms of number of hours from the time of issue of the forecast or in terms of dates and time in UTC of the beginning and the end of the period.

Visibility should be indicated in nautical miles or kilometres or given in descriptive terms.

Units used for visibility shall be indicated

.

5 – SEARCH AND RESCUE

It is expected that the format for the drafting of Search and Rescue messages under the GMDSS will be developed in due course.

Annex 8-22
GUIDELINES ON THE CONFIGURATION OF THE RESERVE SOURCE OR SOURCES OF ENERGY USED TO SUPPLY RADIO INSTALLATIONS ON GMDSS SHIPS [COMSAR/Circ.16 (04.03.98)]

1 With a view to provide recommendations on the configuration of possible reserve source or sources of energy to be used for supplying radio equipment on GMDSS ships, the Sub-Committee on Radiocommunications and Search and Rescue (COMSAR), at its third session (23 to 27 February 1998), prepared the annexed Guidelines.

2 Member Governments are invited to bring the annexed Guidelines to the attention of classification societies, shipbuilders, shipowners, ship operators, shipping companies, manufacturers and shipmasters.

Annex

GUIDELINES ON THE CONFIGURATION OF THE RESERVE SOURCE OR SOURCES OF ENERGY USED TO SUPPLY RADIO INSTALLATIONS ON GMDSS SHIPS

1 INTRODUCTION

1.1 The radio reserve source or sources of energy should meet the requirements set out in regulation IV/13 of SOLAS 1974, as amended, and in IMO resolutions A.694(17) and A.702(17), as applicable, and should also comply with the following requirements.

1.2 The configuration of such reserve sources of energy could comply with recommendations of annexes 1, 2 and 3 of these guidelines, as applicable.

2 GENERAL

2.1 Where the reserve source or sources of energy consists of rechargeable accumulator batteries, the arrangement may consist either of batteries used solely in the absence of ship's supply of electrical energy (see paragraph 3) or of batteries used in an uninterruptible power supply (UPS) configuration (see paragraph 4).

2.2 Only equipment specified in regulation IV/13 of SOLAS 1974, as amended, and paragraphs 2.1.1 and 2.1.2 of the annex to resolution A.702(17) may be connected to the reserve source or sources of energy.

2.3 Any ship's navigational or other equipment providing to the radio installation an input of information, which is needed to ensure its proper performance, should be connected to the ship's main and emergency supply and to the reserve source of energy to ensure an uninterruptible input of information.

2.4 To determine the electrical load to be supplied by the reserve source of energy for each radio installation required for distress conditions, the following formula should be applied:

$\frac{1}{2}$ of the current consumption necessary for transmission

+ the current consumption for reception

+ the current consumption of any additional loads.

2.5 If a manual change-over switch is provided in the configuration, this switch should be clearly marked and readily accessible to the operator.

3 BATTERIES USED SOLELY IN THE ABSENCE OF SHIP'S SUPPLY

3.1 A single battery may be provided for the radio installation specified in regulations IV/13.2, 13.4, 13.5, and 13.8 of SOLAS 1974, as amended. The capacity of the battery should be sufficient for the load determined in paragraph 2.4 in compliance with the requirements of regulations IV/13.2 and 13.4 of SOLAS 1974, as amended, taking in consideration duplication equipment when provided.

3.2 The charging current of the automatic battery charger should be sufficient to comply with regulation IV/13.6.1 for the load determined in paragraph 2.4 (see annex 2, paragraph 2.1).

3.3 The supply lines from the battery distribution panel to each radio installation of both the basic and the duplication equipment should be independent and fused separately.

3.4 In case of interruption of the ship's supply, as well as upon its recovery, the change-over between the radio reserve source of energy and the ship's supply may be manual or automatic.

3.5 The change-over between the ship's supply and the radio reserve source of energy should not require any of the equipment connected to it to be re-initialized manually and should not result in the loss of data stored in memory.

3.6 Any fault in the battery or battery charger should not impair or reduce the functional availability of any GMDSS equipment while energised from the ship's supply.

4 BATTERIES USED IN AN UNINTERRUPTIBLE POWER SUPPLY (UPS) CONFIGURATION

4.1 A single UPS may be provided for the radio installation specified in regulations IV/13.2, 13.4, 13.5 and 13.8 of SOLAS 1974, as amended. The UPS should comply with the load determined in paragraph 2.4 and the requirements of regulations IV/13.2, 13.4 and 13.6 of SOLAS 1974, as amended, taking into consideration duplication equipment when provided.

4.2 To provide for a failure of the single UPS, a second UPS or means for direct supplying the radio installation from ship's main or emergency supply should be installed and be available permanently.

4.3 The change-over to the second UPS or to the ship's supplies may be manual or automatic.

4.4 This change-over should not require any of the equipment connected to it to be re-initialized manually and should not result in the loss of data stored in memory.

4.5 The capacity of the battery charger or chargers used in the UPS configuration should be sufficient to comply with regulation IV/13.6.1 for the load determined in paragraph 2.4 and that all equipment connected can be operated.

For guidance, the following may be used for determining the nominal current of the charger:

$\frac{1}{10}$ of the current consumption necessary for transmission

+ the current consumption for reception

+ the current consumption of any additional loads

+ the nominal charging current of the battery.

4.6 The supply lines from the UPS output to each radio installation of both the basic and the duplication equipment should be independent and fused separately.

5 ALARMS AND INDICATORS

Provision should be made for an aural alarm and visual indication at the position from which the ship is normally navigated, indicating an interruption of the ship's supply. It should not be possible to disable this alarm and indication. It should only be possible to acknowledge and silence the alarm manually. Both the alarm condition and indication should reset automatically when the ship's supply has been restored.

Annex 1

RECHARGEABLE ACCUMULATOR BATTERIES

1 INTRODUCTION

Rechargeable accumulator batteries as installed should meet the general requirements set out in regulation IV/13 of SOLAS 1974, as amended, and in resolution A.694(17), as applicable, and should also comply with the following requirements.

2 GENERAL

2.1 Any type or construction of batteries (e.g. lead–acid, alkaline, maintenance-free, traction, semi-traction, etc.) may be used as reserve source or sources of energy, taking into consideration the environmental conditions of the location where they are installed.

2.2 The capacity of the battery should be sufficient for the load determined in accordance with the annex, paragraph 2.4.

For guidance, the nominal battery capacity to comply with the minimum capacity requirements at all times is 1.4 times the load determined in paragraph 2.4 multiplied by the intended period of operation (1 hour or 6 hours in accordance with SOLAS IV/13.2).

2.3 The battery should maintain its rated capacity when inclined at any angle up to $22\frac{1}{2}^{\circ}$ in any orientation.

3 INSTRUCTIONS FOR RECHARGEABLE BATTERIES

3.1 An instruction manual which contains all necessary specifications of the batteries should be available on board. The information should include at least:

.1 capacity and temperature range within which the stated capacity is maintained for the specified operation period, i.e. 1 hour or 6 hours;

.2 charging voltage and current limits in order to keep batteries fully charged while preventing over-charging;

.3 actual specific gravity of the electrolyte and/or cell voltages or the voltage of the fully charged battery;

.4 guidelines on how to carry out a controlled discharge test;

.5 methods of determining the condition of charge of the battery, e.g. check of specific gravity of electrolyte (acid density) or check of battery cell voltages/battery voltages by using an accurate measuring instrument in accordance with the battery manufacturer's specifications;

.6 requirement for ventilation; and

.7 requirements for maintenance.

4 MARKINGS

4.1 The batteries should be properly marked with type or construction, rated capacity (capacity for 1 hour discharge C_1 and capacity for 5 hours discharge C_5), and installation date. The marking must be visible after the batteries have been installed and during their lifetime.

4.2 A label warning of explosion danger should be displayed near the installed batteries.

5 INSTALLATION

5.1 When defining the minimum required battery capacity, consideration should be given to the expected extreme temperatures for the location of the battery and reduction of its capacity during its lifetime in addition to the loads which are to be connected to it.

5.2 The temperature range of the battery should be wider than the expected temperature range of the location where the battery is to be installed.

5.3 Equipment requiring lower voltage than the total voltage of the battery bank should not be connected to a part of the battery bank.

5.4 The batteries should be installed in an elevated position in the ship and as close to the radio equipment as possible.

5.5 An outdoor located battery case should be avoided due to considerable temperature variations.

5.6 Batteries of different types, different cell constructions, different capacities or different manufacturers should not be mixed in a battery bank.

5.7 Batteries of different types and different cell construction should not be installed in the same location if they can affect each other.

5.8 Sufficient ventilation for the battery should be provided, as required by the battery manufacturer.

5.9 Electrical installations, including battery chargers, located in the battery room should be intrinsically safe.

5.10 Sufficient space between batteries and battery banks should be provided for carrying out inspections and maintenance. The batteries should be well braced to remain firmly fixed under all sea conditions.

5.11 The cabling from the batteries should be protected against earth- and short-circuits and be appropriately fused and installed according to recognized international standards*. Battery cables should have sufficient dimensions to prevent voltage reduction at peak current consumption.

Annex 2

AUTOMATIC BATTERY CHARGERS

1 INTRODUCTION

Automatic battery chargers should meet the general requirements set out in regulation IV/13 of SOLAS 1974, as amended, and in resolution A.694(17), as applicable, and should also comply with the following requirements.

2 GENERAL

2.1 The charger should be capable of recharging the completely discharged accumulator batteries to the minimum required capacity within 10 hours.

2.2 The charger should be capable of keeping the batteries appropriately charged as prescribed by the battery manufacturer for permanent automatic charging.

2.3 The supplied voltage and current should always be within the tolerance limits prescribed by the battery manufacturer, taking into account the environmental temperature of the battery, likely to be experienced in ship. A protection should be provided against over-charging or discharging of batteries from a possible fault in the charger.

3 CONTROL AND INDICATORS

3.1 The automatic charger should be provided with a visual indication that it is switched on.

3.2 Provision should be made for an aural alarm and visual indication at the position from which the ship is normally navigated, indicating when the charging voltage or current is outside the limits given by the battery manufacturer for automatic charging conditions. It should not be possible to disable this alarm and indication and

* IEC 92-101 and IEC 533.

it should only be possible to acknowledge and silence the alarm manually. Both the alarm condition and indication should reset automatically when normal charging condition has been restored. Failure of the alarm system should not interrupt the charging or discharging of batteries.

4 READINESS

The automatic charger should be operational within 5 s of switching on or after a power supply interruption.

5 SAFETY PRECAUTIONS

The automatic charger should be so designed and constructed that it is protected against damage resulting from disconnecting the batteries or, with the battery disconnected, short-circuiting the battery connections. If this protection is provided by electronic means, it should automatically reset following removal of the open- or short-circuit conditions.

Annex 3

UNINTERRUPTIBLE POWER SUPPLIES (UPS)

1 INTRODUCTION

The UPS should meet the general requirements set out in regulation IV/13 of SOLAS 1974, as amended, and in resolution A.694(17), as applicable, and should also comply with the following requirements.

2 GENERAL

2.1 An uninterruptible power supply (UPS) system is defined as a device which for a specific period of time supplies continuous power to radio equipment independent of any power failures in the ship's main or emergency source of electric energy.

2.2 The UPS should comprise at least:

.1 an automatic charger, complying with the requirements of paragraph 4.5 of these guidelines and of annex 2; and

.2 rechargeable accumulator batteries, complying with the requirements of annex 1.

3 CONTROLS AND INDICATORS

Provisions should be made for an aural alarm and visual indication at the position from which the ship is normally navigated, indicating any failure in the UPS which is not already monitored by the alarm and indicators required by paragraph 5 of these guidelines and by annex 2.

4 READINESS

The UPS should be operational within 5 s of switching on.

5 SAFETY PRECAUTIONS

The UPS should be so designed and constructed that it is protected against damage resulting from disconnecting the batteries or, with the battery disconnected, short-circuiting the UPS battery connections. If this protection is provided by electronic means, it should automatically reset following removal of the open- or short-circuit conditions.

Annex 8-23
RECOMMENDATION ON USE OF GMDSS EQUIPMENT FOR NON-SAFETY COMMUNICATIONS [COMSAR/Circ.17 (09.03.98)]

1 The Sub-Committee on Radiocommunications and Search and Rescue (COMSAR), at its third session (23 to 27 February 1998), taking into account reports that some ship masters had instructed watchstanders not to use GMDSS radiocommunications equipment except for safety and distress communications, decided to publish this circular as a recommendation to Member Governments and ship operators that GMDSS equipment should be utilized for routine communications or testing in order to ensure equipment availability and operator competency and also to reduce the false alerts which are often transmitted inadvertently by inexperienced operators.

2 Use of GMDSS equipment for transmission of general radiocommunications is one of the functional requirements specified in SOLAS chapter IV, regulation 4. Regular use of GMDSS equipment helps to develop operator competency and ensure equipment availability. If ships use other radiocommunication systems for the bulk of their business communications, they should adopt a regular programme of sending selected traffic or test messages via GMDSS equipment to ensure operator competency and equipment availability and to help reduce the incidence of false alerts. This policy extends to all GMDSS equipment suites including Digital Selective Calling (DSC) on VHF, MF and HF, to the Inmarsat-A, -B and -C systems, and to any duplicated VHF and long-range communications facilities.

3 Member Governments are invited to bring this guidance to the attention of telecommunication authorities, shipowners, ship operators, shipmasters, GMDSS training institutions and other interested parties.

Annex 8-24
GUIDANCE ON MINIMUM COMMUNICATION NEEDS OF MARITIME RESCUE CO-ORDINATION CENTRES (MRCC) [COMSAR/Circ.18 (11.03.98)]

1 The Sub-Committee on Radiocommunications and Search and Rescue (COMSAR), at its third session (23 to 27 February 1998), noted that all existing IMO documentation on the GMDSS addresses only ships' requirements and provides no guidance for the establishment and operation of MRCCs with regard to communication facilities. Noting that MRCCs are a vital link to a ship in distress, the Sub-Committee prepared the guidance given at annex on the minimum communication needs of Maritime Rescue Co-ordination Centres (MRCCs) to assist national authorities setting up a Maritime Rescue Co-ordination Centre by suggesting the basic communication facilities that should be provided.

2 Member Governments are invited to bring the annexed guidance to the attention of their SAR authorities for appropriate action.

Annex

GUIDANCE ON MINIMUM COMMUNICATION NEEDS OF MARITIME RESCUE CO-ORDINATION CENTRES (MRCCs)

1 INTRODUCTION

1.1 General

The purpose of this guidance is to assist national authorities who envisage creating a maritime rescue co-ordination centre, by suggesting the basic equipment that an MRCC should possess and the minimum communications facilities that it should be able to provide.

This circular is only an introductory document which cannot replace the Organization's other relevant documents (in particular, chapter 5 of Part 1 of the IMOSAR Manual and chapter 4 of the International Aeronautical and Maritime Search and Rescue Manual – volume 1: Organization and Management) or the user guides for systems in use or the technical manuals for installed equipment.

1.2 Objective

In terms of communications, an MRCC should be capable of:

.1 receiving distress calls by the most rapid means available (if possible, directly from ships at sea) in their area of responsibility and acknowledge receipt*;

.2 alerting and activating search and rescue facilities;

.3 co-ordinating operations; and

.4 receiving information from (and transmitting information to) any body or person concerned, including in the form of *maritime safety information*†.

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* In the case of alerts received by radio, the MRCC must acknowledge receipt such that the calling ship and all other ships concerned know that the MRCC has actually received the distress call and is dealing with it. The acknowledgement is generally made by the same system (but not necessarily on the same frequency or the same channel) as the one by which the distress call was received, except for COSPAS–SARSAT, where that is not possible. In the latter case, the most appropriate means is used.

† Depending on the areas involved, MSI is transmitted either via the International SafetyNET Service (see 2.3 and 3.2) or by NAVTEX, which is a dedicated MF NBDP system. NAVTEX transmitting stations can be accessed by fax or telex or any other means according to operational arrangements with the station. Due to the fact that a large number of vessels are not yet GMDSS equipped, MSI have still to be transmitted orally by HF, MF and VHF in certain areas.

2 ESSENTIAL FACILITIES

2.1 Telephone links

A connection to the general telephone network is essential. Depending on the centre's volume of activity, it may be desirable to have several lines. When the MRCC is incorporated into a larger complex (government building, naval base, harbour master's office, etc.), it is strongly recommended that the centre should have its own telephone lines, not going through a switchboard. In any case, the line whose number is published to the public and in IMO documents to ensure that distress calls come straight to the centre must go direct to the continuously manned operational centre.

An ordinary telephone line clearly allows contact with any telephone subscriber in the world. It also allows automatic access to a number of means of communication which allow contact with ships, such as the Inmarsat-A and -B systems, provided that the characteristic number of the called ship is known.

2.2 Fax links

A separate fax connection to the general telephone network is also essential for an MRCC in order to operate a fax machine. The usefulness of such a machine should be emphasized, since with a simple telephone line it allows instant written communication, which facilitates understanding between people who do not speak the same language. It is easier to translate a written text from a foreign language than to understand a speaker using the same foreign language on the telephone. Moreover, fax allows transmission of any sketch, drawing, map, etc.

It is possible to transmit faxes to or from ships equipped with Inmarsat-A, -B or -C ship earth stations.

2.3 Telex link

A connection to the public telex network allows access to the Inmarsat-A, -B and -C systems which allows text conversations with an appropriately equipped ship. This equipment is mandatory for all ships subject to the SOLAS Convention in an A3 area, i.e. not covered by VHF or MF, if shipborne HF equipment is not installed. Messages via the International SafetyNET, the Inmarsat safety network, are also transmitted via Inmarsat-C. MRCCs are authorized (subject to registration as ''information providers'', see below) to transmit free of charge such messages which allow them to call all ships in a given area. A telex is thus necessary in an RCC covering an A3 sea area*.

2.4 VHF and MF with DSC

If the government concerned so decides, A1 or A2 areas (i.e. covered by VHF or MF respectively) may be created along coasts, by setting up the necessary installations with digital selective calling (DSC). The MRCC normally keeps watch on VHF channel 70 and/or the frequency 2187.5 kHz MF. Alerts are received in written form (printer or screen).

Although this solution is less satisfactory, watch can, however, be kept by a radio station on behalf of the MRCC.

Either directly or via a radio station, the MRCC must be able to converse, by voice, VHF and/or MF as applicable, with the ships involved in search and rescue operations. The available frequencies must be at least VHF channel 16 and/or 2182 kHz MF (which must be monitored as soon as the centre receives an alert on channel 70 or frequency 2187.5 kHz). The availability of other channels or frequencies is recommended so as to have alternative channels or frequencies.

2.5 Ordinary VHF

The MRCC may cover an area close to the coast crossed by a large number of vessels equipped only with radio installations that do not meet GMDSS standards, such as ordinary VHF without DSC. It would therefore be useful in this case for the MRCC to be equipped with (or have access to) radio installations which allow them to cover all or part of the area in question. In that case, it is recommended that watch should be kept by the MRCC (or a body which immediately informs it of alerts) on channel 16 (for the quoted example).

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* Unless the MRCC is linked to an X.25 data transmission network which also allows it to access the Inmarsat-C network.

2.6 COSPAS–SARSAT and Inmarsat-E satellite alert systems

Alerts coming from the COSPAS–SARSAT satellite system are transmitted to the MRCC by telex or fax either from an MCC (COSPAS–SARSAT mission control centre), or from a SPOC (SAR point of contact), or from another RCC.*

Distress alerts from ships equipped with Inmarsat-E EPIRBs are transmitted to MRCCs by certain Coast Earth Stations specially equipped to receive these alerts.*

3 ADDITIONAL MEASURES TO BE CONSIDERED

3.1 Special networks

The authority responsible for setting up the rescue organization, in the light of the local context of the country concerned, should examine the possibility of linking, often quite cheaply, with existing networks (Administration, armed forces telephone networks), in particular the aeronautical fixed telecommunication network (AFTN), which provides the link with the aeronautical rescue organization.

3.2 Inmarsat-C ship earth station

MRCCs that originate SafetyNET broadcasts should be provided with an Inmarsat-C receiver or have another arrangement to monitor the broadcasts they originate to confirm that the messages are transmitted and received correctly.

4 ACTIONS TO BE TAKEN BY THE AUTHORITY RESPONSIBLE FOR SETTING UP AN MRCC

4.1 Telephone, fax and telex links

Obtain the necessary number of subscriber lines from the local network operator. Lease or buy the necessary equipment.

4.2 Inmarsat links

Contact the Chairman of the International SafetyNET Co-ordination Panel to ask him to prepare the certificates which will be issued so that the RCC can be considered as "information provider" and have access to the SafetyNET network for the purpose of search and rescue.

Ask the local Inmarsat operator in the country concerned about means of calling subscribers on the network.

4.3 VHF and/or MF radio

Obtain authorizations to set up a radio station (or stations) from the competent national body. Buy and install the necessary equipment. Train the staff responsible for operating it.

Alternatively, conclude a contract with an operating agency able to provide the services in question.

It is recommended to arrange for each station to have several transmitter-receivers, or at least one specialized receiver to monitor the distress channel, while having the capacity to converse on another channel.

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* There are in the world a number of receiving stations (LUT) which receive satellite information and transmit it to COSPAS-SARSAT mission control centres (MCCs). Each of these centres is responsible for broadcasting alerts in areas of responsibility of several countries, which make up its *service area*. When, in a particular country which does not have an MCC, there are several maritime and/or aeronautical rescue co-ordination centres, one of the RCCs is designated as the *SAR point of contact* (SPOC), and broadcasts to the various RCCs in the country.

If the country in question has not designated a SPOC (see 4.4), it receives alerts from the RCC of the country where the nearest MCC is located, or, in any case, from the first RCC which received the alert and which must transmit it to the geographically relevant RCC.

4.4 COSPAS–SARSAT*

If the country concerned has already designated a SPOC, it is sufficient to provide internal data-transmission procedures between the country's SPOC and the MRCC.

If the country concerned so wishes, it may designate the MRCC (or one of the MRCCs if it has several) as a SPOC to the COSPAS–SARSAT Secretariat† and to the MCC via which it wishes to be served. It will establish the procedures for broadcasting alerts with the MCC.

If it does not designate a SPOC, the country concerned may ask the MRCC of the country where the nearest MCC is located to transmit information to it (see footnote to section 2.6).

4.5 Additional means listed in section 3

For special networks, contact the network operators. For an Inmarsat SES, contact the local Inmarsat operator and an equipment supplier.

5 MARITIME RESCUE SUB-CENTRES (MRSCs)

Depending on the importance of a maritime rescue sub-centre (MRSC), the tasks assigned to it, the area covered, the degree of autonomy granted to it, the responsible authority may, if appropriate, reduce the equipment provided to it in relation to that described above.

With respect to connection to the general telephone network, one line for a telephone and one for a fax is a minimum.

6 JOINT AERONAUTICAL AND MARITIME RESCUE CENTRES (JRCC AND JRSC)

Everything that is envisaged in this circular applies to JRCC (and if applicable JRSC, taking into account paragraph 5), subject to being complemented by means of communication specific to the aeronautical rescue organization.

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* Irrespective of the alert transmission procedures described in the text, the State concerned must also install a body to register emergency position-indicating radio beacons (EPIRBs), which must be capable of being continuously interrogated. This body, which may be an MRCC, is called an *SAR Data Provider* (SDP).

† COSPAS–SARSAT Secretariat, Inmarsat House, 99 City Road, London EC1Y 1AX, United Kingdom (Telephone: +44 20 7728 1391; fax: +44 20 7728 1170).

Annex 8-25
DISTRESS PRIORITY COMMUNICATIONS FOR RCC FROM SHORE TO SHIP VIA INMARSAT [COMSAR/Circ.19 (11.05.99)]

1 The Sub-Committee on Radiocommunications and Search and Rescue (COMSAR), at its third session (23 to 27 February 1998), noted information provided by Inmarsat on how an authorized Maritime Rescue Co-ordination Centre (MRCC) can initiate shore-to-ship communications via Inmarsat-A, Inmarsat-B or Inmarsat-C systems using the distress priority (Priority 3), and instructed the Secretariat to disseminate this information when it has been updated by Inmarsat.

2 Some MRCCs have established arrangements whereby they are able to use the distress priority when sending certain messages from shore to ship via the Inmarsat network. The method of achieving this varies depending on the nature of the facilities available at both a Coast Earth Station (CES) and a RCC. Inmarsat believes that such arrangements can contribute significantly to the efficiency and effectiveness of search and rescue operations.

3 In order for an authorized Maritime Rescue Co-ordination Centre (MRCC) to make use of the distress priority in the shore-to-ship direction, it is necessary for that MRCC to establish a prior arrangement with the CES to set up the necessary traffic routeing arrangements. To enable this arrangement to be made, the MRCC should contact the CES via the Operations Co-ordinator for that CES, whose details are contained in COMSAR/Circ.11 and Corr.1. The CES will advise the MRCC on the specific procedures to be used to make use of the distress priority in the shore-to-ship direction via that CES.

4 To facilitate contacts between MRCCs and CESs, detailed updated information on MRCCs has been provided by Inmarsat and is given in the annex.

5 Member Governments are invited to bring this circular to the attention of their SAR authorities and RCCs recommending them to establish appropriate arrangements for the use of distress priority communications from shore to ship when necessary.

Annex
List of Maritime Rescue Co-ordination Centres (MRCCs) associated with Inmarsat Coast Earth Stations (CESs)

No	CES	Country	Services	Ocean Region	MRCC	Address	Contact Details
1	Anatolia	Turkey	A	IOR	MRCC Ankara	Basbakanlik Denizcilik Mustesarligi Gazi Mustafa Kemal Bulvari No: 128 Maltepe 06100 Ankara, Turkey	Tel: +90 312 2319105, +90 312 2324783 Fax: +90 312 2320823 Tlx: (607) 44144 DZMS TR
2	Arvi	India	A/C/B/M	IOR	MRCC Mumbai	Commandant Indian Coast Guard Region (West) Golfa Devi Temple Road Prabha Devi Post Mumbai 400025, India	Tel: +91 22 437 6133, +91 22 437 9201 Fax: +91 22 493 3727, +91 22 437 9201 Tlx: (81) 1171381 BMCG IN Inmarsat-C: (583) 441907210 E-mail: cgmumbai@bom3.vsnl.net.in
3	Ata	Turkey	A/C	AOR-E IOR	MRCC Ankara	Basbakanlik Denizcilik Mustesarligi, Gazi Mustafa Kemal Bulvari No: 128 Maltepe 06100 Ankara, Turkey	Tel: +90 312 2319105, +90 312 2324783 Fax: +90 312 2320823 Tlx: (607) 44144 DZMS TR
4	Aussaguel	France	C/B/M	AOR-E IOR AOR-W	MRCC Etel (SARNET*)	Avenue Louis Bougo BP 48 56410 Etel France	Tel: +33 2 97 55 35 35 Fax: +33 2 97 55 49 34 Tlx: (42) 740846 CROSSA F (distress red line), (42) 950519 CROSSA F E-mail: crossa.etel@wanadoo.fr Inm-C: 422799025
5	Beijing	China	A/C/B/M	IOR POR	China Maritime Search and Rescue Centre	11 Jian Guomennei Ave Beijing, China	Tel: +86 10 65292221 Fax: +86 10 65292245 Tlx: (85) 222258 CMSAR CN
6	Blaavand**	Denmark	C	AOR-E	MRCC Aarhus (SARNET*)	Maritime Rescue Co-ordination Centre, P.O. Box 483 8100 Aarhus C Denmark	Tel: + 45 89433099 Fax: +45 89433230 Tlx: (55) 64485 RCCARH DK E-mail: mrcc@sok.dk Inm-C: 492380442
7	Boumehen	Iran	A/C	IOR	MRCC Tehran	Ports and Shipping Organisation No. 751 Enghelab Avenue Tehran 5994 IR of Iran	Tel: +98 21 8809326, +98 21 8803862 Fax: +98 21 8809324 Tlx: (88) 212271 BNDR IR, (88) 214260 BNDR IR
8	Cape D'Aguilar	Hong Kong	A/B/M	IOR POR	MRCC Hong Kong	HKMRCC Marine Department G.P.O. Box 4155 Hong Kong	Tel: +852 2545-0181, +852 2545-4645, Fax: +852 2541-7714 Tlx: (802) 82952 MRCC HX E-mail: hkmrcc@mail.gcn.gov.hk

No	CES	Country	Services	Ocean Region	MRCC	Address	Contact Details
9	COMSAT Eurasia	Malaysia	B/M	IOR	MRCC Port Klang	Director General, Marine Department Safety of Navigation Division P.O. Box 12, 42007 Port Klang, Malaysia	Tel: +603 3670530, +603 3686616 Fax: +603 3671334, +603 3685020 Tlx: (84) 39748 LAUT MA E-mail: kpgr@marine.gov.my
10	Eik	Norway	A/C/B/M	AOR-E IOR AOR-W	JRCC Southern Norway, Stavanger (SARNET*)	Sikringbygget N-4050 Sola Norway	Tel: +47 51517000 (emergency) Tel: +47 51646000 Fax: +47 51652334 Tlx: (56) 33163 RCCS N Inm-C: 425899999
11	Fucino	Italy	A/C/B/M	AOR-E IOR	MRCC Rome	Italian MRCC Italian Coast Guard Viale dell'Arte,16 I-00144 Rome Italy	Tel: + 39 6 5924145, + 39 6 5923569, +39 6 59084697, +39 6 59084409 Fax: +39 6 5922737, +39 6 59084793 Tlx: (43) 611172 COGECP I, (43) 614156 COGECP I, (43) 614103 COGECP I E-mail: cogecap3@flashnet.it
12	Gnangara	Turkey	A	IOR	MRCC Ankara	Basbakanlik Denizcilik Mustesarligi Gazi Mustafa Kemal Bulvari No: 128 Maltepe 06100 Ankara , Turkey	Tel: +90 312 2319105, +90 312 2324783 Fax: +90 312 2320823 Tlx: (607) 44144 DZMS TR
13	Goonhilly	UK	A/C/B/M/E	AOR-E AOR-W	MRCC Falmouth (SARNET*)	HMCG Pendennis Point Castle Drive, Falmouth Cornwall TR11 4WZ, UK	Tel: +44 1326 317575 Fax: +44 1326 318342 Tlx: (51) 45560 FALMCG G Inm-A (E): 581/871 1441532 Inm-C (E/W): 581 423200158/584 423200159
14	Jatiluhur	Indonesia	B/M	IOR	BASARNAS (Badan SAR Nasional)	Jln. Merdeka Timur No. 5 Jakarta 10110 Indonesia	Tel: +62 21 3521111, +62 21 34832901, +62 21 34832908, +62 21 34832879, +62 21 34832953, +62 21 34832880, +62 21 34832872, +62 21 34832869, +62 21 5501111, +62 21 5507152 Fax: +62 21 34832884 Tlx: (73) 44025 SARNAS IA
15	Jeddah	Saudi Arabia	A/C	IOR	N/A	N/A	N/A
16	Kuantan	Malaysia	B/M	IOR	MRCC Port Klang	Director General, Marine Department Safety of Navigation Division P.O. Box 12 42007 Port Klang, Malaysia	Tel: +603 3670530, +603 3686616 Fax: +603 3671334, +603 3685020 Tlx: (84) 39748 LAUT MA E-mail: kpgr@marine.gov.my

No	CES	Country	Services	Ocean Region	MRCC	Address	Contact Details
17	Kumsan	Republic of Korea	A/B/M/C	IOR POR	Korea National Maritime Police Agency	105-1, Buksung-dong Jung-gu, Inchon City Republic of Korea	Tel: +82 32 883 0461, +82 32 883 4009 Fax: +82 32 881 9595, +82 32 881 5362 Tlx: (801) 24920 ROKNP K
18	Laurentides	Canada	B/M	AOR-E AOR-W	RCC Halifax (SARNET*)	CFB Halifax P.O. Box 99000 Stn. Forces Halifax, Nova Scotia, B3K 5X5 Canada	Tel: +1 902 4272102 Fax: +1 902 4272114 Tlx: (21) 1921533 RCC HALIFAX Inm-C: (E/W) 581 493020114/584 493020115
19	Maadi	Egypt	A	AOR-E	SAR Center in Egypt	Almaza Air Base Heliopolis Cairo, Egypt	Tel: +20 2 4184537, +20 2 4184531 Fax: +20 2 4184531 Tlx: (91) 21095 RCCCR UN
20	Nakhodka	Russia	A	POR	MRCC Vladivostok	Nizhne-Portovaya str., 3 Vladivostok, 690019 Russia	Tel: + 7 4232 412776 Fax: +7 4232 495895 Tlx: (64) 213124 RCC RU, (64) 213115 MRF RU
21	Niles Canyon	USA	A/E	AOR-W POR	RCC Alameda	Commander (cc) Pacific Area, 11th Coast Guard District Coast Guard Island Alameda, CA 94501-5100, USA	Tel: +1 510 437 3701 Fax: +1 510 437 3017 Tlx: (230) 172343 CG ALDA
22	Nonthaburi	Thailand	C/B/M	IOR	RCC Bangkok	71 Soi Ngamduplee, Rama IV Road Tung Mahamek Bangkok 10120, Thailand	Tel: +66 2 2860506, +66 2 2860594, +66 2 2859353, +66 2 2855452 Fax: +66 2 2873186 Tlx: (86) 22720 BKKRCC TH
23	Odessa	Ukraine	A	AOR-E IOR	MRCC Odessa	29, Shevchenko Av. 270058 Odessa Ukraine	Tel: +380 48 2637619 Tel/Fax: +380 48 2634243 Tlx: (680) 232139
24	Perth	Australia	A/C/B/M/E	AOR-E AOR-W IOR POR	RCC Australia	AMSA GPO Box 2181 Canberra City ACT 2601 Australia	Tel: +61 2 6230 6811 Fax: +61 2 6230 6868 Tlx: (71) 62349 MRCCAUS AA62349 E-mail: rccaus@amsa.gov.au
25	Pleumeur Bodou	France	A	AOR-E AOR-W	MRCC Etel (SARNET*)	Avenue Louis Bougo BP 48 56410 Etel France	Tel: +33 2 97 55 35 35 Fax: +33 2 97 55 49 34 Tlx: (42) 740846 CROSSA F (distress red line), (42) 950519 CROSSA F E-mail: crossa.etel@wanadoo.fr Inm-C: 422799025
26	Psary	Poland	A/C	AOR-E IOR	MRCC Gdynia	10 Hryniewickiego Str. 81-340 Gdynia P.O.Box 186 Poland	Tel/Fax: +48 58 6205551, +48 58 6216811, +48 58 6276955 Tlx: (63) 54262 RCC PL E-mail: polratok@ikp.atm.com.pl

No	CES	Country	Services	Ocean Region	MRCC	Address	Contact Details
27	Raisting	Germany	A/C/B/M/E	AOR-E IOR	MRCC Bremen (SARNET*)	German Sea Rescue Service, DGzRS, Attn.: MRCC Bremen, Werderstr. 2, D-28199 Bremen Germany	Tel: +49 421 536870 Fax: +49 421 5368714 Tlx: (41) 246466 MRCC D, (41) 244754 MRCC D Inm-C: 492621021
28	Riyadh	Saudi Arabia	B/M	AOR-E IOR	N/A	N/A	N/A
29	Santa Paula	USA	A/C/B/M	POR	RCC Alameda	Commander (cc), Pacific Area, 11th Coast Guard District, Coast Guard Island Alameda, CA 94501-5100, USA	Tel: +1 510 437 3701 Fax: +1 510 437 3017 Tlx: (230) 172343 CG ALDA
30	Sentosa	Singapore	A/C/B/M	IOR POR	MRCC Singapore, Port Operations Control Centre	Maritime and Port Authority of Singapore Port Master's Department 19 Storey Tanjong Pagar Complex 7B Keppel Road, Singapore 089055, Republic of Singapore	Tel: +65 3252493, +65 3252494 Fax: +65 2245776 Tlx: (87) 34970 PORTPM RS34970 E-mail: pocc@mpa.gov.sg
31	Sintra	Portugal	C	AOR-E	MRCC Lisboa	Comando Naval Reduto Gomes Freire Estrada Da Medrosa 2780 OEIRAS Portugal	Tel: +351 1 4416581, +351 1 4416527 Fax: +351 1 4416159 Tlx: (404) 60747 MRCCL P
32	Southbury	USA	A/C/B/M	AOR-E AOR-W	RCC Norfolk	Commander (cc), Atlantic Area, 5th Coast Guard District 431 Crawford Street Portsmouth, VA 23704-5004, USA	Tel: +1 757 398 6231 Fax: +1 757 398 6392 Tlx: (230) 127775 USCG RCC NYK
33	Staten Island	USA	A	AOR-E	RCC Norfolk	Commander (cc) Atlantic Area, 5th Coast Guard District 431 Crawford Street Portsmouth, VA 23704-5004, USA	Tel: +1 757 398 6231 Fax: +1 757 398 6392 Tlx: (230) 127775 USCG RCC NYK
34	Station-12	Netherlands	A/C/B/M	AOR-E AOR-W IOR POR	JRCC IJmuiden (SARNET*)	JRCC IJmuiden Merwedestraat 1 Postbus 303 1970 AH Ijmuiden The Netherlands	Tel: +31 900 0111 (public emergency number) Tel: +31 255 54 66 54 (watch officer) Fax: +31 255 546599 Tlx: (44) 71088 KUSTW NL Inm-C: 424477710 NLCG X

No	CES	Country	Services	Ocean Region	MRCC	Address	Contact Details
35	Tangua	Brazil	A/C	AOR-E AOR-W	MRCC Brazil	Comando de Operacoes Navais, Salvamar Brasil (MRCC Brazil) Praca Barao de Ladario S/N Edificio Almirante Tamandare, 7 andar Rio de Janeiro, R.J. Brazil 20.091-000	Tel: +55 21 2166056 Fax: +55 21 2166038 Tlx: (38) 2135231 MMAR BR Inmarsat-C: 471009910 Inmarsat-M: 687240227 (voice), 687240228 (fax)
36	Thermopylae	Greece	A/C/B/M	AOR-E IOR	JRCC Piraeus (SARNET*)	Ministry of Mercantile Marine Hellenic Coast Guard RCC – Maritime Section 150, Gr. Lambraki Ave. 185 18 Piraeus Greece	Tel: +30 1 4112500, +30 1 4220772 (emergency) Fax: +30 1 4132398/4224417 Tlx: (601) 211588 RCC GR/211254 RCC GR Inm-A: +581/583 1133207 RCCG Inm-C: +581/583 423767310 RCCG
37	Towi Al Saman	UAE	B/M	IOR	N/A	N/A	N/A
38	Yamaguchi	Japan	A/C/B/M	AOR-E AOR-W IOR POR	Japanese Maritime Safety Agency	2-1-3 Kasumigaseki Chiyoda-ku, Operations Office Search and Rescue Division, Tokyo 100-0013, Japan	Tel: +81-3-3591-9812 Fax: + 81-3-3581-2853 Tlx: (72) 2225193 JMSAHQ J
39	Netley	New Zealand	C	POR	Maritime Operations Centre	Percy Cameron Street P.O. Box 30 945 Lower Hutt New Zealand	Tel: +64 4 6190623 Fax: +64 4 5771881 E-mail: maritime@bclnz.co.nz Inmarsat-C: (582) 451200067

Notes:

* MRCCs associated with Inmarsat CES that have been declared operational on Search and Rescue Network (SARNET). SARNET is a communication broadcast system to allow international MRCCs to exchange or seek SAR information by using Inmarsat-C EGC FleetNET service. MRCC Turku (Finland), MRCC Gothenburg (Sweden), MRCC Madrid (Spain), RCC Bermuda, MRCC Riga (Latvia), MRCC Rejkjavik (Iceland) are not associated with Inmarsat CESs but have also been declared operational on SARNET.

** Blaavand CES will cease operation as of 31 May 1999)].

While Inmarsat takes every care in the compilation of the information contained in this table, no responsibility is or will be accepted by Inmarsat for any inaccuracy or incompleteness of the information. Information compiled May 1999)].

Annex 8-26
GUIDANCE ON DATA FIELDS FOR SAR DATABASES
[COMSAR/Circ.22 (20.06.00)]

1 The Maritime Safety Committee, at its seventy-second session (17 to 26 May 2000), approved the annexed Guidance on Data Fields for SAR Databases.

2 Member Governments are invited to use the annexed Guidance when collecting SAR data and bring it to the attention of all parties concerned.

Annex

GUIDANCE ON DATA FIELDS FOR SAR DATABASES

Part 1
Basic Data Fields

The Incident division concerns the overview of the actions taken. The elements in this division are:

SAR CASE (field is binary function, Y/N, default blank) This field exists because RCCs may be using this database to record emergency assistance other than SAR (IAMSAR Draft 4 volume 2, chapter 7) or other work the RCC is tasked to handle. Generally, it is more efficient to build and use one database than to create a series of databases.

RCC (field is set to the RCC name) i.e. Victoria.

INCIDENT NUMBER (field is numeric, 6 digits, system-generated) Each incident must be uniquely identified to prevent the duplication of records. Ideally, it should be system-generated. It is not recommended to include the year as part of the incident number as the year is recorded separately as part of the record.

START DATE (field is numeric, 8 digits, default current system date, format YYYYMMDD)
START TIME (field is numeric, 4 digits, default current system, format HHMM in UTC) The Start Date and Time is the date and time that the RCC was alerted.

INCIDENT DATE (format as per START DATE, default blank)
INCIDENT TIME (format as per START TIME, default blank) This shall be the earliest time for one of the following events: search object declared distress, the time an electronic beacon was activated or an observer noted the search object in distress.

SMC (field is binary function, Y/N, default blank) This designates that either the RCC was SMC at some point for the SAR incident or was assisting another RCC with the incident.

SMC START DATE (format as per START DATE, default blank)
SMC START TIME (format as per START TIME, default blank)
SMC END DATE (format as per START DATE, default blank)
SMC END TIME (format as per START TIME, default blank) These four fields are only recorded if the RCC assumed SMC or turned over SMC to another responsible authority.

SEARCH OBJECT LATITUDE (format DDMM.MX, default blank)
SEARCH OBJECT LONGITUDE (format DDDMM.MY, default blank) This is the datum point's geographical position, where D is the degrees, M is minutes and decimal minutes, X is either N or S and Y is either E or W.

OBJECT FOUND LATITUDE (format DDMM.MX, default blank)
OBJECT FOUND LONGITUDE (format DDMM.MX, default blank) This is the geographical position where the search object was found, where D is the degrees, M is minutes and decimal minutes, X is either N or S and Y is either E or W. This is to remain blank if the search object was never found.

DISTANCE OFFSHORE (field is numeric, 4 digits, default blank) This field is only for maritime incidents expressed in nautical miles.

WHO ALERTED (field is numeric, 1 digit, default blank) This field uses a limited list to categorize who alerted the RCC.

1. Search Object
2. Relayed (when the Search Object cannot directly transmit to the RCC)
3. MCC (COSPAS–SARSAT MCCs are not included in "Relayed")
4. Observer
5. RCC

INCIDENT TYPE (field is numeric, 1 digit, default blank) This field uses a limited list to categorize the type of incident.

1. Distress
2. Precautionary Assistance
3. Hoax (a deliberate false activation of the system intended to misuse resources)
4. False Alert (a distress alert received when no distress situation resulted and no notification of distress should have resulted)
5. Not Found (a distress alert received but not resolved)
6. Medical (Medical evacuation and MEDICO)

Search Object is the division describing the object.

SEARCH OBJECT NAME (field is alphanumeric, 32 characters, default blank) This field combined with the next two fields offers a unique identity for the search object. Name should be either the name of the vessel, family name of the Captain or Commander if it is an aircraft or a vessel with no name, or primary person's family name (in the case of a diver, swimmer or driver of a motor vehicle).

SEARCH OBJECT OFFICIAL NUMBER (field is alphanumeric, 16 characters, default blank) Filled in, if available.

SEARCH OBJECT RADIO CALLSIGN (field is alphanumeric, 16 characters, default blank) This is the callsign found on the ITU lists.

NATIONALITY OF SEARCH OBJECT (field is alphanumeric, 32 characters, default blank) Self-explanatory.

TYPE OF SEARCH OBJECT (field is numeric, two digits, default blank) This field uses a limited list to generally describe the initial search object.

1. SOLAS Passenger
2. SOLAS Non-passenger
3. Non-SOLAS Passenger
4. Non-SOLAS Non-Passenger
5. Fishing Vessel
6. Pleasure Craft Motor with Accommodation
7. Pleasure Craft Motor without Accommodation
8. Pleasure Craft Sail with Accommodation
9. Pleasure Craft Sail without Accommodation
10. Pleasure Craft Recreation (Air beds, toys, etc.)
11. Government Non-military Vessel
12. Military Vessel
13. Submarine
14. Non-powered Aircraft or Balloon

15. Rotary Wing Commercial
16. Rotary Wing General Aviation
17. Rotary Wing Government Non-military
18. Rotary Wing Military
19. Fixed Wing Commercial
20. Fixed Wing General Aviation
21. Fixed Wing Government Non-military
22. Fixed Wing Military
23. Automobile
24. Truck/Lorry
25. Person (diver, swimmer, parachutist, jumper/suicide)

POB (field is numeric, 4 digits, default value 1) The number of persons aboard the search object.

LIVES LOST BEFORE NOTIFICATION (field is numeric, 4 digits, default value blank)
LIVES LOST AFTER NOTIFICATION (field is numeric, 4 digits, default value blank)
LIVES SAVED (field is numeric, 4 digits, default value blank) This field is the number of lives delivered to a place of refuge (i.e., port, aerodrome, hospital, reception facility).

VALUE OF PROPERTY SAVED (field is numeric, 10 digits, default blank) This is the value that is referred to in IAMSAR Draft 4, Volume 1 Sections 5.6.7 and 5.6.10.

SAR Facilities is the division that describes in general terms the facilities used. Specifics would be found under the amplifying data category.

TYPE AND NUMBER (field is alphanumeric, nine characters, format ANNGNNMNN, default is A00G00M00) This is the collective type and number of SAR facilities used, where the letter A is for Aeronautical, M for Maritime, G for Ground. N is for the number of each unit. e.g., A04G00M03 refers to four aeronautical SAR facilities, three maritime and no ground

SORTIES (field is numeric, 4 digits, default is blank) This is the collective number of sorties during the incident.

DATE TASKED (format as per START DATE, default blank)
TIME TASKED (format as per START TIME, default blank) This group is for the date/time that the first SAR facility was tasked. If the SAR facility is on-scene when the incident began then this field is left blank.

DATE ON-SCENE (format as per START DATE, default blank)
TIME ON-SCENE (format as per START TIME, default blank) This group is for the date/time for the first SAR facility to arrive on-scene. If the SAR facility is on-scene when the incident began then this field is left blank.

DATE SEARCH OBJECT FOUND (format as per START DATE, default blank)
TIME SEARCH OBJECT FOUND (format as per START TIME, default blank) If the SAR facility is on-scene when the incident began then this field is left blank.

DATE SEARCH ENDED (format as per START DATE, default blank)
TIME SEARCH ENDED (format as per START TIME, default blank) Self-explanatory.

DATE NORMAL (format as per START DATE, default blank)
TIME NORMAL (format as per START TIME, default blank) The date/time that the last SAR facility returns to the function or location it was in before it was involved in the incident.

FORMAL SEARCH PLAN (field is binary function, Y/N, default blank)

AMOUNT OF AREA SEARCHED (field is numeric, 7 digits, default blank) The calculated total area searched without overlap expressed in square nautical miles.

Part 2

Amplifying Data Fields – EXAMPLE

WEATHER is the division that describes the weather at the time of the alert. Codes that are used in this division are those published by the WMO, Publication 306, Volume 1.1 Part A. It is important to recognize that the database fields and the operator input screen may not contain identical views. For example, visibility may be observed at greater than 50 nautical miles and recorded in this database as code 99.

Weather does not form part of the basic data fields for two reasons. First, weather may not be a significant factor in every distress case and second, not every field would be recorded in every case.

For the elements of this division, only weather that has caused the incident or a significant deterioration in the weather should be recorded. This division should be repeated and tagged with the date/time when more than one observation is recorded.

DATE WEATHER (format as per START DATE, default blank)
TIME WEATHER (format as per START TIME, default blank)
WIND SPEED
WIND DIRECTION
AIR TEMPERATURE
SEA TEMPERATURE
SEA STATE
SWELL HEIGHT
SEA ICE CONDITIONS
CLOUD COVER
CLOUD CEILING
VISIBILITY
PRECIPITATION

SAR Facilities information that will amplify the basic data is recorded for each SAR facility that was used in the incident. Each set of fields will be tagged to the type and name.

SAR FACILITY TYPE (field is alphanumeric, 1 character, format T, default blank) This is a generic description of type, where T is A, G or M for Aeronautical, Ground or Maritime.
SAR FACILITY NAME (field is alphanumeric, 32 characters, default blank)
SAR FACILITY RADIO CALLSIGN (field is alphanumeric, 16 characters, default blank) This is the callsign found on the ITU lists.
SAR FACILITY NATIONALITY (field is alphanumeric, 32 characters, default blank)
SAR FACILITY DATE TASKED (format as per START DATE, default blank)
SAR FACILITY TIME TASKED (format as per START TIME, default blank)
SAR FACILITY DATE RESPONDED (format as per START DATE, default blank)
SAR FACILITY TIME RESPONDED (format as per START TIME, default blank)
SAR FACILITY DATE ON-SCENE (format as per START DATE, default blank)
SAR FACILITY TIME ON-SCENE (format as per START TIME, default blank)
SAR FACILITY SORTIES (field is numeric, 4 digits, default is blank) The number of sorties conducted by this SAR facility.

SAR FACILITY DOWN-TIME (field is numeric, 6 digits, format DDHHMM) This records time while assigned to a SAR incident where the SAR facility had to refuel, conduct repairs, trade fresh crew for fatigued crew, or any other reason that the SAR facility was not conducting SAR operations.

NUMBER LIVES RESCUED (field is numeric, 4 digits, default value 0)
NUMBER DECEASED RECOVERED (field is numeric, 4 digits, default value 0)

SAR FACILITY DATE RELEASED (format as per START DATE, default blank)
SAR FACILITY TIME RELEASED (format as per START TIME, default blank)

SAR FACILITY DATE NORMAL (format as per START DATE, default blank)
SAR FACILITY TIME NORMAL (format as per START TIME, default blank)

Annex 8-27
GUIDANCE FOR CENTRAL ALERTING POSTS (CAPs)
[COMSAR/Circ.23 (20.06.00)]

1 The Maritime Safety Committee, at its seventy-second session (17 to 26 May 2000), recognizing the need for interim measures for Heads of MRCCs to carry out an efficient co-operation in SAR matters for a transitional period until the global SAR plan had been fully implemented, approved the annexed Guidance on Central Alerting Posts (CAPs).

2 Member Governments are invited to use the annexed Guidance, as appropriate, and bring it to the attention of all parties concerned.

Annex

GUIDANCE ON CENTRAL ALERTING POSTS (CAPs)

INTRODUCTION

Certain States have ratified the 1979 International Convention on Maritime Search and Rescue (SAR Convention). Others have not. However, more general obligations in matter of SAR may be found in the United Nations Convention on the Law of the Sea (UNCLOS) and in the International Convention on the Safety of Life at Sea (SOLAS), 1974, as amended (see appendix A).

Furthermore, even if some States have ratified none of these Conventions, as search and rescue is an action to save human life, not a legal institution, there is a general obligation for every State to participate, among its possibilities, in the global SAR effort. But to be efficient, this participation must respect certain standards of the global SAR organization, particularly when co-operating with other States.

The alerting post

According to the SAR Convention principles (see appendix B), some volunteer States are only responsible for a Search and Rescue Region (SRR).

It follows that some SRRs include coasts and territorial sea of States different from the one that is responsible for this SRR and which hence operates the Maritime Rescue Co-ordination Centre (MRCC) of this SRR. In most cases, exchanges of information between the MRCC and this (these) foreign State(s) pass always through the same local body: police headquarters or harbourmaster, for example. This body so operates as an *alerting post* of a special kind as it is the sole correspondent of the MRCC in this foreign country.

Definition of the *alerting post* may be found in the International Aeronautical and Maritime Search and Rescue (IAMSAR) Manual: ''Any facility intended to serve as an intermediary between a person reporting an emergency and a rescue co-ordination centre or rescue sub-centre''. A lot of them carry out this function very occasionally. Some others are more sea-oriented. But in general, modes of co-operation between the alerting posts are entirely in the hands of the MRCC which has to give to any person or body which may become occasionally an alerting post some instructions such as phone numbers to call and list of data to gather in case of alert. The situation of alerting posts described in the previous indent is a bit different as having a more important general responsibility for SAR in their country. These have been given the name of ''Central Alerting Post'' (CAP).

Purpose of the circular

The purpose of this circular about CAPs is:

- to give guidance to the competent body of the Governments involved, even if this State has not ratified the SAR Convention, because while ratification is strongly recommended, as far as human life is involved, a co-operation without ratification is far better than no co-operation at all;
- to give basic elements to the CAPs for them to carry out an efficient co-operation in SAR matters; and
- to give guidance to the MRCCs involved, for them to advise properly the CAPs in their SRRs.

General remarks

– This circular deals normally only with the maritime SAR organization. However, principles are the same in both organizations and these are joint in certain States.

– It must be stressed that, if States involved organize their co-operation by signing an agreement or arrangement, they may adopt in this latter instrument other solutions than those provided in the present circular, as far as provisions jointly adopted respect SAR Convention principles and provisions.

– MRSC (Maritime Rescue Sub-Centre) can be read in place of the MRCC when a MRSC exists and has been instructed to have link with a CAP.

Appendix A provides pertinent quotations of the UNCLOS and SOLAS Convention.

Appendix B recalls the basic elements of the global SAR organization.

1 DEFINITION

A *Central Alerting Post (CAP)* in a given country* is the sole point of contact for SAR matters between all authorities and SAR facilities of this country and the foreign MRCC of the Search and Rescue Region (SRR) in which the country of the CAP is included.

In most cases the duties of CAP will be a part-time activity of a public body (police or coastguard headquarters or station, harbourmaster, etc.). But it may be carried out by a private body if instructed to do so by a governmental authority.

A CAP should be permanently manned at least by the way of a duty officer able to be called at home out of working hours.

2 DUTIES OF A CAP

2.1 Permanent preparatory duties

2.1.1 Regarding the other alerting posts of the country

A CAP should be given task to centralize information about any maritime incident.

It should insure its role of centralisation is clearly known, at least by other public bodies involved in emergency situations and in maritime activities.

2.1.2 Regarding the SAR resources of the country

The CAP should keep a record of any facility able to intervene in a SAR case, with basic data (type, range, speed, etc.), status of availability, as far as possible, and especially a way of alerting it for intervention.

2.1.3 Regarding the MRCC

The CAP should keep and take into account any information and guidelines received from MRCC.

If there is not a sole phone number to be used out of working hours, it has to send to MRCC a list of duty officers' personal phone numbers.

2.2 Duties about a given SAR case

2.2.1 Normal situation

As soon as a SAR alert is received by the CAP, this body has:

– to pass this alert to the MRCC with full gathered data about the incident;

* This "country" may be either an independent State or a remote part of another State whose main coasts are included in another (or several other) SRR(s).

– if necessary, to receive a request from the MRCC for gathering more information;

– to receive a request from the MRCC for operating local SAR facilities, following assessment of the situation by the MRCC;

– to pass immediately this request to the body which has power to operate these facilities with all useful information about the task: object of the task, area, radio frequencies, etc.;

– if the facilities have no direct communications link with the MRCC (a direct link is the normal way, which has to be seeked), to act as communications relay between these facilities and the MRCC;

– to report any new element to the MRCC; and

– if necessary (for serious accidents, for example), to act as communications relay between the MRCC and any governmental or public authority involved in the State of the CAP.

2.2.2 Special situation

When, according to information received by the CAP:

– a SAR case clearly needs no search action but only a rescue intervention for few people at a precise point;

– this point is in the territorial sea of the CAP's State; and

– the rescue intervention may be carried out by local facilities without help coming from another country or from ships at sea,

the CAP may request immediate intervention of local facilities while informing the MRCC.

It has to be stressed that the three above conditions have to be respected because:

– as soon as there is a search to carry out, it may be a long and difficult operation involving facilities coming from outside; and

– a CAP has no power to co-ordinate foreign facilities and vessels at sea.

3 DUTIES OF A MRCC REGARDING A CAP

3.1 Permanent preparatory duties

The MRCC permanently has to:

– give the CAP any useful indications for organizing their co-operation, keeping in mind that this information must be kept very simple, as a CAP is only a part-time non-specialized (and sometimes non-maritime) SAR actor;

– update all elements regarding transmission of alerts (phone or fax numbers, etc.);

– advise the CAP as appropriate; and

– propose its participation in the training of staff manning the CAP, if practical.

3.2 Duties during a SAR operation

The MRCC has to keep the CAP informed of the latest information about the operation.

4 EQUIPMENT OF A CAP

A phone line and a fax line are sufficient as recommended basic equipment. According to a local situation, VHF equipment may be considered.

5 DOCUMENTATION OF A CAP

5.1 IMO documentation

This circular may be the sufficient IMO documentation for a CAP. However, it may be useful for the latter to have a copy of the IAMSAR Manual.

5.2 MRCC documentation

The CAP has to keep and update documentation sent by the MRCC regarding their mutual co-operation.

5.3 Domestic documentation

The CAP has to maintain and update any documentation issued by any competent authority, especially instructions regarding ways of alerting local facilities.

6 SAR FACILITIES

According to IMO definitions:

- a SAR facility is ''any mobile resource, including designated search and rescue units, used to conduct search and rescue operations''; and
- a SAR unit is ''a unit composed of trained personnel and provided with equipment suitable for the expeditious conduct of search and rescue operations''.

In many countries there are no dedicated SAR units, except small craft. Practically, the SAR resources that a CAP may call for intervention would be in most cases provided by patrol craft of the Navy or the Police or the Coast Guard and by aircraft of these bodies, if any. However, any other solution is acceptable, if efficient.

7 FURTHER EVOLUTION

An advanced evolution of a CAP may be transformed into a Maritime Rescue Sub-Centre (MRSC). Such a transformation is subject to the following conditions:

- a certain number of SAR cases to be treated;
- the ratification of the SAR Convention by the CAP's State;
- a joint wish of the authority of the MRCC and of the authority of the CAP;
- a more important level of equipment, especially communications equipment (see IMO document COMSAR/Circ.18, Guidance on minimum communication needs of MRCCs);
- a more important documentation (see IMO document SAR.7/Circ.2);
- a level of training of personnel similar to the MRCC training level; and
- a jointly decided delegation given by the MRCC to the new MRSC.

Appendix A

United Nations Convention on the Law of the Sea, Article 98, paragraph 2:

> ''Every coastal State shall promote the establishment, operation and maintenance of an adequate and effective search and rescue service regarding safety on and over the sea and, when circumstances so require, by way of mutual regional arrangements co-operate with neighbouring States for this purpose.''

The International Convention on the Safety of Life at Sea (SOLAS), 1974,
as amended, regulation V/15

"(a) Each contracting Government undertakes to ensure that any necessary arrangements are made for coast watching and the rescue of persons in distress at sea round its coasts. These arrangements should include the establishment, operation and maintenance of such maritime safety facilities as are deemed practicable and necessary having regard to the density of the seagoing traffic and the navigational dangers and should, so far as possible, afford adequate means of locating and rescuing such persons.

(b) Each contracting Government undertakes to make available information concerning its existing rescue facilities and the plans for changes therein, if any."

Appendix B

BASIC ELEMENTS OF THE GLOBAL SAR ORGANIZATION

1 International instruments

Two international conventions give the framework of the global Search and Rescue organization in the world:

- the International Civil Aviation Convention (Chicago, 1944) and especially its Annex XII about SAR (1952) for aircraft accidents over land and sea; and
- the International Convention on Maritime Search and Rescue (Hamburg, 1979), as amended, for any "person in distress at sea".

2 Principles of the SAR organization

1st principle: the seas of the world are divided in "Search and Rescue Regions" (SRR). One volunteer State is responsible for this SRR which may include coast and territorial seas of other States, as far as they have accepted it. There is a strong need to avoid confusion in substance between boundaries of these SRRs (which are purely technical in the aim of rescue human life) and political and legal jurisdiction boundaries at sea.

2nd principle: the obligations of the responsible State are not to provide SAR facilities to intervene in any circumstance in any part of the SRR. These obligations are to operate permanently a Rescue Co-ordination Centre (RCC) (and associated technical equipment as appropriate) in charge of reception and centralisation of all alerts in the SRR and then to co-ordinate SAR operations;

3rd principle: any State (hence including States not responsible of a SRR and even States that have not ratified the SAR Convention) has the obligation to participate in the SAR effort, according to its situation regarding length of coasts, maritime activities, etc.;

4th principle: operations co-ordinated by MRCCs are carried out by SAR units of its own State, SAR units of any other State able to participate and any ship at sea, which has a legal obligation to participate;

5th principle: States have the obligation to co-operate, particularly by providing SAR resources even when the operation is not co-ordinated by their own MRCC, as soon as it is technically possible; and

6th principle: any expense in SAR operations are sustained by the operator of the facility (government for public vessel and aircraft, shipowner for trade and fishing vessel, pleasure craft operator).

Annex 8-28
LIST OF NAVAREA CO-ORDINATORS
[COMSAR/Circ.24 (10.01.01)]

1 The Sub-Committee on Radiocommunications and Search and Rescue (COMSAR), at its fifth session (11 to 15 December 2000), updated the list of NAVAREA Co-ordinators, as reproduced at annex.

2 Member Governments are invited to bring the annexed list to the attention of the NAVAREA Co-ordinators shown therein and to other national Maritime Safety Information (MSI) providers concerned, for information.

3 This circular supersedes COMSAR/Circ.20.

Annex

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Annex 8-29
PROCEDURE FOR RESPONDING TO DSC DISTRESS ALERTS BY SHIPS [COMSAR/Circ.25 (15.03.01)]

1 The Sub-Committee on Radiocommunications and Search and Rescue (COMSAR), at its fifth session (11 to 15 December 2000) revised COMSAR/Circ.21 on Procedure for responding to DSC distress alerts by ships, as reproduced at annex.

2 This circular revokes COMSAR/Circ.2 and COMSAR/Circ.21.

Annex

PROCEDURE FOR RESPONDING TO DSC DISTRESS ALERTS BY SHIPS

1 Introduction

The Sub-Committee on Radiocommunications and Search and Rescue (COMSAR), at its fourth session (12 to 16 July 1999), decided that digital selective calling (DSC) relays of distress alerts on all shipborne DSC equipment should be reduced and prepared a procedure for responding to VHF/MF and HF distress alerts, given in flow diagrams 1 and 2, recommending that it be displayed on the ship's bridge as A4 size posters. It also prepared the following guidance.

2 Distress relays

2.1 Radio personnel serving on ships should be made aware of the consequences of transmitting a distress relay call and of routeing a DSC distress relay alert to other than coast stations (CS).

2.2 The number of unintended activations of DSC distress alerts and DSC distress relay alerts creates extra work load and confusion to (M)RCCs and also causing delay in the response-time. The original distress alert from a ship in distress should not be disrupted by other ships, by transmitting a DSC distress relay alert.

2.3 Recommendation ITU-R M.541-8 on Operational procedures for the use of DSC equipment in the Maritime Mobile Service identifies only two situations in which a ship would transmit a distress relay call (distress relay alert):

.1 on receiving a distress alert on a HF channel, which is not acknowledged by a coast station within 5 minutes. The distress relay call should be addressed to the appropriate coast station (Annex 1, paragraph 3.4.2 and Annex 3, paragraph 6.1.4); and

.2 on knowing that another ship in distress is not itself able to transmit the distress alert and the Master of the ship considers that further help is necessary. The distress relay call should be addressed to "all ships" or to the appropriate coast station (Annex 3, paragraph 1.4).

2.4 In no case is a ship permitted to transmit a DSC distress relay call on receipt of a DSC distress alert on either VHF or MF channels.

2.5 Distress relay calls on HF channels should be initiated manually.

2.6 Compliance with operational and technical provisions above would prevent transmissions of inappropriate distress relay calls.

3 All coast stations call

3.1 Recommendation ITU-R M.493-9 on DSC systems for use in the Maritime Mobile Service provides for "group calls" an address consisting of the characters corresponding to the station's Maritime Mobile Service Identity (MMSI) and a number of administrations have already assigned a "group call" MMSI to their coast stations in addition to the coast station's individual MMSI.

3.2 By multilateral agreements, a "group call" MMSI could be assigned to all coast stations of a specific region, e.g., an RCC area and could comply with IMO's requirement without need of introducing further modifications to GMDSS equipment.

3.3 An alternative method to implement an "all coast stations" call without the need to modify Recommendation ITU-R M.493-9 could be to define one MMSI world-wide as an address for all coast stations, in accordance with Nos. S19.100 to S19.126 of the ITU Radio Regulations. However, this solution would also require a modification of the setup at each coast station participating in the GMDSS.

4 Authorization

It should be noted that on ships, distress alerts, distress acknowledgements and distress relay calls can only be transmitted with permission of the Master of the ship.

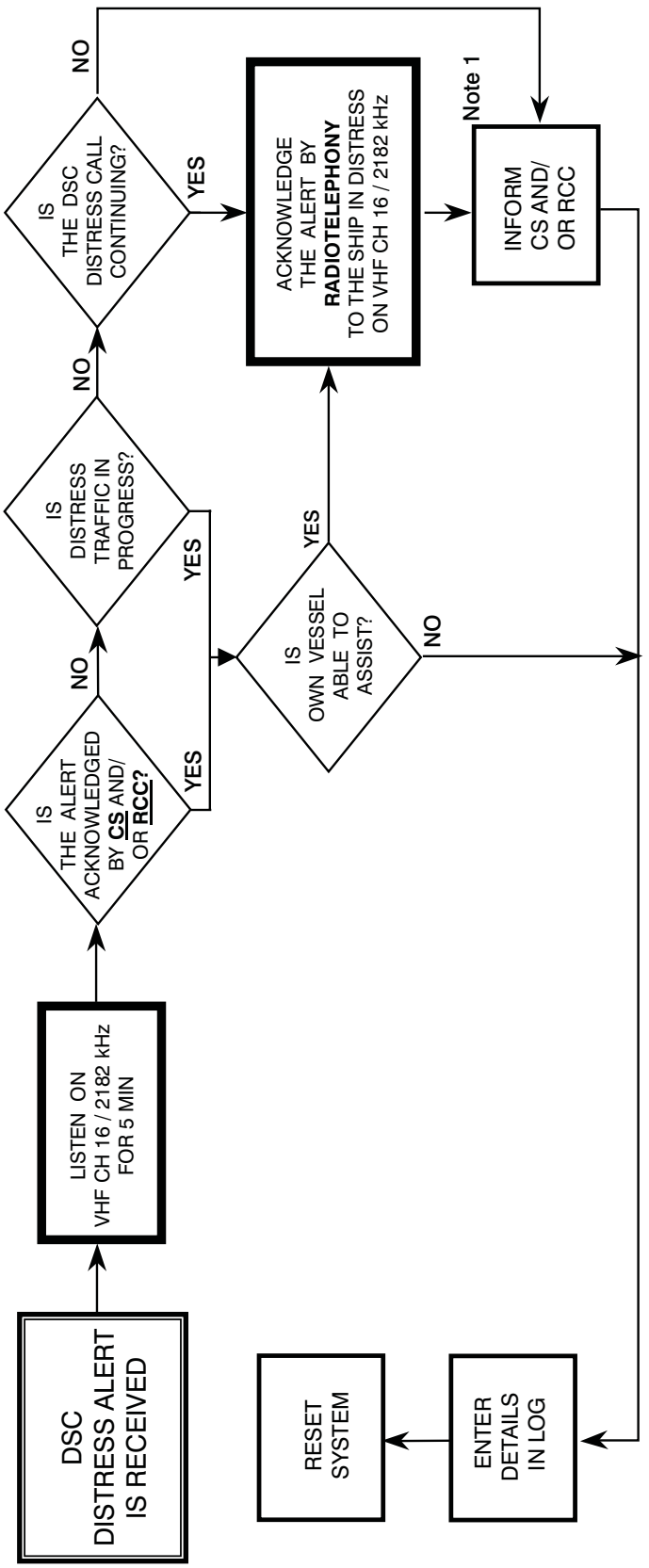
5 Flow diagrams

5.1 The simplified flow diagrams given in annexes 1 and 2 describe actions to be taken aboard ships upon receipt of distress alerts from other ships. Administrations should give wide distribution of these flow diagrams to ships and training institutions.

5.2 Member Governments are invited to bring the above guidance and the annexed flow diagrams to the attention of their shipowners, seafarers, coast stations, RCCs and all others concerned.

Flow diagram 1

ACTIONS BY SHIPS UPON RECEPTION OF VHF/MF DSC DISTRESS ALERT



REMARKS:

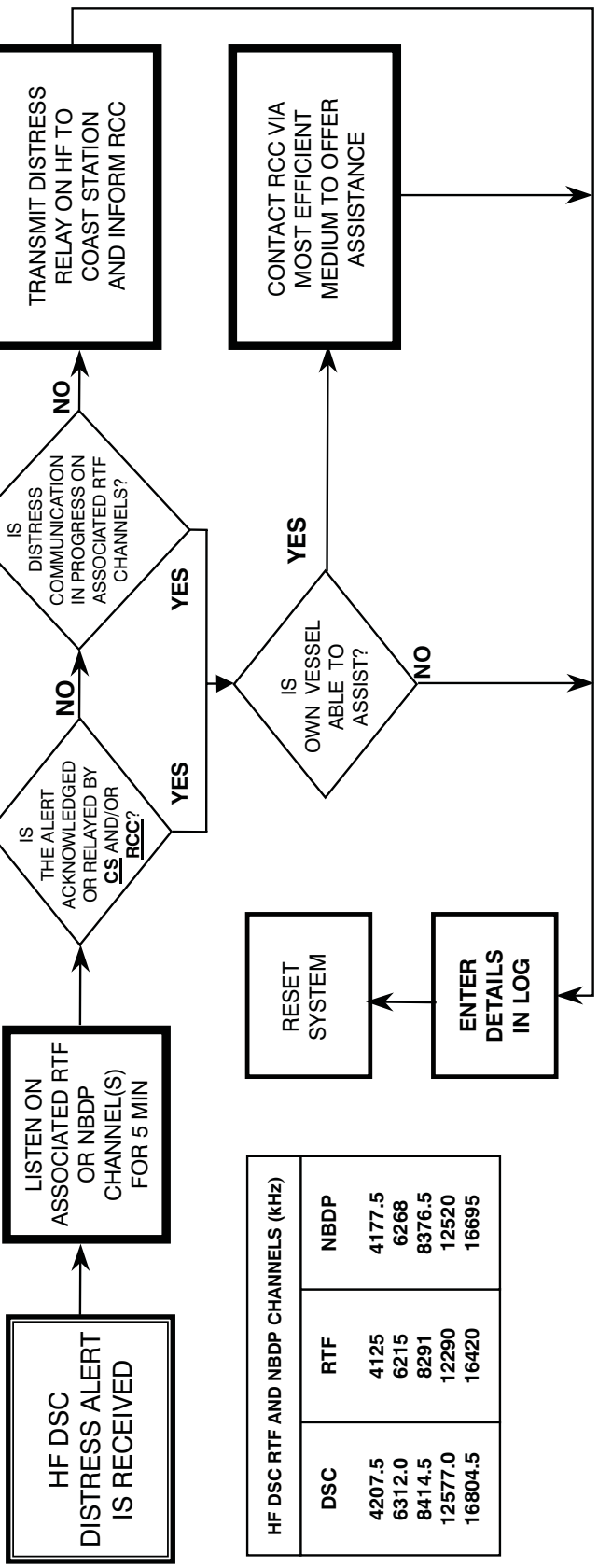
Note 1: Appropriate or relevant RCC and/or Coast Station shall be informed accordingly. If further DSC alerts are received from the same source and the ship in distress is beyond doubt in the vicinity, a DSC acknowledgement may, after consultation with an RCC or Coast Station, be sent to terminate the call.

Note 2: In no case is a ship permitted to transmit a DSC distress delay call on receipt of a DSC distress alert on either VHF channel 70 or MF channel 2187.5 kHz.

CS = Coast Station RCC = Rescue Co-ordination Centre

Flow diagram 2

ACTIONS BY SHIPS UPON RECEPTION OF HF DSC DISTRESS ALERT



HF DSC RTF AND NBDP CHANNELS (kHz)		
DSC	**RTF**	**NBDP**
4207.5	4125	4177.5
6312.0	6215	6268
8414.5	8291	8376.5
12577.0	12290	12520
16804.5	16420	16695

NOTE 1: If it is clear the ship or persons in distress are not in the vicinity and/or other crafts are better placed to assist, superflous communications which could interfere with search and rescue activities are to be avoided. Details should be recorded in the appropriate logbook.

NOTE 2: The ship should establish communications with the station controlling the distress as directed and render such assistance as required and appropriate.

NOTE 3: Distress relay calls should be initiated manually.

CS = Coast Station RCC = Rescue Co-ordination Centre

Annex 9

Articles and appendices of Radio Regulations relevant to the GMDSS

Annex 9-1 – Article S5 – Frequency allocations (Regulations S5.22, S5.79A, S5.108, S5.109, S5.110, S5.129, S5.132, S5.145, S5.200, S5.226, S5.227, S5.266, S5.267, S5.353A, S5.354, S5.356, S5.375)

Annex 9-2 – Article S18 – Licences

Annex 9-3 – Article S19 – Identification of stations and List VII A – Maritime identification digits

Annex 9-4 – Article S20 – Service documents

Annex 9-5 – Article S31 – Frequencies for the global maritime distress and safety system (GMDSS)

Annex 9-6 – Article S32 – Operational procedures for distress and safety communications in the global maritime distress and safety system (GMDSS)

Annex 9-7 – Article S33 – Operational procedures for urgency and safety communications in the global maritime distress and safety system (GMDSS)

Annex 9-8 – Article S34 – Alerting signals in the global maritime distress and safety system (GMDSS)

Annex 9-9 – Article S47 – Operator's certificates

Annex 9-10 – Article S53 – Order of priority of communications

Annex 9-11 – Article S59 – Provisional application of the Radio Regulations

Annex 9-12 – Appendix S15 – Frequencies for distress and safety communications for the global maritime distress and safety system (GMDSS)

Annex 9-13 – Appendix S16 – Documents with which stations on board ships and aircraft shall be provided

Annex 9-1

ARTICLE S5

Frequency allocations

S5.22 A sub-Region is an area consisting of two or more countries in the same Region.

S5.79A When establishing coast stations in the NAVTEX service on the frequencies 490 kHz, 518 kHz and 4 209.5 kHz, administrations are strongly recommended to coordinate the operating characteristics in accordance with the procedures of the International Maritime Organization (IMO) (see Resolution **339 (Rev.WRC-97)**). (WRC-97)

S5.108 The carrier frequency 2 182 kHz is an international distress and calling frequency for radiotelephony. The conditions for the use of the band 2 173.5-2 190.5 kHz are prescribed in Articles **S31** and **S52** and in Appendix **S13**.

S5.109 The frequencies 2 187.5 kHz, 4 207.5 kHz, 6 312 kHz, 8 414.5 kHz, 12 577 kHz and 16 804.5 kHz are international distress frequencies for digital selective calling. The conditions for the use of these frequencies are prescribed in Article **S31**.

S5.110 The frequencies 2 174.5 kHz, 4 177.5 kHz, 6 268 kHz, 8 376.5 kHz, 12 520 kHz and 16 695 kHz are international distress frequencies for narrow-band direct-printing telegraphy. The conditions for the use of these frequencies are prescribed in Article **S31**.

S5.129 On condition that harmful interference is not caused to the maritime mobile service, the frequencies in the bands 4 063-4 123 kHz and 4 130-4 438 kHz may be used exceptionally by stations in the fixed service communicating only within the boundary of the country in which they are located with a mean power not exceeding 50 W.

S5.132 The frequencies 4 210 kHz, 6 314 kHz, 8 416.5 kHz, 12 579 kHz, 16 806.5 kHz, 19 680.5 kHz, 22 376 kHz and 26 100.5 kHz are the international frequencies for the transmission of maritime safety information (MSI) (see Appendix **S17**).

S5.145 The conditions for the use of the carrier frequencies 8 291 kHz, 12 290 kHz and 16 420 kHz are prescribed in Articles **S31** and **S52** and in Appendix **S13**.

S5.200 In the band 117.975-136 MHz, the frequency 121.5 MHz is the aeronautical emergency frequency and, where required, the frequency 123.1 MHz is the aeronautical frequency auxiliary to 121.5 MHz. Mobile stations of the maritime mobile service may communicate on these frequencies under the conditions laid down in Article **S31** and Appendix **S13** for distress and safety purposes with stations of the aeronautical mobile service.

S5.226 The frequency 156.8 MHz is the international distress, safety and calling frequency for the maritime mobile VHF radiotelephone service. The conditions for the use of this frequency are contained in Article **S31** and Appendix **S13**.

In the bands 156-156.7625 MHz, 156.8375-157.45 MHz, 160.6-160.975 MHz and 161.475-162.05 MHz, each administration shall give priority to the maritime mobile service on only such frequencies as are assigned to stations of the maritime mobile service by the administration (see Articles **S31** and **S52**, and Appendix **S13**).

Any use of frequencies in these bands by stations of other services to which they are allocated should be avoided in areas where such use might cause harmful interference to the maritime mobile VHF radio-communication service.

However, the frequency 156.8 MHz and the frequency bands in which priority is given to the maritime mobile service may be used for radiocommunications on inland waterways subject to agreement between interested and affected administrations and taking into account current frequency usage and existing agreements.

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S5.227 In the maritime mobile VHF service the frequency 156.525 MHz is to be used exclusively for digital selective calling for distress, safety and calling. The conditions for the use of this frequency are prescribed in Articles **S31** and **S52**, and Appendices **S13** and **S18**.

S5.266 The use of the band 406-406.1 MHz by the mobile-satellite service is limited to low power satellite emergency position-indicating radiobeacons (see also Article **S31** and Appendix **S13**).

S5.267 Any emission capable of causing harmful interference to the authorized uses of the band 406-406.1 MHz is prohibited.

MOD

S5.353A In applying the procedures of Section II of Article **S9** to the mobile-satellite service in the bands 1 530-1 544 MHz and 1 626.5-1 645.5 MHz, priority shall be given to accommodating the spectrum requirements for distress, urgency and safety communications of the Global Maritime Distress and Safety System (GMDSS). Maritime mobile-satellite distress, urgency and safety communications shall have priority access and immediate availability over all other mobile satellite communications operating within a network. Mobile-satellite systems shall not cause unacceptable interference to, or claim protection from, distress, urgency and safety communications of the GMDSS. Account shall be taken of the priority of safety-related communications in the other mobile-satellite services. (The provisions of Resolution **222 (WRC-2000)** shall apply.)

S5.354 The use of the bands 1 525-1 559 MHz and 1 626.5-1 660.5 MHz by the mobile-satellite services is subject to coordination under No. **S9.11A**.

S5.356 The use of the band 1 544-1 545 MHz by the mobile-satellite service (space-to-Earth) is limited to distress and safety communications (see Article **S31**).

S5.375 The use of the band 1 645.5-1 646.5 MHz by the mobile-satellite service (Earth-to-space) and for inter-satellite links is limited to distress and safety communications (see Article **S31**).

Annex 9-2

ARTICLE S18

Licences

S18.1 § 1 1) No transmitting station may be established or operated by a private person or by any enterprise without a licence issued in an appropriate form and in conformity with the provisions of these Regulations by or on behalf of the government of the country to which the station in question is subject (however, see Nos. **S18.2**, **S18.8** and **S18.11**).

S18.2 2) However, the government of a country may conclude with the government of one or more neighbouring countries a special agreement concerning one or several stations of its broadcasting service or of its land mobile services, operating on frequencies above 41 MHz, situated in the territory of a neighbouring country and intended to improve national coverage. This agreement, which shall be compatible with the provisions of the present Regulations as well as of those regional agreements to which the countries concerned are signatories, may allow exceptions to the provisions of No. **S18.1** and shall be communicated to the Secretary-General in order that it may be brought to the notice of administrations for their information.

S18.3 3) Mobile stations which are registered in a territory or group of territories which does not have full responsibility for its international relations may be considered, in so far as the issue of licences is concerned, as subject to the authority of that territory or group of territories.

S18.4 § 2 The holder of a licence is required to preserve the secrecy of telecommunications, as provided in the relevant provisions of the Constitution and the Convention. Moreover, the licence shall mention, specifically or by reference, that if the station includes a receiver, the interception of radiocommunication correspondence, other than that which the station is authorized to receive, is forbidden, and that in cases where such correspondence is involuntarily received, it shall not be reproduced, nor communicated to third parties, nor used for any purpose, and even its existence shall not be disclosed.

S18.5 § 3 To facilitate the verification of licences issued to mobile stations and mobile earth stations, a translation of the text in one of the working languages of the Union shall be added, when necessary, to the text written in the national language.

S18.6 § 4 1) The government which issues a licence to a mobile station or a mobile earth station shall indicate therein in clear form the particulars of the station, including its name, call sign and, where appropriate, the public correspondence category, as well as the general characteristics of the installation.

S18.7 2) For land mobile stations, including stations consisting only of one or more receivers, a clause shall be included in the licence, specifically or by reference, under which the operation of these stations shall be forbidden in countries other than the country in which the licence is issued, except as may be provided by special agreement between the governments of the countries concerned.

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S18.8 § 5 1) In the case of a new registration of a ship or aircraft in circumstances where delay is likely to occur in the issue of a licence by the country in which it is to be registered, the administration of the country from which the mobile station or mobile earth station wishes to make its voyage or flight may, at the request of the operating company, issue a certificate to the effect that the station complies with these Regulations. This certificate, drawn up in a form determined by the issuing administration, shall give the particulars mentioned in No. **S18.6** and shall be valid only for the duration of the voyage or flight to the country in which the registration of the ship or aircraft will be effected, or for a period of three months, whichever is less.

S18.9 2) The administration issuing the certificate shall inform the administration responsible for issuing the licence of the action taken.

S18.10 3) The holder of the certificate shall comply with the provisions of these Regulations applicable to licence holders.

S18.11 § 6 In the case of hire, lease or interchange of aircraft, the administration having authority over the aircraft operator receiving an aircraft under such an arrangement may, by agreement with the administration of the country in which the aircraft is registered, issue a licence in conformity with that specified in No. **S18.6** as a temporary substitute for the original licence.

Annex 9-3

ARTICLE S19

Identification of stations

Section I – General provisions

S19.1 § 1 All transmissions shall be capable of being identified either by identification signals or by other means[1] .

S19.2 § 2 1) All transmissions with false or misleading identification are prohibited.

S19.3 2) Where practicable and in appropriate services, identification signals should be automatically transmitted in accordance with relevant ITU-R Recommendations.

S19.4 3) All transmissions in the following services should, except as provided in Nos. **S19.13** to **S19.15**, carry identification signals:

S19.5 *a)* amateur service;

S19.6 *b)* broadcasting service;

S19.7 *c)* fixed service in the bands below 28 000 kHz;

S19.8 *d)* mobile service;

S19.9 *e)* standard frequency and time signal service.

S19.10 4) All operational transmissions by radiobeacons shall carry identification signals. However, it is recognized that, for radiobeacons and for certain other radionavigation services that normally carry identification signals, during periods of malfunction or other non-operational service the deliberate removal of identification signals is an agreed means of warning users that the transmissions cannot safely be used for navigational purposes.

S19.11 5) All transmissions by satellite emergency position-indicating radiobeacons (EPIRBs) operating in the band 406-406.1 MHz or the band 1 645.5-1 646.5 MHz, or by EPIRBs using digital selective calling techniques, shall carry identification signals.

S19.12 6) When identification signals are transmitted they shall comply with the provisions of this Article.

S19.13 7) However, the requirements for certain transmissions to carry identification signals need not apply to:

S19.14 *a)* survival craft stations when transmitting distress signals automatically;

S19.15 *b)* emergency position-indicating radiobeacons (except for those in No. **S19.11**).

---

[1] **S19.1.1** In the present state of the technique, it is recognized nevertheless that the transmission of identifying signals for certain radio systems (e.g. radiodetermination, radio relay systems and space systems) is not always possible.

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S19.16 § 3 In transmissions carrying identification signals a station shall be identified by a call sign, by a maritime mobile service identity or by other recognized means of identification which may be one or more of the following: name of station, location of station, operating agency, official registration mark, flight identification number, selective call number or signal, selective call identification number or signal, characteristic signal, characteristic of emission or other clearly distinguishing features readily recognized internationally.

S19.17 § 4 For transmissions carrying identification signals, in order that stations may be readily identified, each station shall transmit its identification as frequently as practicable during the course of transmissions, including those made for tests, adjustments or experiments. During such transmissions, however, identification signals shall be transmitted at least hourly, preferably within the period from five minutes before to five minutes after the hour (UTC) unless to do so would cause unreasonable interruption of traffic, in which case identification shall be given at the beginning and end of transmissions.

S19.18 § 5 Identification signals shall wherever practicable be in one of the following forms:

S19.19 *a)* speech, using simple amplitude or frequency modulation;

S19.20 *b)* international Morse code transmitted at manual speed;

S19.21 *c)* a telegraph code compatible with conventional printing equipment;

S19.22 *d)* any other form recommended by the Radiocommunication Sector.

S19.23 § 6 To the extent possible the identification signal should be transmitted in accordance with relevant ITU-R Recommendations.

S19.24 § 7 Administrations should ensure that wherever practicable superimposed identification methods be employed in accordance with ITU-R Recommendations.

S19.25 § 8 When a number of stations work simultaneously in a common circuit, either as relay stations, or in parallel on different frequencies, each station shall, as far as practicable, transmit its own identification or those of all the stations concerned.

S19.26 § 9 Administrations shall ensure, except in the cases mentioned in Nos. **S19.13** to **S19.15**, that all transmissions not carrying identification signals can be identified by other means when they are capable of causing harmful interference to the services of another administration operating in accordance with these Regulations.

S19.27 § 10 Administrations shall, having regard to the provisions of these Regulations relating to the notification of assignments for recording in the Master Register, adopt their own measures to ensure compliance with the provisions of No. **S19.26**.

S19.28 § 11 Each Member State‡ reserves the right to establish its own measures for identifying its stations used for national defence. However, it shall use, as far as possible, call signs recognizable as such, and containing the distinctive characters of its nationality.

Section II – Allocation of international series and assignment of call signs

S19.28A § 11A 1) For the purpose of the supply of identification signals, a *territory* or *geographical area* shall be understood to mean the territory within the limits of which the station is located. For mobile stations, it shall be understood to mean the territory within the limits of

which the responsible administration is located. A territory which does not have full responsibility for its international relations shall also be considered as a geographical area for this purpose.

S19.28B 2) In all documents of the Union where the terms *allocation of call sign series* and *assignment of call signs* are to be used, they shall be used with the following meaning:

Identification means	Terms used in these Regulations
International series of call signs (including maritime identification digits (MIDs) and selective call numbers)	Allocation to the administration of a Member State ‡ (see definition in No. 1002 of the Constitution)
Call signs (including maritime identification digits (MIDs) and selective call numbers)	Assignment by any administration to stations operating in a territory or geographical area (see No. **S19.28A**)

S19.29 § 12 1) All stations open to international public correspondence, all amateur stations, and other stations which are capable of causing harmful interference beyond the boundaries of the territory or geographical area in which they are located, shall have call signs from the international series allocated to its administration as given in the Table of Allocation of International Call Sign Series in Appendix **S42**.

S19.30 2) As the need arises, ship stations and ship earth stations to which the provisions of Chapter **SIX** apply, and coast stations or coast earth stations capable of communicating with such ship stations, shall have assigned to them maritime mobile service identities in accordance with Section VI of this Article.

S19.31 3) It is not compulsory to assign call signs from the international series to stations identified by maritime mobile service identities or which are easily identified by other means (see No. **S19.16**) and whose signals of identification or characteristics of emission are published in international documents.

S19.32 § 13 Should the available call sign series in Appendix **S42** be exhausted, new call sign series may be allocated according to the principles set out in Resolution **13 (Rev.WRC-97)** relating to the formation of call signs and the allocation of new international series.

S19.33 § 14 Between radiocommunication conferences, the Secretary-General is authorized to deal with questions relating to changes in the allocation of series of call signs, on a provisional basis, and subject to confirmation by the following conference (see also No. **S19.32**).

S19.34 § 15 The Secretary-General shall be responsible for allocating maritime identification digits (MIDs) to administrations and shall regularly publish information regarding allocated MIDs.

S19.35 § 16 The Secretary-General shall be responsible for allocating additional maritime identification digits (MIDs) to administrations within the limits specified[2], provided that he is satisfied that the possibilities offered by the MIDs allocated to an administration will soon be exhausted despite judicious ship station identity assignment as outlined in Section VI, which should be in conformity with the relevant ITU-R and ITU-T Recommendations.

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[2] **S19.35.1** In no circumstances may an administration claim more MIDs than the total number of its ship stations shown in the ITU List of Ship Stations (List V) divided by 1000.

S19.36 § 17 A single maritime identification digit (MID) has been allocated initially to each administration. A second MID should not be requested unless the first MID allocated is more than 80% exhausted in the basic category of three trailing zeros and the rate of assignments is such that 90% exhaustion is foreseen. The same criteria should be applied to subsequent requests for MIDs.

S19.37 § 18 The Secretary-General shall be responsible for supplying series of selective call numbers or signals (see Nos. **S19.92** to **S19.95**) at the request of the administrations concerned.

S19.38 § 19 1) Each administration shall choose the call signs and, if the selective calling system used is in accordance with Recommendation ITU-R M.257-3, the ship station selective call numbers and the coast station identification numbers of its stations from the international series allocated or supplied to it; and shall notify this information to the Secretary-General together with the information which is to appear in Lists I, IV, V, VI and VIIIA. These notifications do not include call signs assigned to amateur and experimental stations.

S19.39 2) Each administration shall choose the maritime mobile service identities of its stations from the maritime identification digits allocated to it and notify this information to the Secretary-General for inclusion in the relevant lists, as provided for in Article **S20**.

S19.40 3) The Secretary-General shall ensure that the same call sign, the same maritime mobile service identity, the same selective call number or the same identification number is not assigned more than once and that call signs which might be confused with distress signals, or with other signals of the same nature, are not assigned.

S19.41 § 20 1) When a fixed station uses more than one frequency in the international service, each frequency may be identified by a separate call sign used solely for this frequency.

S19.42 2) When a broadcasting station uses more than one frequency in the international service, each frequency may be identified by a separate call sign used solely for this frequency or by some other appropriate means, such as announcing the name of the place and frequency used.

S19.43 3) When a land station uses more than one frequency, each frequency may, if desired, be identified by a separate call sign.

S19.44 4) Where practicable, coast stations should use a common call sign for each frequency series[3].

Section III – Formation of call signs

S19.45 § 21 1) The twenty-six letters of the alphabet, as well as digits in the cases specified below, may be used to form call signs. Accented letters are excluded.

S19.46 2) However, the following combinations shall not be used as call signs:

S19.47 *a)* combinations which might be confused with distress signals or with other signals of a similar nature;

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[3] **S19.44.1** By "frequency series" is meant a group of frequencies each of which belongs to one of the different bands between 4 000 kHz and 27 500 kHz that are allocated exclusively to the maritime mobile service.

S19.48 *b)* combinations reserved for the abbreviations to be used in the radiocommunication services (see Recommendation ITU-R M.1172).

S19.49 *c)* for amateur stations, combinations commencing with a digit when the second character is the letter O or the letter I.

S19.50 § 22 Call signs in the international series are formed as indicated in Nos. **S19.51** to **S19.71**. The first two characters shall be two letters or a letter followed by a digit or a digit followed by a letter. The first two characters or in certain cases the first character of a call sign constitute the nationality identification[4] .

S19.51 *Land and fixed stations*

S19.52 § 23 1)

– two characters and one letter, *or*

– two characters and one letter followed by not more than three digits (other than the digits 0 and 1 in cases where they immediately follow a letter).

S19.53 2) However, it is recommended that, as far as possible, the call signs of fixed stations consist of:

– two characters and one letter followed by two digits (other than the digits 0 and 1 in cases where they immediately follow a letter).

S19.54 *Ship stations*

S19.55 § 24 1)

– two characters and two letters, *or*

– two characters, two letters and one digit (other than the digits 0 or 1).

S19.56 2) However, ship stations employing only radiotelephony may also use a call sign consisting of:

– two characters (provided that the second is a letter) followed by four digits (other than the digits 0 or 1 in cases where they immediately follow a letter), *or*

– two characters and one letter followed by four digits (other than the digits 0 or 1 in cases where they immediately follow a letter).

S19.57 *Aircraft stations*

S19.58 § 25

– two characters and three letters.

S19.59 *Ship's survival craft stations*

S19.60 § 26

– the call sign of the parent ship followed by two digits (other than the digits 0 or 1 in cases where they immediately follow a letter).

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[4] **S19.50.1** For call sign series beginning with B, F, G, I, K, M, N, R and W, only the first character is required for nationality identification. In the cases of half series, the first three characters are required for nationality identification.

S19.61 *Emergency position-indicating radiobeacon stations*

S19.62 § 27

– the Morse letter B and/or the call sign of the parent ship to which the radiobeacon belongs.

S19.63 *Aircraft survival craft stations*

S19.64 § 28

– the complete call sign of the parent aircraft (see No. **S19.58**), followed by a single digit other than 0 or 1.

S19.65 *Land mobile stations*

S19.66 § 29

– two characters (provided that the second is a letter) followed by four digits (other than the digits 0 or 1 in cases where they immediately follow a letter), *or*

– two characters and one or two letters followed by four digits (other than the digits 0 or 1 in cases where they immediately follow a letter).

S19.67 *Amateur and experimental stations*

S19.68 § 30 1)

– one character (see No. **S19.50.1**) and a single digit (other than 0 or 1), followed by a group of not more than three letters, *or*

– two characters and a single digit (other than 0 or 1), followed by a group of not more than three letters.

S19.69 2) However, the prohibition of the use of the digits 0 and 1 does not apply to amateur stations.

S19.70 *Stations in the space service*

S19.71 § 31 When call signs for stations in the space service are employed, it is recommended that they consist of:

– two characters followed by two or three digits (other than the digits 0 and 1 in cases where they immediately follow a letter).

Section IV – Identification of stations using radiotelephony

S19.72 § 32 Stations using radiotelephony shall be identified as indicated in Nos. **S19.73** to **S19.82**.

S19.73 § 33 1) *Coast stations*

– a call sign (see No. **S19.52**); *or*

– the geographical name of the place as it appears in the List of Coast Stations, followed preferably by the word RADIO or by any other appropriate indication.

S19.74 2) *Ship stations*

– a call sign (see Nos. **S19.55** and **S19.56**); *or*

– the official name of the ship preceded, if necessary, by the name of the owner on condition that there is no possible confusion with distress, urgency and safety signals; *or*

– its selective call number or signal.

S19.75 3) *Ship's survival craft stations*

– a call sign (see No. **S19.60**); *or*

– a signal of identification consisting of the name of the parent ship followed by two digits.

S19.76 4) *Emergency position-indicating radiobeacon stations*

When speech transmission is used (see Appendix **S13**):

– the name and/or the call sign of the parent ship to which the radiobeacon belongs.

S19.77 § 34 1) *Aeronautical stations*

– the name of the airport or geographical name of the place followed, if necessary, by a suitable word indicating the function of the station.

S19.78 2) *Aircraft stations*

– a call sign (see No. **S19.58**), which may be preceded by a word designating the owner or the type of aircraft; *or*

– a combination of characters corresponding to the official registration mark assigned to the aircraft; *or*

– a word designating the airline, followed by the flight identification number.

S19.79 3) In the exclusive aeronautical mobile frequency bands, aircraft stations using radiotelephony may use other methods of identification, after special agreement between governments, and on condition that they are internationally known.

S19.80 4) *Aircraft survival craft stations*

– a call sign (see No. **S19.64**).

S19.81 § 35 1) *Base stations*

– a call sign (see No. **S19.52**); *or*

– the geographical name of the place followed, if necessary, by any other appropriate indication.

S19.82 2) *Land mobile stations*

– a call sign (see No. **S19.66**); *or*

– the identity of the vehicle or any other appropriate indication.

Section V – Selective call numbers in the maritime mobile Service

S19.83 § 36 When stations of the maritime mobile service use selective calling devices in accordance with Recommendations ITU-R M.257-3, ITU-R M.476-5, ITU-R M.625-3 and ITU-R M.627-1, their call numbers shall be assigned by the responsible administrations in accordance with the provisions below.

S19.84 *Formation of ship station selective call numbers and coast station identification numbers*

S19.85 § 37 1) The ten digits from 0 to 9 inclusive shall be used to form selective call numbers.

S19.86 2) However, combinations of numbers commencing with the digits 00 (zero, zero) shall not be used when forming the identification numbers for coast stations.

S19.87 3) Ship station selective call numbers and coast station identification numbers in the series are formed as indicated in Nos. **S19.88**, **S19.89** and **S19.90**.

S19.88 4) *Coast station identification numbers*

– four digits (see No. **S19.86**).

S19.89 5) *Ship station selective call numbers*

– five digits.

S19.90 6) *Predetermined groups of ship stations*

– five digits consisting of:

  – the same digit repeated five times; *or*

  – two different digits repeated alternately.

S19.91 *Assignment of ship station selective call numbers and coast station identification numbers*

S19.92 § 38 1) In cases where selective call numbers for ship stations and identification numbers for coast stations are required for use in the maritime mobile service and the selective calling system is in accordance with Recommendation ITU-R M.257-3, the selective call numbers and identification numbers shall be supplied by the Secretary-General on request. Upon notification by an administration of the introduction of selective calling for use in the maritime mobile service:

S19.93 *a)* selective call numbers for ships will be supplied as required in blocks of 100 (one hundred);

S19.94 *b)* coast station identification numbers will be supplied in blocks of 10 (ten) to meet actual requirements;

S19.95 *c)* selective call numbers for selective calling of predetermined groups of ship stations in accordance with No. **S19.90** will be supplied as required as single numbers.

S19.96 2) Each administration shall choose the selective call numbers to be assigned to its ship stations from the blocks of the series supplied to it. Administrations shall

notify the Bureau immediately in accordance with No. **S20.16** when assigning selective call numbers to ship stations.

S19.96A 3) Five-digit ship station selective call numbers are assigned to sequential single frequency selective calling (SSFC) equipment (as described in Recommendation ITU-R M.257-3) for calling in radiotelephony and for the phasing in of narrow-band direct printing (NBDP) equipment (as described in Recommendation ITU-R M.476-5). Within one administration the same five-digit number may be used:

- for identification of ship stations fitted with both SSFC and NBDP equipment;
- for identification of ship stations of two different ships fitted with either SSFC or NBDP equipment only.

S19.97 4) Each administration shall choose the coast station identification numbers to be assigned to its coast stations from the blocks of the series supplied to it.

Section VI – Maritime mobile service identities in the maritime mobile service and the maritime mobile-satellite service

S19.98 *A – General*

S19.99 § 39 When a station[5] in the maritime mobile service or the maritime mobile-satellite service is required to use maritime mobile service identities, the responsible administration shall assign the identity to the station in accordance with the provisions described in Nos. **S19.100** to **S19.126**; in so doing, it should take into account the relevant ITU-R and ITU-T Recommendations. In accordance with No. **S20.16,** administrations shall notify the Bureau immediately when assigning maritime mobile service identities

S19.100 § 40 1) Maritime mobile service identities are formed of a series of nine digits which are transmitted over the radio path in order to uniquely identify ship stations, ship earth stations, coast stations, coast earth stations and group calls.

S19.101 2) These identities are formed in such a way that the identity or part thereof can be used by telephone and telex subscribers connected to the general telecommunications network principally to call ships automatically in the shore-to-ship direction.

S19.102 3) There are four kinds of maritime mobile service identities:

S19.103 i) ship station identities;

S19.104 ii) group ship station call identities

S19.105 iii) coast station identities;

S19.106 iv) group coast station call identities.

S19.107 Not used.

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[5] **S19.99.1** In this Section a reference to a ship station or a coast station may include the respective earth stations.

S19.108 *B – Maritime identification digits (MIDs)*

S19.109 § 42 These provisions do not require an administration to assign numerical identities until it determines that such identities are necessary. They do not concern the assignment of ship station identities without trailing zeros, since it is assumed that there is enough capacity inherent in the system to provide for the assignment of such identities to all ship stations which an administration may wish to identify in this manner.

S19.110 *C – Ship station identities*

S19.111 § 43 1) Administrations should:

S19.112 *a)* follow the guidelines contained in the relevant ITU-R and ITU-T Recommendations for the assignment of ship station identities;

S19.113 *b)* make optimum use of the possibilities of forming identities from the single MID allocated to them;

S19.114 *c)* take particular care in assigning ship station identities with six significant digits (three-trailing-zero identities), which should be assigned only to ship stations which can reasonably be expected to require such an identity for automatic access on a world-wide basis for public switched networks;

S19.115 *d)* assign one-trailing-zero or two-trailing-zero identities to vessels when they require automatic access only on a national or regional level, as defined in the relevant ITU-T Recommendations;

S19.116 *e)* assign ship station identities without trailing zeros to all other vessels requiring a numerical identification.

S19.117 2) The 9-digit code constituting a ship station identity is formed as follows:

$$M_1I_2D_3X_4X_5X_6X_7X_8X_9$$

wherein

$$M_1I_2D_3$$

represent the maritime identification digits and X is any figure from 0 to 9.

S19.118 *D – Group ship station call identities*

S19.119 § 44 1) Group ship station call identities for calling simultaneously more than one ship are formed as follows:

$$0_1M_2I_3D_4X_5X_6X_7X_8X_9$$

where the first figure is zero and X is any figure from 0 to 9.

S19.120 2) The MID represents only the territory or geographical area of the administration assigning the group ship station call identity and does not therefore prevent group calls to fleets containing more than one ship nationality.

S19.121 *E – Coast station identities*

S19.122 § 45 1) Coast station identities are formed as follows:

$$0_1 0_2 M_3 I_4 D_5 X_6 X_7 X_8 X_9$$

where the first two figures are zeros and X is any figure from 0 to 9.

S19.123 2) The MID reflects the territory or geographical area in which the coast station or coast earth station is located.

S19.124 *F – Group coast station call identities*

S19.125 § 46 1) Group coast station call identities for calling simultaneously more than one coast station are formed as a subset of coast station identities, as follows:

$$0_1 0_2 M_3 I_4 D_5 X_6 X_7 X_8 X_9$$

where the first two figures are zeros and X is any figure from 0 to 9.

S19.126 2) The MID represents only the territory or geographical area of the administration assigning the group coast station call identity. The identity may be assigned to stations of one administration which are located in only one geographical region as indicated in the relevant ITU-T Recommendations.

Section VII – Special provisions

S19.127 § 47 1) In the aeronautical mobile service, after communication has been established by means of the complete call sign, the aircraft station may use, if confusion is unlikely to arise, an abbreviated call sign or identification consisting of:

S19.128 *a)* in radiotelegraphy, the first character and last two letters of the complete call sign (see No. **S19.58**);

S19.129 *b)* in radiotelephony:

- the first character of the complete call sign; *or*
- the abbreviation of the name of the owner of the aircraft (company or individual); *or*
- the type of aircraft;

followed by the last two letters of the complete call sign (see No. **S19.58**) or by the last two characters of the registration mark.

S19.130 2) The provisions of Nos. **S19.127**, **S19.128** and **S19.129** may be amplified or modified by agreement between administrations concerned.

S19.131 § 48 The distinguishing signals allotted to ships for visual and aural signalling shall, in general, agree with the call signs of ship stations.

Table 4

MARITIME IDENTIFICATION DIGITS*

MID	Allocated to
201	Albania (Republic of)
202	Andorra (Principality of)
203	Austria
204	Azores
205	Belgium
206	Belarus (Republic of)
207	Bulgaria (Republic of)
208	Vatican City State
209	Cyprus (Republic of)
210	Cyprus (Republic of)
211	Germany (Federal Republic of)
212	Cyprus (Republic of)
213	Georgia
214	Moldova (Republic of)
215	Malta
218	Germany (Federal Republic of)
219	Denmark
220	Denmark
224	Spain
226	France
227	France
228	France
230	Finland
231	Faroe Islands
232	United Kingdom of Great Britain and Northern Ireland
233	United Kingdom of Great Britain and Northern Ireland
234	United Kingdom of Great Britain and Northern Ireland
235	United Kingdom of Great Britain and Northern Ireland
236	Gibraltar
237	Greece
238	Croatia (Republic of)
239	Greece
242	Morocco (Kingdom of)
243	Hungary (Republic of)
244	Netherlands (Kingdom of the)
245	Netherlands (Kingdom of the)
246	Netherlands (Kingdom of the)
247	Italy
248	Malta
249	Malta
250	Ireland
251	Iceland
252	Liechtenstein (Principality of)
253	Luxembourg
254	Monaco (Principality of)
255	Madeira
256	Malta
257	Norway
258	Norway
259	Norway
261	Poland (Republic of)
263	Portugal
264	Romania
265	Sweden

MID	Allocated to
267	Slovak Republic
268	San Marino (Republic of)
269	Switzerland (Confederation of)
270	Czech Republic
271	Turkey
272	Ukraine
273	Russian Federation
274	The Former Yugoslav Republic of Macedonia
275	Latvia (Republic of)
276	Estonia (Republic of)
277	Lithuania (Republic of)
278	Slovenia (Republic of)
279	Yugoslavia (Federal Republic of)
301	Anguilla
303	Alaska (State of)
304	Antigua and Barbuda
306	Netherlands Antilles
307	Aruba
308	Bahamas (Commonwealth of the)
309	Bahamas (Commonwealth of the)
310	Bermuda
311	Bahamas (Commonwealth of the)
312	Belize
314	Barbados
316	Canada
319	Cayman Islands
321	Costa Rica
323	Cuba
325	Dominica (Commonwealth of)
327	Dominican Republic
329	Guadeloupe (French Department of)
330	Grenada
331	Greenland
332	Guatemala (Republic of)
334	Honduras (Republic of)
336	Haiti (Republic of)
338	United States of America
339	Jamaica
341	Saint Kitts and Nevis
343	Saint Lucia
345	Mexico
347	Martinique (French Department of)
348	Montserrat
350	Nicaragua
351	Panama (Republic of)
352	Panama (Republic of)
353	Panama (Republic of)
354	Panama (Republic of)
355	Panama (Republic of)
356	Panama (Republic of)
357	Panama (Republic of)
358	Puerto Rico
359	El Salvador (Republic of)
361	Saint Pierre and Miquelon (Territorial Collectivity of)
362	Trinidad and Tobago
364	Turks and Caicos Islands

MID	Allocated to
366	United States of America
367	United States of America
368	United States of America
375	Saint Vincent and the Grenadines
376	Saint Vincent and the Grenadines
378	British Virgin Islands
379	United States Virgin Islands
401	Afghanistan (Islamic State of)
403	Saudi Arabia (Kingdom of)
405	Bangladesh (People's Republic of)
408	Bahrain (State of)
410	Bhutan (Kingdom of)
412	China (People's Republic of)
413	China (People's Republic of)
416	Taiwan (Province of China)
417	Sri Lanka (Democratic Socialist Republic of)
419	India (Republic of)
422	Iran (Islamic Republic of)
423	Azerbaijani Republic
425	Iraq (Republic of)
428	Israel (State of)
431	Japan
432	Japan
434	Turkmenistan
436	Kazakstan (Republic of)
438	Jordan (Hashemite Kingdom of)
440	Korea (Republic of)
441	Korea (Republic of)
445	Democratic People's Republic of Korea
447	Kuwait (State of)
450	Lebanon
453	Macao
455	Maldives (Republic of)
457	Mongolia
459	Nepal
461	Oman (Sultanate of)
463	Pakistan (Islamic Republic of)
466	Qatar (State of)
468	Syrian Arab Republic
470	United Arab Emirates
473	Yemen (Republic of)
475	Yemen (Republic of)
477	Hongkong
501	Adelie Land
503	Australia
506	Myanmar (Union of)
508	Brunei Darussalam
510	Micronesia (Federated States of)
511	Palau (Republic of)
512	New Zealand
514	Cambodia (Kingdom of)
516	Christmas Island (Indian Ocean)
518	Cook Islands
520	Fiji (Republic of)
523	Cocos (Keeling) Islands
525	Indonesia (Republic of)
529	Kiribati (Republic of)
531	Lao People's Democratic Republic
533	Malaysia
536	Northern Mariana Islands (Commonwealth of the)
538	Marshall Islands (Republic of the)
540	New Caledonia

MID	Allocated to
542	Niue
544	Nauru (Republic of)
546	French Polynesia
548	Philippines (Republic of the)
553	Papua New Guinea
555	Pitcairn Island
557	Solomon Islands
559	American Samoa
561	Western Samoa (Independent State of)
563	Singapore (Republic of)
564	Singapore (Republic of)
567	Thailand
570	Tonga (Kingdom of)
572	Tuvalu
574	Viet Nam (Socialist Republic of)
576	Vanuatu (Republic of)
578	Wallis and Futuna Islands
601	South Africa (Republic of)
603	Angola (Republic of)
605	Algeria (People's Democratic Republic of)
607	Saint Paul and Amsterdam Islands
608	Ascension Island
609	Burundi (Republic of)
610	Benin (Republic of)
611	Botswana (Republic of)
612	Central African Republic
613	Cameroon (Republic of)
615	Congo (Republic of the)
616	Comoros (Islamic Federal Republic of the)
617	Cape Verde (Republic of)
618	Crozet Archipelago
619	Côte d'Ivoire (Republic of)
621	Djibouti (Republic of)
622	Egypt (Arab Republic of)
624	Ethiopia (Federal Democratic Republic of)
625	Eritrea
626	Gabonese Republic
627	Ghana
629	Gambia (Republic of the)
630	Guinea-Bissau (Republic of)
631	Equatorial Guinea (Republic of)
632	Guinea (Republic of)
633	Burkina Faso
634	Kenya (Republic of)
635	Kerguelen Islands
636	Liberia (Republic of)
642	Libya (Socialist People's Libyan Arab Jamahiriya)
644	Lesotho (Kingdom of)
645	Mauritius (Republic of)
647	Madagascar (Republic of)
649	Mali (Republic of)
650	Mozambique (Republic of)
654	Mauritania (Islamic Republic of)
655	Malawi
656	Niger (Republic of the)
657	Nigeria (Federal Republic of)
659	Namibia (Republic of)
660	Reunion (French Department of)
661	Rwandese Republic
662	Sudan (Republic of the)
663	Senegal (Republic of)
664	Seychelles (Republic of)

MID	Allocated to
665	Saint Helena
666	Somali Democratic Republic
667	Sierra Leone
668	Sao Tome and Principe (Democratic Republic of)
669	Swaziland (Kingdom of)
670	Chad (Republic of)
671	Togolese Republic
672	Tunisia
674	Tanzania (United Republic of)
675	Uganda (Republic of)
676	Democratic Republic of the Congo
677	Tanzania (United Republic of)
678	Zambia (Republic of)
679	Zimbabwe (Republic of)
701	Argentine Republic

MID	Allocated to
710	Brazil (Federative Republic of)
711	Hungary (Republic of)
720	Bolivia (Republic of)
725	Chile
730	Colombia (Republic of)
735	Ecuador
740	Falkland Islands (Malvinas)
745	Guiana (French Department of)
750	Guyana
755	Paraguay (Republic of)
760	Peru
765	Suriname (Republic of)
770	Uruguay (Eastern Republic of)
775	Venezuela (Republic of)

***)** In connection with the inclusion of an allocation to the Falkland Islands (Malvinas) in the Table of Maritime Identification Digits, reference is made to the statements by the Argentine Republic and by the United Kingdom of Great Britain and Northern Ireland reproduced in numbers 4 and 33 respectively of the Final Protocol to the Final Acts of the World Administrative Radio Confernece for Mobile Services, Geneva, 1983.

This text is reproduced from List VII A – List of Call Signs and Numerical Identities of Stations Used by the Maritime Mobile and Maritime Mobile-Satellite Services, 2001 edition

Annex 9-4

ARTICLE S20

Service documents

Section I – Titles, contents and publication of service documents

S20.1 § 1 The following documents shall be published by the Secretary-General. As circumstances warrant and in response to individual requests by administrations, the published information shall also be available in computer printed form, machine readable form, film, microfiche or by other appropriate means.

S20.2 § 2 *List I – The International Frequency List.*

S20.3 This list shall contain:

S20.4 *a)* particulars of frequency assignments recorded in the Master International Frequency Register;

S20.5 *b)* the frequencies (e.g. 500 kHz or 2 182 kHz) prescribed by these Regulations for common use by certain services;

S20.6 *c)* the allotments in the Allotment Plans included in Appendices **S25**, **S26** and **S27**.

S20.7 § 3 *List IV – List of Coast Stations.*

S20.8 § 4 *List V – List of Ship Stations.*

S20.9 § 5 *List VI – List of Radiodetermination and Special Service Stations.*

S20.10 § 6 *List VII A – List of Call Signs and Numerical Identities of Stations Used by the Maritime Mobile and Maritime Mobile-Satellite Services*.

SUP

S20.11

S20.12 § 8 *List VIII – List of International Monitoring Stations.*

S20.13 § 9 *List VIII A – List of Stations in the Space Radiocommunication Services and in the Radio Astronomy Service.*

S20.14 § 10 *Manual for Use by the Maritime Mobile and Maritime Mobile-Satellite Services.*

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Section II – Preparation and amendment of service documents

S20.15 § 11 The form, the content and the periodicity of each publication shall be decided by the Bureau in consultation with administrations and the international organizations concerned.

S20.16 § 12 Administrations shall take all appropriate measures to notify the Bureau immediately of any changes in the operational information contained in Lists IV, V and VI, in view of the importance of this information, particularly with regard to safety. In the case of other documents, administrations shall communicate the changes in the information contained in them as soon as possible.

S20.17 § 13 For the purpose of the service documents, a "country" shall be understood to mean the territory within the limits of which the station is located; a territory which does not have full responsibility for its international relations shall also be considered as a country for this purpose.

Annex 9-5

ARTICLE S31

Frequencies for the global maritime distress and safety system (GMDSS)

Section I – General

S31.1 § 1 The frequencies to be used for the transmission of distress and safety information under the GMDSS are contained in Appendix **S15**. In addition to the frequencies listed in Appendix **S15**, coast stations should use other appropriate frequencies for the transmission of safety messages.

S31.2 § 2 Any emission causing harmful interference to distress and safety communications on any of the discrete frequencies identified in Appendices **S13** and **S15** is prohibited.

S31.3 § 3 The number and duration of test transmissions shall be kept to a minimum on the frequencies identified in Appendix **S15**; they should be coordinated with a competent authority, as necessary, and, wherever practicable, be carried out on artificial antennas or with reduced power. However, testing on the distress and safety calling frequencies should be avoided, but where this is unavoidable, it should be indicated that these are test transmissions.

S31.4 § 4 Before transmitting for other than distress purposes on any of the frequencies identified in Appendix **S15** for distress and safety, a station shall, where practicable, listen on the frequency concerned to make sure that no distress transmission is being sent.

S31.5 Not used.

Section II – Survival craft stations

S31.6 § 5 1) Equipment for radiotelephony use in survival craft stations shall, if capable of operating on any frequency in the bands between 156 MHz and 174 MHz, be able to transmit and receive on 156.8 MHz and at least one other frequency in these bands.

S31.7 2) Equipment for transmitting locating signals from survival craft stations shall be capable of operating in the 9 200-9 500 MHz band.

S31.8 3) Equipment with digital selective calling facilities for use in survival craft shall, if capable of operating:

S31.9 *a)* in the bands between 1 605 kHz and 2 850 kHz, be able to transmit on 2 187.5 kHz;

S31.10 *b)* in the bands between 4 000 kHz and 27 500 kHz, be able to transmit on 8 414.5 kHz;

S31.11 *c)* in the bands between 156 MHz and 174 MHz, be able to transmit on 156.525 MHz.

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Section III – Watchkeeping

S31.12 *A – Coast stations*

S31.13 § 6 Those coast stations assuming a watch-keeping responsibility in the GMDSS shall maintain an automatic digital selective calling watch on frequencies and for periods of time as indicated in the information published in the List of Coast Stations.

S31.14 *B – Coast earth stations*

S31.15 § 7 Those coast earth stations assuming a watch-keeping responsibility in the GMDSS shall maintain a continuous automatic watch for appropriate distress alerts relayed by space stations.

S31.16 *C – Ship stations*

S31.17 § 8 1) Ship stations, where so equipped, shall, while at sea, maintain an automatic digital selective calling watch on the appropriate distress and safety calling frequencies in the frequency bands in which they are operating. Ship stations, where so equipped, shall also maintain watch on the appropriate frequencies for the automatic reception of transmissions of meteorological and navigational warnings and other urgent information to ships. However, ship stations shall also continue to apply the appropriate watch-keeping provisions of Appendix **S13** (see Resolution **331 (Rev.WRC-97)**).

S31.18 2) Ship stations complying with the provisions of this Chapter should, where practicable, maintain a watch on the frequency 156.650 MHz for communications related to the safety of navigation.

S31.19 *D – Ship earth stations*

S31.20 § 9 Ship earth stations complying with the provisions of this Chapter shall, while at sea, maintain watch except when communicating on a working channel.

Annex 9-6

ARTICLE S32

Operational procedures for distress and safety communications in the global maritime distress and safety system (GMDSS)

Section I – General

S32.1 § 1 Distress and safety communications rely on the use of terrestrial MF, HF and VHF radiocommunications and communications using satellite techniques.

S32.2 § 2 1) The distress alert (see No. **S32.9**) shall be sent through a satellite either with absolute priority in general communication channels or on exclusive distress and safety frequencies or, alternatively, on the distress and safety frequencies in the MF, HF and VHF bands using digital selective calling.

S32.3 2) The distress alert (see No. **S32.9**) shall be sent only on the authority of the person responsible for the ship, aircraft or other vehicle carrying the mobile station or the mobile earth station.

S32.4 § 3 All stations which receive a distress alert transmitted by digital selective calling shall immediately cease any transmission capable of interfering with distress traffic and shall continue watch until the call has been acknowledged.

S32.5 § 4 Digital selective calling shall be in accordance with the relevant ITU-R Recommendations.

S32.5A § 4A Each administration shall ensure that suitable arrangements are made for assigning and registering identities used by ships participating in the GMDSS, and shall make registration information available to rescue coordination centres on a 24-hour day, 7-day week basis. Where appropriate, administrations shall notify responsible organizations immediately of additions, deletions and other changes in these assignments (see Nos. **S19.39**, **S19.96** and **S19.99**). Registration information shall be in accordance with Resolution **340 (WRC-97)**.

S32.5B § 4B Any GMDSS shipboard equipment which is capable of transmitting position coordinates as part of a distress alert message and which does not have an integral electronic position-fixing system receiver shall be interconnected to a separate navigation receiver, if one is installed, to provide that information automatically.

S32.6 § 5 Transmissions by radiotelephony shall be made slowly and distinctly, each word being clearly pronounced to facilitate transcription.

S32.7 § 6 The Phonetic Alphabet and Figure Code in Appendix **S14** and the abbreviations and signals in accordance with Recommendation ITU-R M.1172 should be used where applicable[1] .

[1] **S32.7.1** The use of the Standard Marine Communication Phrases and, where language difficulties exists, the International Code of Signals, both published by the International Maritime Organization (IMO), is also recommended.

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Section II – Distress alerting

S32.8 *A – General*

S32.9 § 7 1) The transmission of a distress alert indicates that a mobile unit[2] or person[3] is threatened by grave and imminent danger and requests immediate assistance. The distress alert is a digital selective call using a distress call format[4] in the bands used for terrestrial radiocommunication or a distress message format, in which case it is relayed through space stations.

S32.10 2) The distress alert shall provide[5] the identification of the station in distress and its position.

S32.10A § 7A A distress alert is false if it was transmitted without any indication that a mobile unit or person was in distress and required immediate assistance (see No. **S32.9**). Administrations receiving a false distress alert shall report this infringement in accordance with Section V of Article **S15**, if that alert:

a) was transmitted intentionally;

b) was not cancelled in accordance with Resolution **349 (WRC-97)**;

c) could not be verified as a result of either the ship's failure to keep watch on appropriate frequencies in accordance with Nos. **S31.16** to **S31.20**, or its failure to respond to calls from an authorized rescue authority;

d) was repeated; or

e) was transmitted using a false identity.

Administrations receiving such a report shall take appropriate steps to ensure that the infringement does not recur. No action should normally be taken against any ship or mariner for reporting and cancelling a false distress alert.

S32.11 *B – Transmission of a distress alert*

B1 – Transmission of a distress alert by a ship station or a ship earth station

S32.12 § 8 Ship-to-shore distress alerts are used to alert rescue coordination centres via coast stations or coast earth stations that a ship is in distress. These alerts are based on the use of transmissions via satellites (from a ship earth station or a satellite EPIRB) and terrestrial services (from ship stations and EPIRBs).

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[2] **S32.9.1** Mobile unit: A ship, aircraft or other vehicle.

[3] **S32.9.2** In this Article, where the case is of a person in distress, the application of the procedures may require adaptation to meet the needs of the particular circumstances.

[4] **S32.9.3** The format of distress calls and distress messages shall be in accordance with the relevant ITU-R Recommendations (see Resolution **27 (Rev.WRC-97)**).

[5] **S32.10.1** The distress alert may also contain information regarding the nature of the distress, the type of assistance required, the course and speed of the mobile unit, the time that this information was recorded and any other information which might facilitate rescue.

S32.13 § 9 Ship-to-ship distress alerts are used to alert other ships in the vicinity of the ship in distress and are based on the use of digital selective calling in the VHF and MF bands. Additionally, the HF band may be used.

B2 – Transmission of a shore-to-ship distress alert relay

S32.14 § 10 1) A station or a rescue coordination centre which receives a distress alert shall initiate the transmission of a shore-to-ship distress alert relay addressed, as appropriate, to all ships, to a selected group of ships or to a specific ship by satellite and/or terrestrial means.

S32.15 2) The distress alert relay shall contain the identification of the mobile unit in distress, its position and all other information which might facilitate rescue.

B3 – Transmission of a distress alert by a station not itself in distress

S32.16 § 11 A station in the mobile or mobile-satellite service which learns that a mobile unit is in distress shall initiate and transmit a distress alert in any of the following cases:

S32.17 *a)* when the mobile unit in distress is not itself in a position to transmit the distress alert;

S32.18 *b)* when the master or person responsible for the mobile unit not in distress or the person responsible for the land station considers that further help is necessary.

S32.19 § 12 A station transmitting a distress alert relay in accordance with Nos. **S32.16**, **S32.17**, **S32.18** and **S32.31** shall indicate that it is not itself in distress.

S32.20 *C – Receipt and acknowledgement of distress alerts*

C1 – Procedure for acknowledgement of receipt of distress alerts

S32.21 § 13 Acknowledgement by digital selective calling of receipt of a distress alert in the terrestrial services shall be in accordance with relevant ITU-R Recommendations (see Resolution **27 (Rev.WRC-97)**).

S32.22 § 14 Acknowledgement through a satellite of receipt of a distress alert from a ship earth station shall be sent immediately (see No. **S32.26**).

S32.23 § 15 1) Acknowledgement by radiotelephony of receipt of a distress alert from a ship station or a ship earth station shall be given in the following form:

- the distress signal MAYDAY;
- the call sign or other identification of the station sending the distress message, spoken three times;
- the words THIS IS (or DE spoken as DELTA ECHO in case of language difficulties);
- the call sign or other identification of the station acknowledging receipt, spoken three times;
- the word RECEIVED (or RRR spoken as ROMEO ROMEO ROMEO in case of language difficulties);
- the distress signal MAYDAY.

S32.24 2) The acknowledgement by direct-printing telegraphy of receipt of a distress alert from a ship station shall be given in the following form:

– the distress signal MAYDAY;

– the call sign or other identification of the station sending the distress alert;

– the word DE;

– the call sign or other identification of the station acknowledging receipt of the distress alert;

– the signal RRR;

– the distress signal MAYDAY.

S32.25 § 16 The acknowledgement by direct-printing telegraphy of receipt of a distress alert from a ship earth station shall be given by the coast earth station receiving the distress alert, by retransmitting the ship station identity of the ship transmitting the distress alert.

C2 – Receipt and acknowledgement of receipt by a coast station, a coast earth station or a rescue coordination centre

S32.26 § 17 Coast stations and appropriate coast earth stations in receipt of distress alerts shall ensure that they are routed as soon as possible to a rescue coordination centre. Receipt of a distress alert is to be acknowledged as soon as possible by a coast station, or by a rescue coordination centre via a coast station or an appropriate coast earth station.

S32.27 § 18 A coast station using digital selective calling to acknowledge a distress call shall transmit the acknowledgement on the distress calling frequency on which the call was received and should address it to all ships. The acknowledgement shall include the identification of the ship whose distress call is being acknowledged.

C3 – Receipt and acknowledgement of receipt by a ship station or ship earth station

S32.28 § 19 1) Ship or ship earth stations in receipt of a distress alert shall, as soon as possible, inform the master or person responsible for the ship of the contents of the distress alert.

S32.29 2) In areas where reliable communications with one or more coast stations are practicable, ship stations in receipt of a distress alert should defer acknowledgement for a short interval so that receipt may be acknowledged by a coast station.

S32.30 § 20 1) Ship stations operating in areas where reliable communications with a coast station are not practicable which receive a distress alert from a ship station which is, beyond doubt, in their vicinity, shall, as soon as possible and if appropriately equipped, acknowledge receipt and inform a rescue coordination centre through a coast station or coast earth station (see No. **S32.18**).

S32.31 2) However, a ship station receiving an HF distress alert shall not acknowledge it but shall observe the provisions of Nos. **S32.36** to **S32.38**, and shall, if the alert is not acknowledged by a coast station within 3 minutes, relay the distress alert.

S32.32 § 21 A ship station acknowledging receipt of a distress alert in accordance with No. **S32.29** or No. **S32.30** should:

S32.33 *a)* in the first instance, acknowledge receipt of the alert by using radiotelephony on the distress and safety traffic frequency in the band used for the alert;

S32.34 *b)* if acknowledgement by radiotelephony of the distress alert received on the MF or VHF distress alerting frequency is unsuccessful, acknowledge receipt of the distress alert by responding with a digital selective call on the appropriate frequency.

S32.35 § 22 A ship station in receipt of a shore-to-ship distress alert (see No. **S32.14**) should establish communication as directed and render such assistance as required and appropriate.

S32.36 *D – Preparations for handling of distress traffic*

S32.37 § 23 On receipt of a distress alert transmitted by use of digital selective calling techniques, ship stations and coast stations shall set watch on the radiotelephone distress and safety traffic frequency associated with the distress and safety calling frequency on which the distress alert was received.

S32.38 § 24 Coast stations and ship stations with narrow-band direct-printing equipment shall set watch on the narrow-band direct-printing frequency associated with the distress alert signal if it indicates that narrow-band direct-printing is to be used for subsequent distress communications. If practicable, they should additionally set watch on the radiotelephone frequency associated with the distress alert frequency.

Section III – Distress traffic

S32.39 *A – General and search and rescue coordinating communications*

S32.40 § 25 Distress traffic consists of all messages relating to the immediate assistance required by the ship in distress, including search and rescue communications and on-scene communications. The distress traffic shall as far as possible be on the frequencies contained in Article **S31**.

S32.41 § 26 1) The distress signal consists of the word MAYDAY, pronounced in radiotelephony as the French expression “m’aider”.

S32.42 2) For distress traffic by radiotelephony, when establishing communications, calls shall be prefixed by the distress signal MAYDAY.

S32.43 § 27 1) Error correction techniques in accordance with relevant ITU-R Recommendations shall be used for distress traffic by direct-printing telegraphy. All messages shall be preceded by at least one carriage return, a line feed signal, a letter shift signal and the distress signal MAYDAY.

S32.44 2) Distress communications by direct-printing telegraphy should normally be established by the ship in distress and should be in the broadcast (forward error correction) mode. The ARQ mode may subsequently be used when it is advantageous to do so.

S32.45 § 28 1) The Rescue Coordination Centre responsible for controlling a search and rescue operation shall also coordinate the distress traffic relating to the incident or may appoint another station to do so.

S32.46 2) The rescue coordination centre coordinating distress traffic, the unit coordinating search and rescue operations[6] or the coast station involved may impose silence on stations which interfere with that traffic. This instruction shall be addressed to all stations or to one station only, according to circumstances. In either case, the following shall be used:

S32.47 *a)* in radiotelephony, the signal SEELONCE MAYDAY, pronounced as the French expression "silence, m'aider";

S32.48 *b)* in narrow-band direct-printing telegraphy normally using forward-error correcting mode, the signal SILENCE MAYDAY. However, the ARQ mode may be used when it is advantageous to do so.

S32.49 § 29 Until they receive the message indicating that normal working may be resumed (see No. **S32.51**), all stations which are aware of the distress traffic, and which are not taking part in it, and which are not in distress, are forbidden to transmit on the frequencies in which the distress traffic is taking place.

S32.50 § 30 A station of the mobile service which, while following distress traffic, is able to continue its normal service, may do so when the distress traffic is well established and on condition that it observes the provisions of No. **S32.49** and that it does not interfere with distress traffic.

S32.51 § 31 When distress traffic has ceased on frequencies which have been used for distress traffic, the rescue coordination centre controlling a search and rescue operation shall initiate a message for transmission on these frequencies indicating that distress traffic has finished.

S32.52 § 32 1) In radiotelephony, the message referred to in No. **S32.51** consists of:

- the distress signal MAYDAY;
- the call "Hello all stations" or CQ (spoken as CHARLIE QUEBEC) spoken three times;
- the words THIS IS (or DE spoken as DELTA ECHO in the case of language difficulties);
- the call sign or other identification of the station sending the message;
- the time of handing in of the message;
- the name and call sign of the mobile station which was in distress;
- the words SEELONCE FEENEE pronounced as the French words "silence fini".

S32.53 2) In direct-printing telegraphy, the message referred to in No. **S32.51** consists of:

- the distress signal MAYDAY;
- the call CQ;
- the word DE;

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[6] **S32.46.1** In accordance with the International Convention on Maritime Search and Rescue, 1979, this is the on-scene commander (OSC) or the coordinator surface search (CSS).

– the call sign or other identification of the station sending the message;

– the time of handing in of the message;

– the name and call sign of the mobile station which was in distress; and

– the words SILENCE FINI.

S32.54 *B – On-scene communications*

S32.55 § 33 1) On-scene communications are those between the mobile unit in distress and assisting mobile units, and between the mobile units and the unit coordinating search and rescue operations[6].

S32.56 2) Control of on-scene communications is the responsibility of the unit coordinating search and rescue operations[6]. Simplex communications shall be used so that all on-scene mobile stations may share relevant information concerning the distress incident. If direct-printing telegraphy is used, it shall be in the forward error-correcting mode.

S32.57 § 34 1) The preferred frequencies in radiotelephony for on-scene communications are 156.8 MHz and 2 182 kHz. The frequency 2 174.5 kHz may also be used for ship-to-ship on-scene communications using narrow-band direct-printing telegraphy in the forward error correcting mode.

S32.58 2) In addition to 156.8 MHz and 2 182 kHz, the frequencies 3 023 kHz, 4 125 kHz, 5 680 kHz, 123.1 MHz and 156.3 MHz may be used for ship-to-aircraft on-scene communications.

S32.59 § 35 The selection or designation of on-scene frequencies is the responsibility of the unit coordinating search and rescue operations[6]. Normally, once an on-scene frequency is established, a continuous aural or teleprinter watch is maintained by all participating on-scene mobile units on the selected frequency.

S32.60 *C – Locating and homing signals*

S32.61 § 36 1) Locating signals are radio transmissions intended to facilitate the finding of a mobile unit in distress or the location of survivors. These signals include those transmitted by searching units, and those transmitted by the mobile unit in distress, by survival craft, by float-free EPIRBs, by satellite EPIRBs and by search and rescue radar transponders to assist the searching units.

S32.62 2) Homing signals are those locating signals which are transmitted by mobile units in distress, or by survival craft, for the purpose of providing searching units with a signal that can be used to determine the bearing to the transmitting stations.

S32.63 3) Locating signals may be transmitted in the following frequency bands:

117.975-136 MHz;

156-174 MHz;

406-406.1 MHz;

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6 **S32.55.1**, **S32.56.1** and **S32.59.1** In accordance with the International Convention on Maritime Search and Rescue, 1979, this is the on-scene commander (OSC) or the coordinator surface search (CSS).

1 645.5-1 646.5 MHz; and

9 200-9 500 MHz.

S32.64 4) Locating signals shall be in accordance with the relevant ITU-R Recommendations (see Resolution **27 (Rev.WRC-97)**).

Annex 9-7
ARTICLE S33

Operational procedures for urgency and safety communications in the global maritime distress and safety system (GMDSS)

Section I – General

S33.1 § 1 Urgency and safety communications include:

S33.2 *a)* navigational and meteorological warnings and urgent information;

S33.3 *b)* ship-to-ship safety of navigation communications;

S33.4 *c)* ship reporting communications;

S33.5 *d)* support communications for search and rescue operations;

S33.6 *e)* other urgency and safety messages; and

S33.7 *f)* communications relating to the navigation, movements and needs of ships and weather observation messages destined for an official meteorological service.

Section II – Urgency communications

S33.8 § 2 In a terrestrial system the announcement of the urgency message shall be made on one or more of the distress and safety calling frequencies specified in Section I of Article **S31** using digital selective calling and the urgency call format. A separate announcement need not be made if the urgency message is to be transmitted through the maritime mobile-satellite service.

S33.9 § 3 The urgency signal and message shall be transmitted on one or more of the distress and safety traffic frequencies specified in Section I of Article **S31**, or via the maritime mobile-satellite service or on other frequencies used for this purpose.

S33.10 § 4 The urgency signal consists of the words PAN PAN. In radiotelephony each word of the group shall be pronounced as the French word “panne”.

S33.11 § 5 The urgency call format and the urgency signal indicate that the calling station has a very urgent message to transmit concerning the safety of a mobile unit or a person.

S33.12 § 6 1) In radiotelephony, the urgency message shall be preceded by the urgency signal (see No. **S33.10**), repeated three times, and the identification of the transmitting station.

S33.13 2) In narrow-band direct-printing, the urgency message shall be preceded by the urgency signal (see No. **S33.10**) and the identification of the transmitting station.

S33.14 § 7 1) The urgency call format or urgency signal shall be sent only on the authority of the master or the person responsible for the mobile unit carrying the mobile station or mobile earth station.

S33.15 2) The urgency call format or the urgency signal may be transmitted by a land station or a coast earth station with the approval of the responsible authority.

S33.16 § 8 When an urgency message which calls for action by the stations receiving the message has been transmitted, the station responsible for its transmission shall cancel it as soon as it knows that action is no longer necessary.

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S33.17 § 9 1) Error correction techniques in accordance with relevant ITU-R Recommendations shall be used for urgency messages by direct-printing telegraphy. All messages shall be preceded by at least one carriage return, a line feed signal, a letter shift signal and the urgency signal PAN PAN.

S33.18 2) Urgency communications by direct-printing telegraphy should normally be established in the broadcast (forward error correction) mode. The ARQ mode may subsequently be used when it is advantageous to do so.

Section III – Medical transports

S33.19 § 10 The term "medical transports", as defined in the 1949 Geneva Conventions and Additional Protocols, refers to any means of transportation by land, water or air, whether military or civilian, permanent or temporary, assigned exclusively to medical transportation and under the control of a competent authority of a party to a conflict or of neutral States and of other States not parties to an armed conflict, when these ships, craft and aircraft assist the wounded, the sick and the shipwrecked.

S33.20 § 11 For the purpose of announcing and identifying medical transports which are protected under the above-mentioned Conventions, the procedure of Section II of this Article is used. The urgency signal shall be followed by the addition of the single word MEDICAL in narrow-band direct-printing and by the addition of the single word MAY-DEE-CAL pronounced as in French "médical", in radiotelephony.

S33.21 § 12 The use of the signals described in No. **S33.20** indicates that the message which follows concerns a protected medical transport. The message shall convey the following data:

S33.22 *a)* call sign or other recognized means of identification of the medical transport;

S33.23 *b)* position of the medical transport;

S33.24 *c)* number and type of vehicles in the medical transport;

S33.25 *d)* intended route;

S33.26 *e)* estimated time en route and of departure and arrival, as appropriate;

S33.27 *f)* any other information, such as flight altitude, radio frequencies guarded, languages used and secondary surveillance radar modes and codes.

S33.28 § 13 1) The identification and location of medical transports at sea may be conveyed by means of appropriate standard maritime radar transponders (see Recommendation **14 (Mob-87)**).

S33.29 2) The identification and location of aircraft medical transports may be conveyed by the use of the secondary surveillance radar (SSR) system specified in Annex 10 to the Convention on International Civil Aviation.

S33.30 § 14 The use of radiocommunications for announcing and identifying medical transports is optional; however, if they are used, the provisions of these Regulations and particularly of this Section and of Articles **S30** and **S31** shall apply.

Section IV – Safety communications

S33.31 § 15 In a terrestrial system the announcement of the safety message shall be made on one or more of the distress and safety calling frequencies specified in Section I of Article **S31**

using digital selective calling techniques. A separate announcement need not be made if the message is to be transmitted through the maritime mobile-satellite service.

S33.32 § 16 The safety signal and message shall normally be transmitted on one or more of the distress and safety traffic frequencies specified in Section I of Article **S31**, or via the maritime mobile-satellite service or on other frequencies used for this purpose.

S33.33 § 17 The safety signal consists of the word SECURITE. In radiotelephony, it shall be pronounced as in French.

S33.34 § 18 The safety call format or the safety signal indicates that the calling station has an important navigational or meteorological warning to transmit.

S33.35 § 19 1) In radiotelephony, the safety message shall be preceded by the safety signal (see No. **S33.33**) repeated three times, and the identification of the transmitting station.

S33.36 2) In narrow-band direct-printing, the safety message shall be preceded by the safety signal (see No. **S33.33**), and the identification of the transmitting station.

S33.37 § 20 1) Error correction techniques in accordance with relevant ITU-R Recommendations shall be used for safety messages by direct-printing telegraphy. All messages shall be preceded by at least one carriage return, a line feed signal, a letter shift signal and the safety signal SECURITE.

S33.38 2) Safety communications by direct-printing telegraphy should normally be established in the broadcast (forward error correction) mode. The ARQ mode may subsequently be used when it is advantageous to do so.

Section V – Transmission of maritime safety information[1]

S33.39 *A – General*

S33.39A § 20A 1) Messages from ship stations containing information concerning the presence of cyclones shall be transmitted, with the least possible delay, to other mobile stations in the vicinity and to the appropriate authorities at the first point of the coast with which contact can be established. These transmissions shall be preceded by the safety signal.

S33.39B 2) Messages from ship stations containing information on the presence of dangerous ice, dangerous wrecks, or any other imminent danger to marine navigation, shall be transmitted as soon as possible to other ships in the vicinity, and to the appropriate authorities at the first point of the coast with which contact can be established. These transmissions shall be preceded by the safety signal.

S33.40 § 21 The operational details of the stations transmitting maritime safety information in accordance with Nos. **S33.43**, **S33.45**, **S33.46**, **S33.48** and **S33.50** shall be indicated in the List of Radiodetermination and Special Service Stations (see also Appendix **S13**).

S33.41 § 22 The mode and format of the transmissions mentioned in Nos. **S33.43**, **S33.45**, **S33.46** and **S33.48** shall be in accordance with the relevant ITU-R Recommendations.

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[1] **S33.V.1** Maritime safety information includes navigation and meteorological warnings, meteorological forecasts and other urgent messages pertaining to safety normally transmitted to or from ships, between ships and between ship and coast stations or coast earth stations.

S33.42 *B – International NAVTEX system*

S33.43 § 23 Maritime safety information shall be transmitted by means of narrow-band direct-printing telegraphy with forward error correction using the frequency 518 kHz in accordance with the international NAVTEX system (see Appendix **S15**).

S33.44 *C – 490 kHz and 4 209.5 kHz*

S33.45 § 24 1) The frequency 490 kHz may be used, after full implementation of the GMDSS, for the transmission of maritime safety information by means of narrow-band direct-printing telegraphy with forward error correction (see Appendix **S15**).

S33.46 2) The frequency 4 209.5 kHz is used exclusively for NAVTEX-type transmission by means of narrow-band direct-printing telegraphy with forward error correction.

S33.47 *D – High seas maritime safety information*

S33.48 § 25 Maritime safety information is transmitted by means of narrow-band direct-printing telegraphy with forward error correction using the frequencies 4 210 kHz, 6 314 kHz, 8 416.5 kHz, 12 579 kHz, 16 806.5 kHz, 19 680.5 kHz, 22 376 kHz and 26 100.5 kHz.

S33.49 *E – Maritime safety information via satellite*

S33.50 § 26 Maritime safety information may be transmitted via satellite in the maritime mobile-satellite service using the band 1 530-1 545 MHz (see Appendix **S15**).

Section VI – Intership navigation safety communications

S33.51 § 27 1) Intership navigation safety communications are those VHF radio-telephone communications conducted between ships for the purpose of contributing to the safe movement of ships.

S33.52 2) The frequency 156.650 MHz is used for intership navigation safety communications (see also Appendix **S15** and note *k)* in Appendix **S18**).

Section VII – Use of other frequencies for distress and safety

S33.53 § 28 Radiocommunications for distress and safety purposes may be conducted on any appropriate communications frequency, including those used for public correspondence. In the maritime mobile-satellite service, frequencies in the bands 1 530-1 544 MHz and 1 626.5-1 645.5 MHz are used for this function as well as for distress alerting purposes (see No. **S32.2**).

Section VIII – Medical advice

S33.54 § 29 1) Mobile stations requiring medical advice may obtain it through any of the land stations shown in the List of Radiodetermination and Special Service Stations.

S33.55 2) Communications concerning medical advice may be preceded by the urgency signal.

Annex 9-8

ARTICLE S34

Alerting signals in the global maritime distress and safety system (GMDSS)

Section I – Emergency position-indicating radiobeacon (EPIRB) and satellite EPIRB signals

S34.1 § 1 The emergency position-indicating radiobeacon signal transmitted on 156.525 MHz and satellite EPIRB signals in the band 406-406.1 MHz or 1 645.5-1 646.5 MHz shall be in accordance with relevant ITU-R Recommendations (see Resolution **27 (Rev.WRC-97)**).

Section II – Digital selective calling

S34.2 § 2 The characteristics of the "distress call" (see No. S32.9) in the digital selective calling system shall be in accordance with relevant ITU-R Recommendations (see Resolution **27 (Rev**.WRC-97)).

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Annex 9-9

ARTICLE S47

Operator's certificates

Section I – General provisions

S47.1 § 1 1) The service of every ship Morse radiotelegraph station shall be performed by an operator holding a certificate issued or recognized by the government to which the station is subject.

S47.2 2) The service of every ship radiotelephone station, ship earth station and ship station using the frequencies and techniques prescribed in Chapter **SVII** shall be controlled by an operator holding a certificate issued or recognized by the government to which the station is subject. Provided the station is so controlled, other persons besides the holder of the certificate may use the equipment.

S47.3 3) The service of automatic communication devices[1] installed in a ship station shall be controlled by an operator holding a certificate issued or recognized by the government to which the station is subject. Provided the devices are so controlled, they may be used by other persons. If such devices require for their basic function the use of Morse code signals specified in the Instructions for the Operation of the International Public Telegram Service, the service shall be performed by an operator holding a radiotelegraph operator's certificate. However, this latter requirement does not apply to automatic devices which may use Morse code signals solely for identification purposes.

S47.4 4) Nevertheless, in the service of radiotelephone stations operating solely on frequencies above 30 MHz, each government shall decide for itself whether a certificate is necessary and, if so, shall define the conditions for obtaining it.

S47.5 5) The provisions of No. **S47.4** shall not, however, apply to any ship station working on frequencies assigned for international use.

S47.6 § 2 1) In the case of complete unavailability of the operator in the course of a sea passage and solely as a temporary measure, the master or the person responsible for the station may authorize an operator holding a certificate issued by the government of another Member State ‡ to perform the radiocommunication service.

S47.7 2) When it is necessary to employ a person without a certificate or an operator not holding an adequate certificate as a temporary operator, his performance as such must be limited solely to signals of distress, distress alerting, urgency and safety, messages relating thereto, messages relating directly to the safety of life and urgent messages relating to the movement of the ship.

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[1] **S47.3.1** The term "automatic communication devices" is intended to include such equipment as teleprinters, data transfer systems, etc.

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S47.8 3) In all cases, such temporary operators must be replaced as soon as possible by operators holding the certificate prescribed in Nos. **S47.1** to **S47.5** of this Article.

S47.9 § 3 1) Each administration shall take the necessary steps to prevent, to the maximum extent possible, the fraudulent use of certificates. For this purpose, such certificates shall bear the holder's signature and shall be authenticated by the issuing administration. Administrations may employ, if they wish, other means of identification such as photographs, fingerprints, etc.

S47.10 2) In the maritime mobile service the certificates issued after 1 January 1978 shall bear the photograph of the holder and the holder's date of birth.

S47.11 3) To facilitate verification of certificates, these may carry, if necessary, in addition to the text in the national language, a translation of this text in a working language of the Union.

S47.12 4) In the maritime mobile service all certificates not in one of the working languages of the Union and issued after 1 January 1978 shall carry at least the following information in one of these working languages:

S47.13 *a)* the name and date of birth of the holder;

S47.14 *b)* the title of the certificate and its date of issue;

S47.15 *c)* if applicable, the number and period of validity of the certificate;

S47.16 *d)* the issuing administration.

S47.17 § 4 Each administration shall take the necessary steps to place operators under the obligation to preserve the secrecy of correspondence as provided for in No. **S18.4**.

S47.18 § 5 Each administration may determine the conditions under which personnel holding certificates specified in Appendix **S13** may be granted certificates specified in Nos. **S47.20** to **S47.23**.

Section II – Categories of operator's certificates

S47.19 § 6 1) There are four categories of certificates, shown in descending order of requirements, for personnel of ship stations and ship earth stations using the frequencies and techniques prescribed in Chapter **SVII**. An operator meeting the requirements of a certificate automatically meets all of the requirements of lower order certificates.

S47.20 *a)* First-class radio electronic certificate.

S47.21 *b)* Second-class radio electronic certificate.

S47.22 *c)* General operator's certificate.

S47.23 *d)* Restricted operator's certificate.

S47.24 2) The holder of one of the certificates specified in Nos. **S47.20** to **S47.23** may carry out the service of ship stations or ship earth stations using the frequencies and techniques prescribed in Chapter **SVII**.

Section III – Conditions for the issue of certificates

S47.25 § 7 The requirements of the certificates of this section, for which candidates must show proof of the technical and professional knowledge and qualification, are shown in Table **S47-1**.

TABLE **S47-1**

Requirements for radio electronic and operator's certificates

The relevant certificate is issued to a candidate who has given proof of the technical and professional knowledge and qualifications enumerated below, as indicated by an asterisk in the appropriate box	**1st-class radio electronic certificate**	**2nd-class radio electronic certificate**	**General operator's certificate**	**Restricted operator's certificate**
Knowledge of the principles of electricity and the theory of radio and of electronics sufficient to meet the requirements specified below:	*	*		
Theoretical knowledge of GMDSS radiocommunication equipment, including narrow-band direct-printing telegraph and radiotelephone transmitters and receivers, digital selective calling equipment, ship earth stations, emergency position-indicating radiobeacons, marine antenna systems, radio equipment for survival craft together with all auxiliary items, including power supplies, as well as general knowledge of the principles of other equipment generally used for radionavigation, with particular reference to maintaining equipment in service.	*			
General theoretical knowledge of GMDSS radiocommunication equipment, including narrow-band direct-printing telegraph and radiotelephone transmitters and receivers, digital selective calling equipment, ship earth stations, emergency position-indicating radiobeacons, marine antenna systems, radio equipment for survival craft together with all auxiliary items, including power supplies, as well as general knowledge of the principles of other equipment generally used for radionavigation, with particular reference to maintaining equipment in service.		*		
Practical knowledge of the operation and knowledge of the preventive maintenance of the equipment indicated above.	*	*		
Practical knowledge necessary for the location and repair (using appropriate testing equipment and tools) of faults in the equipment mentioned above which may occur during a voyage.	*			
Practical knowledge necessary for effecting repairs in the case of faults in the equipment indicated above, using the means available on board and, if necessary, replacing modular units.		*		
Detailed practical knowledge of the operation of all the GMDSS sub-systems and equipment.	*	*	*	

The relevant certificate is issued to a candidate who has given proof of the technical and professional knowledge and qualifications enumerated below, as indicated by an asterisk in the appropriate box	**1st-class radio electronic certificate**	**2nd-class radio electronic certificate**	**General operator's certificate**	**Restricted operator's certificate**
Practical knowledge of the operation of all the GMDSS sub-systems and equipment which is required while the ship is within the range of VHF coast stations (see NOTE 1).				*
Ability to send and to receive correctly by radiotelephone and direct-printing telegraphy.	*	*	*	
Ability to send and to receive correctly by radiotelephone.				*
Detailed knowledge of the regulations applying to radiocommunications, knowledge of the documents relating to charges for radiocommunications and knowledge of those provisions of the International Convention for the Safety of Life at Sea (SOLAS), 1974, as amended which relate to radio.	*	*	*	
Knowledge of the regulations applying to radiotelephone communications and specifically of that part of those regulations relating to the safety of life.				*
Sufficient knowledge of one of the working languages of the Union. Candidates should be able to express themselves satisfactorily in that language, both orally and in writing.	*	*	*	
An elementary knowledge of one of the working languages of the Union. Candidates should be able to express themselves satisfactorily in that language, both orally and in writing. Administrations may waive the above language requirements for holders of a restricted operator's certificate when the ship station is confined to a limited area specified by the administration concerned. In such cases the certificate shall be suitably endorsed.				*

NOTE 1 – A restricted operator's certificate covers only the operation of GMDSS equipment required for GMDSS sea areas A1, and does not cover the operation of GMDSS A2/A3/A4 equipment fitted on a ship over and above the basic A1 requirements, even if the ship is in a sea area A1. GMDSS sea areas A1, A2, A3 and A4 are identified in the International Convention for the Safety of Life at Sea, (SOLAS), 1974, as amended.

Section IV – Qualifying service

S47.26 § 8 1) The holder of a radiocommunication general operator's certificate or a first- or second-class radiotelegraph operator's certificate is authorized to embark as chief operator of a ship station of the fourth category (see Recommendation ITU-R M.1169).

S47.27 2) However, before becoming chief or sole operator of a ship station of the fourth category (see Recommendation ITU-R M.1169) which is required by international

agreements to carry a radiotelegraph operator, the holder of a radiocommunication general operator's certificate or a first- or second-class radiotelegraph operator's certificate shall have had adequate experience as operator on board ship at sea.

S47.28 3) Before becoming chief operator of a ship station of the second or third category (see Recommendation ITU-R M.1169), the holder of a radiocommunication general operator's certificate or a first- or second-class radiotelegraph operator's certificate shall have had, as operator on board ship or in a coast station, at least six months' experience of which at least three months shall have been on board ship.

S47.29 4) Before becoming chief operator of a ship station of the first category (see Recommendation ITU-R M.1169), the holder of a radiocommunication general operator's certificate or a first-class radiotelegraph operator's certificate shall have had, as operator on board ship or in a coast station, at least one year's experience of which at least six months shall have been on board ship.

Annex 9-10

ARTICLE S53

Order of priority of communications

S53.1 § 1 All stations in the maritime mobile service and the maritime mobile-satellite service shall be capable of offering four levels of priority in the following order:

1) Distress calls, distress messages, and distress traffic.

2) Urgency communications.

3) Safety communications.

4) Other communications.

S53.2 § 2 In a fully automated system, where it is impracticable to offer all four levels of priority, category 1 shall receive priority until such time as intergovernmental agreements[1] remove exemptions granted for such systems from offering the complete order of priority.

[1] **S53.2.1** Requirements and performance standards for radio systems and equipment for maritime distress and safety radiocommunications are developed and adopted by the International Maritime Organization (IMO).

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Annex 9-11

ARTICLE S59

Provisional application of the Radio Regulations

MOD

S59.1 These Regulations, which complement the provisions of the Constitution and Convention of the International Telecommunication Union, and as revised and contained in the Final Acts of WRC-95, WRC-97 and WRC-2000, shall be applied, pursuant to Article 54 of the Constitution, on the following basis.

S59.2 The provisions of these Regulations, as revised by WRC-95, concerning new or modified frequency allocations (including any new or modified conditions applying to existing allocations) and the related provisions of Articles **S21** and **S22,** and Appendix **S4**, apply provisionally as of 1 January 1997.

MOD

S59.3 The other provisions of these Regulations, as revised by WRC-95 and WRC-97, apply provisionally as of 1 January 1999, with the following exceptions:

S59.4 – the revised provisions for which other effective dates of application are stipulated in Resolutions **49 (WRC-97)**, **51 (WRC-97)**, **52 (WRC-97)**, **54 (WRC-97)**, **130 (WRC-97)**, **533 (WRC-97)**, **534 (WRC-97)** and **538 (WRC-97)**.

ADD

S59.5 The other provisions of these Regulations, as revised by WRC-2000, shall enter into force on 1 January 2002, with the following exceptions:

ADD

S59.6 – the revised provisions for which other effective dates of application are stipulated in Resolutions **49 (Rev.WRC-2000)**, **51 (Rev.WRC-2000)**, **53 (Rev.WRC-2000)**, **55 (WRC-2000)**, **56 (WRC-2000)**, **58 (WRC-2000), 59 (WRC-2000)**, **77 (WRC-2000)**, **84 (WRC-2000)**, **122 (Rev.WRC-2000)**, **128 (Rev.WRC-2000)**, **533 (Rev.WRC-2000)**, **539 (WRC-2000)**, **540 (WRC-2000)**, **541 (WRC-2000), 542 (WRC-2000), 604 (WRC-2000)** and **605 (WRC-2000).**

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Annex 9-12

APPENDIX S15

Frequencies for distress and safety communications for the Global Maritime Distress and Safety System (GMDSS)

(See Article **S31**)

The frequencies for distress and safety communications for the GMDSS are given in Tables S15-1 and S15-2 for frequencies below and above 30 MHz, respectively.

TABLE S15-1

Frequencies below 30 MHz

Frequency (kHz)	Description of usage	Notes
490	MSI	The frequency 490 kHz will be used exclusively for maritime safety information (MSI) after full implementation of the GMDSS.
518	MSI	The frequency 518 kHz is used exclusively by the international NAVTEX system.
*2 174.5	NBDP-COM	
*2 182	RTP-COM	The frequency 2 182 kHz uses class of emission J3E. See also No. **S52.190** and Appendix **S13**.
*2 187.5	DSC	
3 023	AERO-SAR	The aeronautical carrier (reference) frequencies 3 023 kHz and 5 680 kHz may be used for intercommunication between mobile stations engaged in coordinated search and rescue operations, and for communication between these stations and participating land stations, in accordance with the provisions of Appendix **S27** (see Nos. **S5.111** and **S5.115**).
*4 125	RTP-COM	See also No. **S52.221** and Appendix **S13**. The carrier frequency 4 125 kHz may be used by aircraft stations to communicate with stations of the maritime mobile service for distress and safety purposes, including search and rescue (see No. **S30.11**).
*4 177.5	NBDP-COM	
*4 207.5	DSC	
4 209.5	MSI	The frequency 4 209.5 kHz is exclusively used for NAVTEX-type transmissions (see Resolution **339 (Rev.WRC-97)**).
4 210	MSI-HF	
5 680	AERO-SAR	See note under 3 023 kHz above.
*6 215	RTP-COM	See also No. **S52.221** and Appendix **S13**.
*6 268	NBDP-COM	
*6 312	DSC	

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TABLE S15-1 (*end*)

Frequency (kHz)	Description of usage	Notes
6 314	MSI-HF	
*8 291	RTP-COM	
*8 376.5	NBDP-COM	
*8 414.5	DSC	
8 416.5	MSI-HF	
*12 290	RTP-COM	
*12 520	NBDP-COM	
*12 577	DSC	
12 579	MSI-HF	
*16 420	RTP-COM	
*16 695	NBDP-COM	
*16 804.5	DSC	
16 806.5	MSI-HF	
19 680.5	MSI-HF	
22 376	MSI-HF	
26 100.5	MSI-HF	

Legend:

AERO-SAR These aeronautical carrier (reference) frequencies may be used for distress and safety purposes by mobile stations engaged in coordinated search and rescue operations.

DSC These frequencies are used exclusively for distress and safety calls using digital selective calling in accordance with No. **S32.5** (see Nos. **S32.9**, **S33.11** and **S33.34**).

MSI In the maritime mobile service, these frequencies are used exclusively for the transmission of maritime safety information (MSI) (including meteorological and navigational warnings and urgent information) by coast stations to ships, by means of narrow-band direct-printing telegraphy.

MSI-HF In the maritime mobile service, these frequencies are used exclusively for the transmission of high seas MSI by coast stations to ships, by means of narrow-band direct-printing telegraphy.

NBDP-COM These frequencies are used exclusively for distress and safety communications (traffic) using narrow-band direct-printing telegraphy.

RTP-COM These carrier frequencies are used for distress and safety communications (traffic) by radio-telephony.

* Except as provided in these Regulations, any emission capable of causing harmful interference to distress, alarm, urgency or safety communications on the frequencies denoted by an asterisk (*) is prohibited. Any emission causing harmful interference to distress and safety communications on any of the discrete frequencies identified in Appendices **S13** and **S15** is prohibited.

TABLE S15-2

Frequencies above 30 MHz (VHF/UHF)

Frequency (MHz)	Description of usage	Notes
*121.5	AERO-SAR	The aeronautical emergency frequency 121.5 MHz is used for the purposes of distress and urgency for radiotelephony by stations of the aeronautical mobile service using frequencies in the band between 117.975 MHz and 137 MHz. This frequency may also be used for these purposes by survival craft stations. Emergency position-indicating radio beacons use the frequency 121.5 MHz as indicated in Recommendation ITU-R M.690-1. Mobile stations of the maritime mobile service may communicate with stations of the aeronautical mobile service on the aeronautical emergency frequency 121.5 MHz for the purposes of distress and urgency only, and on the aeronautical auxiliary frequency 123.1 MHz for coordinated search and rescue operations, using class A3E emissions for both frequencies (see also Nos. **S5.111** and **S5.200**). They shall then comply with any special arrangement between governments concerned by which the aeronautical mobile service is regulated.
123.1	AERO-SAR	The aeronautical auxiliary frequency 123.1 MHz, which is auxiliary to the aeronautical emergency frequency 121.5 MHz, is for use by stations of the aeronautical mobile service and by other mobile and land stations engaged in coordinated search and rescue operations (see also No. **S5.200**). Mobile stations of the maritime mobile service may communicate with stations of the aeronautical mobile service on the aeronautical emergency frequency 121.5 MHz for the purposes of distress and urgency only, and on the aeronautical auxiliary frequency 123.1 MHz for coordinated search and rescue operations, using class A3E emissions for both frequencies (see also Nos. **S5.111** and **S5.200**). They shall then comply with any special arrangement between governments concerned by which the aeronautical mobile service is regulated.
156.3	VHF-CH06	The frequency 156.3 MHz may be used for communication between ship stations and aircraft stations engaged in coordinated search and rescue operations. It may also be used by aircraft stations to communicate with ship stations for other safety purposes (see also Note *f*) in Appendix **S18**).
*156.525	VHF-CH70	The frequency 156.525 MHz is used in the maritime mobile service for distress and safety calls using digital selective calling (see also Nos**. S4.9, S5.227, S30.2** and **S30.3**).
156.650	VHF-CH13	The frequency 156.650 MHz is used for ship-to-ship communications relating to the safety of navigation in accordance with Note *k*) in Appendix **S18**.
*156.8	VHF-CH16	The frequency 156.8 MHz is used for distress and safety communications by radiotelephony (see also Appendix **S13**). Additionally, the frequency 156.8 MHz may be used by aircraft stations for safety purposes only.

TABLE S15-2 (*end*)

Frequency (MHz)	Description of usage	Notes
*406-406.1	406-EPIRB	This frequency band is used exclusively by satellite emergency position-indicating radio beacons in the Earth-to-space direction (see No. **S5.266**).
1 530-1 544	SAT-COM	In addition to its availability for routine non-safety purposes, the band 1 530-1 544 MHz is used for distress and safety purposes in the space-to-Earth direction in the maritime mobile-satellite service. GMDSS distress, urgency and safety communications have priority in this band (see No. **S5.353A**).
*1 544-1 545	D&S-OPS	Use of the band 1 544-1 545 MHz (space-to-Earth) is limited to distress and safety operations (see No. **S5.356**), including feeder links of satellites needed to relay the emissions of satellite emergency position-indicating radio beacons to earth stations and narrow-band (space-to-Earth) links from space stations to mobile stations.
1 626.5-1 645.5	SAT-COM	In addition to its availability for routine non-safety purposes, the band 1 626.5-1 645.5 MHz is used for distress and safety purposes in the Earth-to-space direction in the maritime mobile-satellite service. GMDSS distress, urgency and safety communications have priority in this band (see No. **S5.353A**).
*1 645.5-1 646.5	D&S-OPS	Use of the band 1 645.5-1 646.5 MHz (Earth-to-space) is limited to distress and safety operations (see No. **S5.375**), including transmissions from satellite EPIRBs and relay of distress alerts received by satellites in low polar Earth orbits to geostationary satellites.
9 200-9 500	SARTS	This frequency band is used by radar transponders to facilitate search and rescue.

Legend:

AERO-SAR These aeronautical carrier (reference) frequencies may be used for distress and safety purposes by mobile stations engaged in coordinated search and rescue operations.

D&S-OPS The use of these bands is limited to distress and safety operations of satellite emergency position-indicating radio beacons (EPIRBs).

SAT-COM These frequency bands are available for distress and safety purposes in the maritime mobile-satellite service (see Notes).

VHF-CH# These VHF frequencies are used for distress and safety purposes. The channel number (CH#) refers to the VHF channel as listed in Appendix **S18,** which should also be consulted.

* Except as provided in these Regulations, any emission capable of causing harmful interference to distress, alarm, urgency or safety communications on the frequencies denoted by an asterisk (*) is prohibited. Any emission causing harmful interference to distress and safety communications on any of the discrete frequencies identified in Appendices **S13** and **S15** is prohibited.

Annex 9-13

APPENDIX S16

Documents with which stations on board ships and aircraft shall be provided

(see Articles **S42** and **S51**)

Section I – Ship stations for which a Morse radiotelegraph installation is required by international agreement

These stations shall be provided with:

1 the licence prescribed by Article **S18**;

2 certificates of the operator or operators;

3 a log in which the following are recorded as they occur, together with the time of the occurrence, unless administrations have adopted other arrangements for recording all information which the log should contain:

a) all communications relating to distress traffic in full;

b) urgency and safety communications;

c) observance of watch on the international distress frequency during silence periods;

d) communications exchanged between the ship station and land or mobile stations;

e) service incidents of all kinds;

f) if the ship's rules permit, the position of the ship at least once a day;

g) the opening and closing of each period of service;

4 the Alphabetical List of Call Signs of Stations used in the Maritime Mobile Service;

5 the List of Coast Stations;

6 the List of Ship Stations (the carriage of the supplement is optional);

7 the List of Radiodetermination and Special Service Stations;

8 the Manual for Use by the Maritime Mobile and Maritime Mobile-Satellite Services;

9 telegraph tariffs of the countries for which the station most frequently accepts radiotelegrams.

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Section II – Other ship stations with Morse radiotelegraph facilities

These stations shall be provided with the documents mentioned in items 1 to 6, 8 and 9 of Section I.

Section III – Ship stations for which a radiotelephone installation is required by international agreement

These stations shall be provided with:

1 the licence prescribed by Article **S18**;

2 certificates of the operator or operators;

3 a log in which the following are recorded as they occur, together with the time of the occurrence, unless administrations have adopted other arrangements for recording all information which the log should contain:

a) a summary of all communications relating to distress, urgency and safety traffic;

b) a reference to important service incidents;

c) if the ship's rules permit, the position of the ship at least once a day;

4 a list of coast stations with which communications are likely to be conducted, showing watchkeeping hours, frequencies and charges;

5 the provisions of the Radio Regulations and of the ITU-T Resolutions and Recommendations applicable to the maritime mobile radiotelephone service, or the Manual for Use by the Maritime Mobile and Maritime Mobile-Satellite Services.

Section IV – Other ship radiotelephone stations

These stations shall be provided with:

1 the documents mentioned in items 1 and 2 of Section III;

2 the documents mentioned in items 3, 4 and 5 of Section III, in accordance with the requirements of the administrations concerned.

Section V – Ship stations equipped with multiple installations

These stations shall be provided with:

1 for each installation, if necessary, the documents mentioned in items 1 to 3 of Section I, or in items 1, 2 and 3 of Section III;

2 for only one installation, the other documents mentioned in Sections I or III, as appropriate.

Section VA. – Stations on board ships for which a GMDSS installation is required by international agreement

These stations shall be provided with:

1 the licence prescribed by Article **S18**;

2 the certificates prescribed in Article **S48**;

3 a log in which the following are recorded as they occur, together with the time of their occurrence, unless administrations have adopted other arrangements for recording all information which the log should contain:

a) a summary of communications relating to distress, urgency and safety traffic;

b) a reference to important service incidents;

c) if the ship's rules permit, the position of the ship at least once a day;

4 the Alphabetical List of Call Signs and/or Numerical Table of Identities of Stations Used by the Maritime Mobile Service and Maritime Mobile-Satellite Service (Coast, Coast Earth, Ship, Ship Earth, Radiodetermination and Special Service Stations), Ship and Ship Earth Stations, Maritime Mobile Service Identities and Selective Call Numbers or Signals, and Coast and Coast Earth Stations, Maritime Mobile Service Identities and Identification Numbers or Signals (List VIIA);

5 a list of coast stations and coast earth stations with which communications are likely to be established, showing watch-keeping hours, frequencies and charges; and a list of coast stations and coast earth stations providing navigational and meteorological warnings and other urgent information for ships (see Article **S20**);

6 the List of Ship Stations (the carriage of the supplement is optional);

7 the Manual for Use by the Maritime Mobile and Maritime Mobile-Satellite Services.

NOTE – Administrations may, under appropriate circumstances (for example, when ships are sailing only within range of VHF coast stations) exempt ships from the carriage of the documents mentioned in items 4 to 7 above.

Section VI – Stations on board aircraft

These stations shall be provided with:

1 the documents mentioned in items 1 and 2 of Section I;

2 a log, unless administrations have adopted other arrangements for recording all information which the log should contain;

3 the documents containing official information relating to stations which the aircraft station may use for the execution of its service.

Annex 10
WARC-Mob-83, WARC-Mob-87, WRC-95, WRC-97 and WRC-2000 Resolutions and Recommendations

Annex 10-1 – Resolution 18 (Mob-83) – *Relating to the procedure for identifying and announcing the position of ships and aircraft of States not parties to an armed conflict*

Annex 10-2 – Resolution 26 (Rev.WRC-97) – *Footnotes to the Table of Frequency Allocations in Article S5 of the Radio Regulations*

Annex 10-3 – Resolution 27 (Rev.WRC-2000) – *Use of incorporation by reference in the Radio Regulations*

Annex 10-4 – Resolution 28 (Rev.WRC-2000) – *Revision of references to the text of ITU-R Recommendations incorporated by reference in the Radio Regulations*

Annex 10-5 – Resolution 44 (Mob-87) – *Compatibility of equipment used in the mobile-satellite service*

Annex 10-6 – Resolution 205 (Rev.Mob-87) – *Protection of the band 406–406.1 MHz allocated to the mobile-satellite service*

Annex 10-7 – Resolution 209 (Mob-87) – *Study and implementation of a global land and maritime distress and safety system*

Annex 10-8 – Resolution 217 (WRC-97) – *Implementation of wind profiler radars*

Annex 10-9 – Resolution 218 (WRC-97) – SUP by WRC-2000

Annex 10-10 – Resolution 219 (WRC-97) – SUP by WRC-2000

Annex 10-11 – Resolution 220 (WRC-97) – SUP by WRC-2000

Annex 10-12 – Resolution 331 (Rev.WRC-97) – *Transition to the global maritime distress and safety system (GMDSS) and continuation of the distress and safety provisions in Appendix S13*

Annex 10-13 – Resolution 339 (Rev.WRC-97) – *Co-ordination of NAVTEX services*

Annex 10-14 – Resolution 340 (WRC-97) – *Need for additional search and rescue information in databases*

Annex 10-15 – Resolution 343 (WRC-97) – *Maritime certification for personnel of ship stations and ship earth stations for which a radio installation is not compulsory*

Annex 10-16 – Resolution 344 (WRC-97) – *Exhaustion of the maritime mobile service identity numbering resource*

Annex 10-17 – Resolution 345 (WRC-97) – *Operation of global maritime distress and safety system equipment on and assignment of maritime mobile service identities to non-compulsory fitted vessels*

Annex 10-18 – Resolution 346 (WRC-97) – *Protection of distress and safety communications on the frequencies 12290 kHz and 16420 kHz from harmful interference caused by these frequencies if also used for non-safety calling*

Annex 10-19 – Resolution 348 (WRC-97) – *Studies required to provide priority to distress communications originated by shore-based search and rescue authorities*

Annex 10-20 – Resolution 349 (WRC-97) – *Operational procedures for cancelling false distress alerts in the global maritime distress and safety system*

Annex 10-21 – Recommendation 7 (Rev.WRC-97) – *Adoption of standard forms for ship station and ship earth station licences and aircraft station and aircraft earth station licences*

Annex 10-22 – Recommendation 34 (WRC-95) – *Principles for the allocation of frequency bands*

Annex 10-23 – Recommendation 316 (Rev.Mob-87) – *Use of ship earth stations within harbours and other waters under national jurisdiction*

Annex 10-1

RESOLUTION 18 (Mob-83)

Relating to the procedure for identifying and announcing the position of ships and aircraft of States not parties to an armed conflict[1]

The World Administrative Radio Conference for the Mobile Services, Geneva, 1983,

considering

a) that ships and aircraft encounter considerable risk in the vicinity of an area of armed conflict;

b) that for the safety of life and property it is desirable for ships and aircraft of States not parties to an armed conflict to be able to identify themselves and announce their position in such circumstances;

c) that radiocommunication offers such ships and aircraft a rapid means of self-identification and providing location information prior to their entering areas of armed conflict and during their passage through the areas;

d) that it is considered desirable to provide a supplementary signal and procedure for use, in accordance with customary practice, in the area of armed conflict by ships and aircraft of States representing themselves as not parties to an armed conflict;

resolves

1 that the frequencies for urgency signal and messages specified in Appendix **S13** of the Radio Regulations may be used by ships and aircraft of States not parties to an armed conflict for self-identification and establishing communications. The transmission will consist of the urgency or safety signals, as appropriate, described in Appendix **S13** followed by the addition of the single group "NNN" in radiotelegraphy and by the addition of the single word “NEUTRAL” pronounced as in French “neutral” in radiotelephony. As soon as practicable, communications shall be transferred to an appropriate working frequency;

2 that the use of the signal as described in the preceding paragraph indicates that the message which follows concerns a ship or aircraft of a State not party to an armed conflict. The message shall convey at least the following data:

a) call sign or other recognized means of identification of such ship or aircraft;

b) position of such ship or aircraft;

c) number and type of such ships or aircraft;

d) intended route;

[1] WRC-97 made editorial amendments to this Resolution.

This text is reproduced from Final Acts of the World Administrative Radio Conference for the Mobile Services (MOB-83)

e) estimated time en route and of departure and arrival, as appropriate;

f) any other information, such as flight altitude, radio frequencies guarded, languages and secondary surveillance radar modes and codes;

3 that the provisions of Appendix **S13** relating to urgency and safety transmissions, and medical transports shall apply as appropriate to the use of the urgency and safety signals, respectively, by such ship or aircraft;

4 that the identification and location of ships of a State not party to an armed conflict may be effected by means of appropriate standard maritime radar transponders. The identification and location of aircraft of a State not party to an armed conflict may be effected by the use of the secondary surveillance radar (SSR) system in accordance with procedures to be recommended by the International Civil Aviation Organization (ICAO);

5 that the use of the signals described above would not confer or imply recognition of any rights or duties of a State not party to an armed conflict or a party to the conflict, except as may be recognized by common agreement between the parties to the conflict and a non-party;

6 to encourage parties to a conflict to enter into such agreements,

requests the Secretary-General

to communicate the contents of this Resolution to the International Maritime Organization (IMO) and ICAO for such action as they may consider appropriate,

requests ITU-R

to recommend an appropriate signal in the digital selective calling system for use in the maritime mobile service and other appropriate information as necessary.

Annex 10-2

RESOLUTION 26 (Rev.WRC-97)

Footnotes to the Table of Frequency Allocations in Article S5 of the Radio Regulations

The World Radiocommunication Conference (Geneva, 1997),

considering

a) that footnotes are an integral part of the Table of Frequency Allocations in the Radio Regulations and, as such, form part of an international treaty text;

b) that footnotes to the Table of Frequency Allocations should be clear, concise and easy to understand;

c) that footnotes should relate directly to matters of frequency allocation;

d) that, in order to ensure that footnotes allow modification of the Table of Frequency Allocations without introducing unnecessary complications, principles relating to the use of footnotes are needed;

e) that, currently, footnotes are adopted by competent world radiocommunication conferences and any addition, modification or deletion of a footnote is considered and adopted by the competent conference;

f) that some problems concerning country footnotes may be resolved through the application of a special agreement envisaged by Article **S6**;

g) that, in certain cases, administrations are confronted with major difficulties due to inconsistencies or omissions in footnotes;

h) that, in order to keep the footnotes to the Table of Frequency Allocations up to date, there should be clear and effective guidelines for additions, modifications and deletions of footnotes,

resolves

1 that, wherever possible, footnotes to the Table of Frequency Allocations should be confined to altering, limiting or otherwise changing the relevant allocations rather than dealing with the operation of stations, assignment of frequencies or other matters;

2 that the Table of Frequency Allocations should include only those footnotes which have international implications for the use of the radio-frequency spectrum;

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3 that new footnotes to the Table of Frequency Allocations should only be adopted in order to:

a) achieve flexibility in the Table of Frequency Allocations;

b) protect the relevant allocations in the body of the Table and in other footnotes in accordance with Section II of Article **S5**;

c) introduce either transitional or permanent restrictions on a new service to achieve compatibility; or

d) meet the specific requirements of a country or area when it is impracticable to satisfy such needs otherwise within the Table of Frequency Allocations;

4 that footnotes serving a common purpose should be in a common format, and, where possible, be grouped into a single footnote with appropriate references to the relevant frequency bands,

further resolves

1 that any addition of a new footnote or modification of an existing footnote should be considered by a world radiocommunication conference only when:

a) the agenda of that conference explicitly includes the frequency band to which the proposed additional or modified footnote relates; or

b) the frequency bands to which the desired additions or modifications of the footnote belong are considered during the conference and the conference decides to make a change in those bands; or

c) the addition or modification of footnotes is specifically included in the agenda of the conference as a result of the consideration of proposals submitted by one or more interested administration(s);

2 that recommended agendas for future world radiocommunication conferences should include a standing agenda item which would allow for the consideration of proposals by administrations for deletion of country footnotes, or country names in footnotes, if no longer required;

3 that in cases not covered by *further resolves* 1 and 2, proposals for new footnotes or modification of existing footnotes could exceptionally be considered by a world radio-communication conference if they concern corrections of obvious omissions, inconsistencies, ambiguities or editorial errors and have been submitted to ITU as stipulated in No. 316 of the Convention (Geneva, 1992),

urges administrations

1 to review footnotes periodically and to propose the deletion of their country footnotes or of their country names from footnotes, as appropriate;

2 to take account of the *further resolves* above in making proposals to world radio-communication conferences.

Annex 10-3

RESOLUTION 27 (Rev.WRC-2000)

Use of incorporation by reference in the Radio Regulations

The World Radiocommunication Conference (Istanbul, 2000),

considering

a) that the principles of incorporation by reference were adopted by WRC-95, revised by WRC-97 and further refined by this Conference (see Annexes 1 and 2 to this Resolution);

b) that there are provisions in the Radio Regulations containing references which fail to distinguish adequately whether the status of the referenced text is mandatory or non-mandatory;

noting

that references to Resolutions or Recommendations of a world radiocommunication conference (WRC) require no special procedures, and are acceptable for consideration, since such texts will have been agreed by a WRC,

resolves

1 that for the purposes of the Radio Regulations, the term "incorporation by reference" shall only apply to those references intended to be mandatory;

2 that when introducing new instances of incorporation by reference:

– only texts which are relevant to a specific WRC agenda item may be considered;

– for the correct method of reference, the principles set out in Annex 1 to this Resolution and the guidance contained in Annex 2 to this Resolution shall be applied;

3 that the procedure described in Annex 3 to this Resolution shall be applied during WRCs for the adoption of texts for incorporation by reference;

4 that all texts incorporated by reference at the conclusion of each WRC shall be collated and published in a volume of the Radio Regulations (see Annex 3 to this Resolution),

instructs the Director of the Radiocommunication Bureau

to bring this Resolution to the attention of the Radiocommunication Assembly and the ITU-R Study Groups,

urges administrations

to prepare proposals to future conferences in order to clarify the status of references, where ambiguities remain regarding the mandatory or non-mandatory status of the references in question, and where they are relevant to specific agenda items.

This text is reproduced from Final Acts of the World Radiocommunication Conference (WRC-2000)

ANNEX 1 TO RESOLUTION 27 (Rev.WRC-2000)

Principles of incorporation by reference

1 For the purposes of the Radio Regulations, the term "incorporation by reference" shall apply only to those references intended to be mandatory.

2 Where the relevant texts are brief, the referenced material should be placed in the body of the Radio Regulations rather than using incorporation by reference.

3 Texts which are of a non-mandatory nature or which refer to other texts of a non-mandatory nature shall not be considered for incorporation by reference.

4 If, on a case-by-case basis, it is decided to incorporate material by reference on a mandatory basis, then the following provisions shall apply:

4.1 the text incorporated by reference shall have the same treaty status as the Radio Regulations themselves;

4.2 the reference must be explicit, specifying the specific part of the text (if appropriate) and the version or issue number;

4.3 the text incorporated by reference must be submitted for adoption by a competent WRC in accordance with *resolves* 3;

4.4 all texts incorporated by reference shall be published following a WRC, in accordance with *resolves* 4.

5 If, between WRCs, a text incorporated by reference (e.g. an ITU-R Recommendation) is updated, the reference in the Radio Regulations shall continue to apply to the earlier version incorporated by reference until such time as a competent WRC agrees to incorporate the new version. The mechanism for considering such a step is given in Resolution **28 (Rev.WRC-2000)**.

6 Where references are non-mandatory, it is not necessary to establish specific conditions in applying the texts quoted. In such cases, reference should be made using the terminology "the most recent version" of a Recommendation.

ANNEX 2 TO RESOLUTION 27 (Rev.WRC-2000)

Application of incorporation by reference

When introducing new instances of incorporation by reference in the provisions of the Radio Regulations or reviewing existing instances of incorporation by reference, administrations and ITU-R should address the following factors in order to ensure that the correct style of reference is employed for the intended purpose:

1 whether each reference is mandatory, i.e. incorporated by reference, or non-mandatory;

2 mandatory references shall use clear linking language, i.e. "shall";

3 non-mandatory references, or ambiguous references that are determined to be of a non-mandatory character, shall use appropriate linking language, e.g. "should" or "may";

4 mandatory references shall be explicitly and specifically identified, e.g. "Recommendation ITU-R M.541-8";

5 if the intended reference material is, as a whole, unsuitable as treaty-status text, the reference shall be limited to just those portions of the material in question which are of a suitable nature, e.g. "Annex A to Recommendation ITU-R Z.123-4".

SUP

ANNEX 3 TO RESOLUTION 27 (Rev.WRC-97)

Provisions of the Radio Regulations referring to ITU-R and ITU-T Recommendations

ADD

ANNEX 3 TO RESOLUTION 27 (Rev.WRC-2000)

Procedures applicable by WRC for the adoption of texts for incorporation by reference

The referenced texts shall be made available to delegations in sufficient time for all administrations to consult them in their final English, Spanish and French versions. A single copy of the texts shall be made available to each administration as a conference document.

During the course of each WRC, a list of the texts incorporated by reference shall be developed and maintained by the committees. This list shall be published as a conference document in line with developments during the conference.

Following the end of each WRC, the Radiocommunication Bureau and General Secretariat will update the volume of the Radio Regulations which serves as the repository of texts incorporated by reference in line with developments at the conference as recorded in the above-mentioned document.

SUP

ANNEX 4 TO RESOLUTION 27 (Rev.WRC-97)

List of ITU-R Recommendations referred to in the Radio Regulations

Annex 10-4

RESOLUTION 28 (Rev.WRC-2000)

Revision of references to the text of ITU-R Recommendations incorporated by reference in the Radio Regulations

The World Radiocommunication Conference (Istanbul, 2000),

considering

a) that the Voluntary Group of Experts on simplification of the Radio Regulations (VGE) proposed the transfer of certain texts of the Radio Regulations to other documents, especially to ITU-R Recommendations, using the incorporation by reference procedure;

b) that, in some cases, the provisions of the Radio Regulations imply an obligation on Member States to conform to the criteria or specifications incorporated by reference;

c) that references to incorporated texts shall be explicit and shall refer to a precisely identified provision (see Resolution **27 (Rev.WRC-2000)**);

d) that all texts of ITU-R Recommendations incorporated by reference are published in a volume of the Radio Regulations;

e) that, taking into account the rapid evolution of technology, ITU-R may revise the ITU-R Recommendations containing text incorporated by reference at short intervals;

f) that, following revision of an ITU-R Recommendation containing text incorporated by reference, the reference in the Radio Regulations shall continue to apply to the earlier version until such time as a competent WRC agrees to incorporate the new version;

g) that it would be desirable that texts incorporated by reference reflect the most recent technical developments,

noting

that administrations need sufficient time to examine the potential consequences of changes to ITU-R Recommendations containing text incorporated by reference and would therefore benefit greatly from being advised, as early as possible, of which ITU-R Recommendations have been revised and approved during the elapsed study period,

resolves

1 that each radiocommunication assembly shall communicate to the following WRC a list of the ITU-R Recommendations containing text incorporated by reference in the Radio Regulations which have been revised and approved during the elapsed study period;

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2 that, on this basis, WRC should examine those revised ITU-R Recommendations, and decide whether or not to update the corresponding references in the Radio Regulations;

3 that, if the WRC decides not to update the corresponding references, the currently referenced version shall be maintained in the Radio Regulations;

4 that WRCs shall place the examination of ITU-R Recommendations in conformity with *resolves* 1 and *resolves* 2 of this Resolution on the agenda of future WRCs,

instructs the Director of the Radiocommunication Bureau

to provide the CPM immediately preceding each WRC with a list, for inclusion in the CPM Report, of those ITU-R Recommendations containing texts incorporated by reference that have been revised or approved since the previous WRC, or that may be revised in time for the following WRC,

urges administrations

1 to participate actively in the work of the radiocommunication study groups and the radiocommunication assembly on revision of those Recommendations to which mandatory references are made in the Radio Regulations;

2 to examine any indicated revisions of ITU-R Recommendations containing text incorporated by reference and to prepare proposals on possible updating of relevant references in the Radio Regulations.

Annex 10-5

RESOLUTION 44 (Mob-87)

Compatibility of equipment used in the mobile-satellite service[1]

The World Administrative Radio Conference for the Mobile Services, Geneva, 1987,

considering

a) that only a limited number of frequency bands is allocated to the mobile-satellite service;

b) that the ITU-R is studying the preferred technical and operating characteristics for a mobile-satellite system which would have earth stations on ships, land and/or aircraft, all operating within the same system;

c) that there is a need to use efficiently the bands allocated to the mobile-satellite service;

d) that the maritime mobile-satellite service and the aeronautical mobile-satellite service have special requirements with regard to safety,

resolves

that the ITU-R should continue to study, as a matter of urgency, terminal characteristics which are common to the extent practicable, in order to ensure compatibility between the land, maritime, and aeronautical mobile-satellite services,

urges administrations

to encourage the development and manufacture of compatible mobile-satellite user equipment.

[1] WRC-97 made editorial amendments to this Resolution.

This text is reproduced from Final Acts of the World Administrative Radio Conference for the Mobile Services (MOB-87)

Annex 10-6

RESOLUTION 205 (Rev.Mob-87)

Protection of the band 406-406.1 MHz allocated to the mobile-satellite service[1]

The World Administrative Radio Conference for the Mobile Services, Geneva, 1987,

considering

a) that WARC-79 allocated the band 406-406.1 MHz to the mobile-satellite service in the Earth-to-space direction;

b) that Nos. **S5.266** and **S5.267** limit the use of the band 406-406.1 MHz to low-power satellite emergency position-indicating radiobeacons (EPIRBs);

c) that WARC Mob-83 made provision in the Radio Regulations for the introduction and development of a global distress and safety system;

d) that the use of satellite EPIRBs is an essential element of this system;

e) that, like any frequency band reserved for a distress and safety system, the band 406-406.1 MHz is entitled to full protection against all harmful interference;

f) that WARC Mob-83 adopted Recommendation **604 (Rev.Mob-83)** which recommends that the ITU-R continue its studies on the technical and operational questions for EPIRBs, including those using the frequencies in the band 406-406.1 MHz;

g) that the ITU-R has initiated a study of the compatibility between satellite EPIRBs in the band 406-406.1 MHz and services using adjacent bands,

considering further

h) that some administrations have developed and implemented an operational low-altitude, near-polar orbiting satellite system (COSPAS-SARSAT) operating in the band 406-406.1 MHz to provide alerting and to aid in the locating of distress incidents;

i) that the International Maritime Organization (IMO) has decided that EPIRBs operating in the COSPAS-SARSAT system will form part of the Global Maritime Distress and Safety System (GMDSS);

j) that observations of the use of frequencies in the band 406-406.1 MHz show that they are being used by stations other than those authorized by No. **S5.266**, and that these stations have

[1] WRC-97 made editorial amendments to this Resolution.

This text is reproduced from Final Acts of the World Administrative Radio Conference for the Mobile Services (MOB-87)

caused harmful interference to the mobile-satellite service, and particularly to the reception of satellite EPIRB signals by the COSPAS-SARSAT system;

k) that in the future, new satellite systems which may be either geostationary or non-geostationary may be introduced in this band,

recognizing

that it is essential for the protection of human life and property that bands allocated exclusively to a service for distress and safety purposes be kept free from harmful interference,

resolves

to instruct the Radiocommunication Bureau

to organize monitoring programmes in the band 406-406.1 MHz in order to identify the source of any unauthorized emission in that band,

to urge administrations

1 to take part in monitoring programmes requested by the Bureau in accordance with No. **S16.5**, in the band 406-406.1 MHz, with a view to identifying and locating stations of services other than those authorized in the band;

2 to ensure that stations other than those operated under No. **S5.266** abstain from using frequencies in the band 406-406.1 MHz;

3 to take the appropriate measures to eliminate harmful interference caused to the distress and safety system,

invites the ITU-R

to continue on an urgent basis its study of compatibility between satellite EPIRBs in the band 406-406.1 MHz and services using adjacent bands.

Annex 10-7

RESOLUTION 209 (Mob-87)

Study and implementation of a global land and maritime distress and safety system

The World Administrative Radio Conference for the Mobile Services, Geneva, 1987,

considering

a) that the basic characteristics of the Global Maritime Distress and Safety System (GMDSS) have been developed by the International Maritime Organization (IMO) to meet the specific needs of the maritime mobile and maritime mobile-satellite services;

b) that stations of the land mobile and land mobile-satellite services may use the frequencies and procedures of the GMDSS in sparsely populated, uninhabited or remote areas for distress and safety purposes;

c) that further development of the communication facilities in the GMDSS would enable the system also to meet the specific needs of the land mobile and land mobile-satellite services for distress and safety,

noting

that the ITU-R made a considerable contribution to the development of the GMDSS by carrying out appropriate technical and operational studies,

noting further

that WARC Mob-83 decided that the stations of the land mobile service in sparsely populated and remote areas may be authorized to use the frequencies of the then Future Global Maritime Distress and Safety System on condition that no harmful interference was caused to other distress and safety communications,

recognizing

a) that this Conference has adopted provisions to facilitate implementation of the GMDSS;

b) that administrative, technical and operational studies concerning the land mobile and land mobile-satellite services need to be conducted before detailed provisions relating to the distress and safety requirements of these services can be incorporated into the Radio Regulations

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resolves

that a future competent conference be invited to include, as necessary, provisions in Chapter **SVII** to ensure adequate distress and safety communications in sparsely populated, uninhabited or remote areas,

invites the ITU-R

to study the requirements for distress and safety communications in sparsely populated, uninhabited or remote areas by the land mobile and land mobile-satellite services, including the technical and operational characteristics of equipment which is simple to operate and inexpensive for use in the global land and maritime distress and safety system,

invites administrations

1 actively to contribute to and participate in the work of the ITU-R;

2 to take all legislative or other appropriate measures for the implementation of such a system;

3 to permit the appropriate equipment to be used within the areas under their national jurisdiction,

invites the Council

to take the necessary steps to place this matter on the agenda of the next competent conference,

instructs the Secretary-General

to communicate this Resolution to IMO and the International Civil Aviation Organization (ICAO).

Annex 10-8

RESOLUTION 217 (WRC-97)

Implementation of wind profiler radars

The World Radiocommunication Conference (Geneva, 1997),

having noted

a request to ITU from the Secretary-General of the World Meteorological Organization (WMO), in May 1989, for advice and assistance in the identification of appropriate frequencies near 50 MHz, 400 MHz and 1 000 MHz in order to accommodate allocations and assignments for wind profiler radars,

considering

a) that wind profiler radars are vertically-directed Doppler radars exhibiting characteristics similar to radiolocation systems;

b) that wind profiler radars are important meteorological systems used to measure wind direction and speed as a function of altitude;

c) that it is necessary to use frequencies in different ranges in order to have options for different performance and technical characteristics;

d) that, in order to conduct measurements up to a height of 30 km, it is necessary to allocate frequency bands for these radars in the general vicinity of 50 MHz (3 to 30 km), 400 MHz (500 m to about 10 km) and 1 000 MHz (100 m to 3 km);

e) that some administrations have either already deployed, or plan to expand their use of, wind profiler radars in operational networks for studies of the atmosphere and to support weather monitoring, forecasting and warning programmes;

f) that the Radiocommunication Study Groups have studied the technical and sharing considerations between wind profiler radars and other services allocated in bands near 50 MHz, 400 MHz and 1 000 MHz,

considering further

a) that some administrations have addressed this matter nationally by assigning frequencies for use by wind profiler radars in existing radiolocation bands or on a non-interference basis in other bands;

b) the work of the Voluntary Group of Experts on the Allocation and Improved Use of the Radio Frequency Spectrum and Simplification of the Radio Regulations supports increased flexibility in the allocation of frequency spectrum,

noting in particular

a) that wind profiler radars operating in the meteorological aids service in the band 400.15-2406 MHz interfere with satellite emergency position-indicating radio beacons operating in the mobile-satellite service in the band 406-406.1 MHz under No. **S5.266**;

b) that in accordance with No. **S5.267**, any emission capable of causing harmful interference to the authorized uses of the band 406-406.1 MHz is prohibited,

resolves

1 to urge administrations to implement wind profiler radars as radiolocation service systems in the following bands, having due regard to the potential for incompatibility with other services and assignments to stations in these services, thereby taking due account of the principle of geographical separation, in particular with regard to neighbouring countries, and keeping in mind the category of service of each of these services:

46-68 MHz in accordance with No. **S5.162A**

440-450 MHz

470-494 MHz in accordance with No. **S5.291A**

904-928 MHz in Region 2 only

1 270-1 295 MHz

1 300-1 375 MHz;

2 that, in case compatibility between wind profiler radars and other radio applications operating in the band 440-450 MHz or 470-494 MHz cannot be achieved, the bands 420-435 MHz or 438-440 MHz could be considered for use;

3 to urge administrations to implement wind profiler radars in accordance with Recommendations ITU-R M.1226, ITU-R M.1085-1 and ITU-R M.1227 for the frequency bands around 50 MHz, 400 MHz and 1 000 MHz, respectively;

4 to urge administrations not to implement wind profiler radars in the band 400.15-406 MHz;

5 to urge administrations currently operating wind profiler radars in the band 400.15-406 MHz to discontinue them as soon as possible,

instructs the Secretary-General

to bring this Resolution to the attention of the International Civil Aviation Organization (ICAO), International Maritime Organization (IMO) and WMO.

Annexes 10-9, 10-10 and 10-11

RESOLUTIONS 218, 219 and 220 (WRC-97)

SUP by WRC-2000

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Annex 10-12

RESOLUTION 331 (Rev.WRC-97)

Transition to the Global Maritime Distress and Safety System (GMDSS) and continuation of the distress and safety provisions in Appendix S13

The World Radiocommunication Conference (Geneva, 1997),

noting

that the International Convention for the Safety of Life at Sea (SOLAS), 1974, as amended, prescribes that all ships subject to this Convention shall be fitted for the Global Maritime Distress and Safety System (GMDSS) by 1 February 1999,

noting further

a) that a number of administrations have taken steps to implement the GMDSS also for classes of vessels not subject to SOLAS, 1974, as amended;

b) that an increasing number of vessels not subject to SOLAS, 1974, as amended, are making use of the techniques and frequencies of the GMDSS prescribed in Chapter **SVII**;

c) that some administrations and vessels, not subject to SOLAS, 1974, as amended, may wish to continue to use provisions of Appendix **S13** for distress and safety communications for some time after 1 February 1999;

d) that it would be costly for administrations to maintain in parallel for an excessive period of time shore-based facilities necessary to support both the old and new distress and safety systems;

e) that there may be a need to continue existing shore-based distress and safety services for a certain period after 1 February 1999 so that vessels not subject to SOLAS, 1974, as amended and not yet using the techniques and frequencies of the GMDSS will be able to obtain assistance from these services until such time as they are able to participate in the GMDSS;

f) that separate provisions of the existing Radio Regulations designate VHF channel 16 and the frequency 2 182 kHz as the international channels for general calling by radiotelephony;

g) that the International Maritime Organization (IMO) has already decided for GMDSS vessels that:

– listening watches on 2 182 kHz will no longer be mandatory after 1 February 1999;

– listening watches on VHF channel 16 will be continued and that a final date for the cessation of mandatory watchkeeping on channel 16 is yet to be determined;

h) that the Radio Regulations require GMDSS ships to keep watch on the appropriate digital selective calling (DSC) distress frequencies;

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i) that the Radio Regulations establish that ship stations should, when practicable, keep watch on VHF channel 13;

j) that several administrations have established Vessel Traffic Service (VTS) systems and require their ships to keep watch on local VTS channels;

k) that ships that are required by SOLAS to carry a radio station are being equipped with DSC, but the majority of vessels that carry a radio station on a voluntary basis might not have DSC equipment;

l) that similarly, many administrations have established distress and safety service based on DSC watchkeeping, but the majority of port stations, pilot stations and other operational coast stations have not been equipped with DSC facilities;

m) that for the reasons listed above, it will remain necessary for some stations in the maritime mobile service to call each other by radiotelephony in certain situations,

considering

a) that the operation of the GMDSS described in Chapter **SVII** and the present distress and safety system described in Appendix **S13** differ in many crucial aspects, such as means and methods of alerting, communication facilities available, announcement and transmission of maritime safety information, etc.;

b) that operation of the two systems in parallel for a long period would cause ever-increasing difficulties and incompatibilities between ships operating in the two different systems and may thus seriously degrade safety at sea in general;

c) that the GMDSS overcomes the deficiencies of the aural watch-keeping on maritime distress and calling frequencies on which the distress and safety system described in Appendix **S13** relies, by replacing these watches by automatic watch, i.e. digital selective calling and satellite communication systems,

resolves

1 that, until such time as voice calling has become obsolete, VHF channel 16 and the frequency 2 182 kHz may be used as voice-calling channels;

2 to urge all administrations to assist in enhancing safety at sea by:

– encouraging all ships to make use of the GMDSS as soon as possible;

– encouraging, where appropriate, establishment of suitable shore-based facilities for GMDSS, either on an individual basis or in cooperation with other relevant parties in the area;

3 that administrations may, taking account of all aspects involved, such as:

– decisions by IMO on aural watch on 2 182 kHz and VHF channel 16;

– the GMDSS radio systems available in the area concerned;

– the compatibility problems mentioned in *considering a)* and *b)* above;

– the density and classes of ships normally in the area;

– the geographical nature of the area and general navigational conditions within the area;

– other adequate measures taken to ensure safety communications for ships sailing in the area,

at a time after 1 February 1999, when the development on transition to the GMDSS and the prevailing conditions in the area makes it reasonable to do so, release their ship stations and coast stations within the area concerned from the obligations described in Appendix **S13** on listening watch on 2 182 kHz or VHF channel 16 or both;

when doing so, administrations should:

– inform IMO of their decisions and submit to IMO details on the area concerned;

– inform the Secretary-General on the necessary details for inclusion in the List of Coast Stations,

resolves further

that the Secretary-General should ensure that such arrangements and details regarding the area concerned be indicated in relevant maritime publications,

invites the next world radiocommunication conference

to include the review of this Resolution, Appendix **S13** and Chapter **SVII** on the agenda of WRC-01,

instructs the Secretary-General

to communicate this Resolution to IMO and the International Civil Aviation Organization (ICAO),

invites the Radiocommunication Study Group 8

to review the operational and procedural incompatibilities between the old and new systems with a view to presenting the information to WRC-01.

Annex 10-13

RESOLUTION 339 (Rev.WRC-97)

Coordination of NAVTEX services

The World Radiocommunication Conference (Geneva, 1997),

considering

a) that the International Maritime Organization (IMO) has established a Coordinating Panel on NAVTEX to, *inter alia*, coordinate the operational aspects of NAVTEX services, such as allocation of transmitter identification character (B1) and time schedules, in the planning stages for transmissions on the frequencies 490 kHz, 518 kHz or 4 209.5 kHz;

b) that coordination in the frequencies 490 kHz, 518 kHz and 4 209.5 kHz is essentially operational;

c) that Article **14A** was deleted by WRC-95 with effect from 18 November 1995;

d) that the frequency band around 518 kHz is also allocated to the aeronautical radio-navigation service on a primary basis;

e) that WRC-95 resolved in its Resolution **23 (WRC-95)** that, with effect from 18 November 1995, the Radiocommunication Bureau shall not examine with respect to Nos. **1241** to **1245**, and shall not apply the related provisions to, frequency assignment notices in the non-planned bands below 28 000 kHz,

resolves

to invite administrations to apply the procedures established by IMO, taking into account the IMO NAVTEX Manual, for coordinating the use of the frequencies 490 kHz, 518 kHz and 4 209.5 kHz,

instructs the Secretary-General

1 to invite IMO to provide ITU with information on a regular basis on operational coordination for NAVTEX services on the frequencies 490 kHz, 518 kHz and 4 209.5 kHz;

2 to publish this information in the List of Coast Stations (see No. **S20.7**).

This text is reproduced from Final Acts of the World Radicommunication Conference (WRC-97)

Annex 10-14

RESOLUTION 340 (WRC-97)

Need for additional search and rescue information in databases

The World Radiocommunication Conference (Geneva, 1997),

noting

a) that the provisions of No. **S20.16** of Article **S20** require administrations to notify the Radiocommunication Bureau of ship station characteristics contained in the List of Ship Stations (List V), which currently includes: name of ship, call sign, selective call number, country, auxiliary installations, class of ship, nature of service, hours of service, telegraph transmission frequency bands, telephone transmission frequency bands, accounting authority, and remarks (e.g. Inmarsat terminal number, MMSI);

b) that the provisions of No. **S20.15**, however, give the Bureau authority to change the content and form of this information in consultation with administrations; and

c) that administrations and the International Maritime Organization (IMO) have expressed a need for additional information to be included in search and rescue databases, including:

- vessel identification number (IMO number or national registration number);
- name, address and telephone number and, if applicable, telefax number of emergency contact person ashore;
- alternative 24-hour emergency telephone number;
- capacity for persons on board (passengers and crew),

resolves

to instruct the Director of the Radiocommunication Bureau to begin consultations with administrations with a view to incorporating the information contained in the Annex to this Resolution in the ITU maritime services data-base,

invites

administrations to consider also the incorporation of that information in their national databases,

instructs the Secretary-General

to communicate this Resolution to the IMO.

This text is reproduced from Final Acts of the World Radiocommunication Conference (WRC-97)

ANNEX TO RESOLUTION 340 (WRC-97)

Registration database for the Global Maritime Distress and Safety System

(See Article **S32** of the Radio Regulations)

1 All identities used by the Global Maritime Distress and Safety System (GMDSS) for identifying vessels in distress shall be registered in accordance with this Annex. Administrations or organizations responsible for assigning these identities shall make suitable arrangements for ensuring that registrations of these identities are made and maintained. Administrations shall notify this information to the Bureau in accordance with No. **S20.16**.

2 Means shall be provided by the Bureau and administrations maintaining national databases to allow rescue coordination centres immediate access to this database on a 24-hour per day, 7-day per week basis.

3 Each registration database should include the following information:

3.1 vessel name;

3.2 maritime mobile service identity (MMSI);

3.3 call sign;

3.4 emergency position indicating radiobeacons (EPIRB) identification code (if applicable);

3.5 country (vessel flag State; may be derived from MMSI and call sign);

3.6 vessel identification number (IMO number or national registration number);

3.7 brief ship description (type);

3.8 name, address, telephone and (if applicable) telefax number of emergency contact person ashore;

3.9 alternative 24-hour emergency telephone number;

3.10 capacity for persons on board (passengers and crew);

3.11 ship's radio installation (Inmarsat A, B, C, M, VHF digital selective calling (DSC), etc.); and

3.12 Inmarsat ship earth station identities (if applicable).

Annex 10-15

RESOLUTION 343 (WRC-97)

Maritime certification for personnel of ship stations and ship earth stations for which a radio installation is not compulsory

The World Radiocommunication Conference (Geneva, 1997),

considering

a) that WRC-97 has considered the question of certification for personnel of ship stations and ship earth stations within the Global Maritime Distress and Safety System (GMDSS);

b) that GMDSS will be fully implemented on 1 February 1999 by ships subject to an international agreement;

c) that ships not subject to an international agreement have begun to adopt GMDSS systems and techniques;

d) that use of GMDSS equipment should be accompanied by appropriate training and certification;

e) that the Radio Regulations stipulate that the service of every ship radio station working on frequencies assigned for international use shall be performed by operators holding a certificate;

f) that the present certificates described in Article **S47** may be too demanding for radio operators of ship stations and ship earth stations on board ships for which a radio installation is not compulsory,

noting

that a number of administrations currently issue radio operator certificates specially designed for the non-compulsory sector,

resolves

that administrations wishing to implement special certification for the non-compulsory sector should implement the certificates contained in the Annex to this Resolution,

invites ITU-R

to develop a Recommendation describing these certificates,

instructs the Secretary-General

to bring this Resolution to the attention of the International Maritime Organization (IMO).

This text is reproduced from Final Acts of the World Radiocommunication Conference (WRC-97)

ANNEX TO RESOLUTION 343 (WRC-97)

Examination syllabus for radio operator's certificates appropriate to vessels using the frequencies and techniques of the Global Maritime Distress and Safety System on a non-compulsory basis

Introduction

The introduction of the Global Maritime Distress and Safety System (GMDSS) in February 1992 made it necessary to harmonize the examination requirements for certificates for professional radio operators. Harmonized examination procedures for the general operator's Certificate and restricted operator's Certificate, based on the syllabuses described in Article **S47**, have already been introduced for maritime radio operators performing radiocommunication duties on board vessels subject to the International Convention for the Safety of Life at Sea (SOLAS), 1974, as amended. The GMDSS will be fully implemented on 1 February 1999 for vessels subject to SOLAS, 1974, as amended.

For vessels not subject to SOLAS, 1974, as amended, and which install radiocommunication equipment on a voluntary basis, there are significant advantages to also using the GMDSS. However, it was foreseen by some administrations that such vessels would use some, but not all, of the frequencies and techniques of the GMDSS and that radio personnel on board such vessels would not need the same level of certification as radio personnel on board vessels which use all of the frequencies and techniques of the GMDSS on a compulsory basis. A syllabus has been developed which provides the flexibility for a depth of study, level of knowledge, and length of course appropriate to meet the certification requirements of radio personnel on board vessels which use some of the frequencies and techniques of the GMDSS on a non-compulsory basis. The syllabus also provides for certification in the use of satellite equipment where appropriate.

This Annex describes the syllabus developed to meet the certification requirements referred to above, and which are implemented in a number of countries under the title "Long Range Certificate" and "Short Range Certificate". The Short Range Certificate should at least contain those elements of the syllabus which are relevant to sea area A1.

Examination syllabus

the examination should consist of theoretical and practical tests and should include at least:

A General knowledge of radiocommunications in the maritime mobile service

A.1 The general principles and basic features of the maritime mobile service.

B Detailed practical knowledge and ability to use radio equipment

B.1 The VHF radio installation. Use of VHF equipment in practice.

B.2 The MF/HF radio installation. Use of MF/HF equipment in practice.

B.3 Purpose and use of digital selective calling (DSC) facilities and techniques.

C Operational procedures of the GMDSS and detailed practical operation of GMDSS subsystems and equipment

C.1 Basic introduction to GMDSS procedures.

C.2 Distress, urgency and safety communication procedures in the GMDSS.

C.3 Distress, urgency and safety communication procedures by radiotelephony in the old distress and safety system.

C.4 Protection of distress frequencies.

C.5 Maritime safety information (MSI) systems in the GMDSS.

C.6 Alerting and locating signals in the GMDSS.

D Operational procedures and regulations for radiotelephone communications

D.1 Ability to exchange communications relevant to the safety of life at sea.

D.2 Regulations, obligatory procedures and practices.

D.3 Practical and theoretical knowledge of radiotelephone procedures.

D.4 Use of the international phonetic alphabet and, where appropriate, parts of the IMO Standard Marine Communication Phrases.

E Optional examination module for the maritime mobile-satellite service for vessels not subject to a compulsory fit

E.1 The general principles and basic features of the maritime mobile-satellite service.

E.2 Operational procedures and detailed practical operation of ship earth stations in the GMDSS.

Annex 10-16

RESOLUTION 344 (WRC-97)

Exhaustion of the maritime mobile service identity numbering resource

The World Radiocommunication Conference (Geneva, 1997),

noting

a) that ships not required to carry Global Maritime Distress and Safety System (GMDSS) equipment may do so, for safety purposes;

b) that digital selective calling equipment on such ships for VHF radio, and/or Inmarsat ship earth station equipment requires the assignment of a unique maritime mobile service identity (MMSI);

c) that not all administrations assign these identities to users of digital selective calling-equipped VHF radios on such ships, from the numbers intended for use by vessels sailing and communicating only with domestic coast stations,

considering

a) that VHF digital selective calling distress alerts require valid identities for use by search and rescue authorities;

b) that Recommendation ITU-R M.585 contains guidance for the assignment of MMSIs, including to non-compulsory ships which communicate only with domestic radio stations; and

c) that Recommendation ITU-R M.585 was derived from ITU-T Recommendation E.210,

recognizing

a) that even domestic ships which install Inmarsat will require the assignment of MMSI numbers from those numbers reserved for ships communicating worldwide, further depleting the resource;

b) that future growth of Inmarsat B, C and M mobile earth station use by non-compulsory ships is not, however, expected to deplete the resource;

c) that growth projections of Inmarsat systems by non-compulsory ships could nevertheless change,

noting further

that ITU-R can monitor the status of the MMSI resource by monitoring the available spare maritime identification digits (first three digits of the MMSI),

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instructs the Director of the Radiocommunication Bureau

to monitor the status of the MMSI resource, and to report to each world radiocommunication conference on the anticipated reserve capacity and expected exhaustion of the resource,

resolves to invite ITU-T and ITU-R

1 to keep under review the Recommendations for assigning MMSIs, with a view to identifying alternative resources before the resources are exhausted;

2 to consult each other when addressing changes to any of the Recommendations affecting the MMSI numbering resources;

3 to complete studies on an urgent basis when a future world radiocommunication conference identifies the impending exhaustion of the MMSI resource,

instructs the Secretary-General

to communicate this Resolution to the International Maritime Organization.

Annex 10-17

RESOLUTION 345 (WRC-97)

Operation of Global Maritime Distress and Safety System equipment on and assignment of maritime mobile service identities to non-compulsory fitted vessels

The World Radiocommunication Conference (Geneva, 1997),

noting

a) that ships not required by international agreement to carry Global Maritime Distress and Safety System (GMDSS) equipment could elect to do so for safety purposes;

b) that such vessels may only carry VHF digital selective calling (DSC) equipment;

c) that some administrations may not require operators on such vessels to have appropriate training, certification or licence;

d) that not all administrations assign and register identities to users of VHF DSC equipment on such ships,

considering

that VHF DSC false distress alerts are a problem for rescue coordination centres, particularly when incorrect identities are used, or when the radio is operated by persons untrained in its use,

recognizing

that administrations have different training requirements for users of VHF DSC equipment,

resolves

1 to invite ITU-R to consider DSC standards and operating procedures in order to simplify operation of this equipment;

2 to invite ITU-T and ITU-R to review the process for assigning maritime mobile service identities for simplifying the process, taking into account cases of new installation, sale of the vessel or transfer of the equipment to a new ship;

3 to invite ITU-T and ITU-R to undertake studies to ensure the registration and continuous accessibility and availability of identities to rescue authorities,

instructs the Secretary-General

to communicate this Resolution to the International Maritime Organization for consideration and comments.

This text is reproduced from Final Acts of the World Radiocommunication Conference (WRC-97)

Annex 10-18

RESOLUTION 346 (WRC-97)

Protection of distress and safety communications on the frequencies 12 290 kHz and 16 420 kHz from harmful interference caused by these frequencies if also used for non-safety calling

The World Radiocommunication Conference (Geneva, 1997),

noting

a) that the frequencies 4 125 kHz, 6 215 kHz, 12 290 kHz and 16 420 kHz are used for distress and safety communications as well as for non-safety calling by ships in radiotelephony in accordance with the provisions of Article **S31** and No. **S52.221** respectively;

b) that considerable worldwide interference to distress and safety communications is experienced, especially on the frequencies 12 290 kHz and 16 420 kHz, due to ships being unable to monitor these frequencies before calling,

noting further

a) that the recommended agenda for WRC-01 includes an agenda item 2.4 for review of the channel arrangements in the HF bands for the maritime mobile service, taking into account the use of new digital technology;

b) that consideration of this item by WRC-01 may result in assigning the frequencies 12 290 kHz and 16 420 kHz exclusively for distress and safety communications,

recognizing

that it is of vital importance for the safety of life at sea that distress and safety communications can be carried out without being hampered by harmful interference,

resolves

1 to urge administrations:

1.1 to move, where appropriate, their coast station calling frequencies from the channels 1221 and 1621 to any other suitable HF channel;

1.2 to request ships under their jurisdiction to refrain from using the frequencies 12 290 kHz and 16 420 kHz for non-safety calling;

2 to recommend that WRC-01 consider this subject,

instructs the Secretary-General

to bring this Resolution to the attention of the International Maritime Organization.

This text is reproduced from Final Acts of the World Radiocommunication Conference (WRC-97)

Annex 10-19

RESOLUTION 348 (WRC-97)

Studies required to provide priority to distress communications originated by shore-based search and rescue authorities

The World Radiocommunication Conference (Geneva, 1997),

noting

a) that Article **S53** provides priority for distress and safety communications which involves immediate access to the space segment;

b) that distress and safety communications from shore-based search and rescue authorities will also be given priority access to the space segment;

c) that when ships are communicating using their ship earth stations, these priority requests are not able to be completed without manual intervention using a manual procedure to clear all traffic to and from the ship,

considering

a) that persons on board ships in distress or involved with a distress case may wish to use the ship earth station to notify friends, family and business associates on shore;

b) that this could cause priority requests from rescue authorities to receive a busy signal;

c) that unacceptable delays may be encountered in clearing all traffic to and from the ships manually,

recognizing

a) that life and property may be lost if rapid access is not provided for distress related communications originated by the rescue authority;

b) that the International Maritime Organization (IMO) has considered this problem and decided that provisions are necessary for giving priority to shore-originated distress communications;

c) that Inmarsat is currently studying how to provide such priority communications,

resolves to invite

1 ITU-R to monitor the status of these studies and to develop suitable Recommendations;

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2 IMO to develop requirements for priority communications for distress-related communications originated by shore-based search and rescue authorities and to submit these requirements to the next competent world radiocommunication conference,

further invites the Council

to place this Resolution on the agenda of a future competent world radiocommunication conference,

instructs the Secretary-General

to communicate this Resolution to IMO and the International Civil Aviation Organization for appropriate action and comment.

Annex 10-20

RESOLUTION 349 (WRC-97)

Operational procedures for cancelling false distress alerts in the Global Maritime Distress and Safety System

The World Radiocommunication Conference (Geneva, 1997),

considering

a) that the 1974 International Convention for the Safety of Life at Sea (SOLAS), as amended, prescribes that ships subject to that Convention shall be fitted with Global Maritime Distress and Safety System (GMDSS) equipment as appropriate;

b) that non-SOLAS vessels are also being equipped with GMDSS equipment;

c) that the transmission and relay of false distress alerts is a significant problem within the GMDSS,

noting

that the International Maritime Organization (IMO) has developed similar operational procedures to cancel false distress alerts,

resolves

1 to urge administrations to take all necessary measures to avoid false distress alerts and to minimize the unnecessary burden on rescue organizations which occurs;

2 to urge administrations to encourage the correct use of GMDSS equipment, with particular attention to appropriate training;

3 to urge administrations to implement the operational procedures contained in the Annex to this Resolution;

4 that administrations should take any consequential appropriate action in this respect,

instructs the Secretary-General

to bring this Resolution to the attention of IMO.

This text is reproduced from Final Acts of the World Radiocommunication Conference (WRC-97)

ANNEX TO RESOLUTION 349 (WRC-97)

Cancelling of false distress alerts

If a distress alert is inadvertently transmitted, the following steps shall be taken to cancel the distress alert.

1 VHF digital selective calling

1) Reset the equipment immediately;
2) Set to channel 16; and
3) Transmit a broadcast message to "All Stations" giving the ship's name, call sign and maritime mobile service identity (MMSI), and cancel the false distress alert.

2 MF digital selective calling

1) Reset the equipment immediately;
2) Tune for radiotelephony transmission on 2 182 kHz; and
3) Transmit a broadcast message to "All Stations" giving the ship's name, call sign and MMSI, and cancel the false alert.

3 HF digital selective calling

1) Reset the equipment immediately;
2) Tune for radiotelephony on the distress and safety frequency in each band in which a false distress alert was transmitted (see Appendix **S15**); and
3) Transmit a broadcast message to "All Stations" giving the ship's name, call sign and MMSI, and cancel the false alert on the distress and safety frequency in each band in which the false distress alert was transmitted.

4 Inmarsat ship earth station

Notify the appropriate rescue coordination centre that the alert is cancelled by sending a distress priority message by way of the same coast earth station through which the false distress alert was sent. Provide ship name, call sign and Inmarsat identity with the cancelled alert message.

5 Emergency position indicating radiobeacon (EPIRB)

If for any reason an EPIRB is activated inadvertently, contact the appropriate rescue coordination centre through a coast station or land earth station and cancel the distress alert.

6 General

Notwithstanding the above, ships may use additional appropriate means available to them to inform the appropriate authorities that a false distress alert has been transmitted and should be cancelled.

Annex 10-21

RECOMMENDATION 7 (Rev.WRC-97)

Adoption of standard forms for ship station and ship earth station licences and aircraft station and aircraft earth station licences[1]

The World Radiocommunication Conference (Geneva, 1997),

considering

a) that the standardization of the licence forms issued to stations installed on board ships and aircraft making international voyages and flights would greatly facilitate the task of inspection of such stations;

b) that standard licence forms for ship stations and for aircraft stations would serve as a useful guide to those administrations desiring to improve their existing national licences;

c) that standard licence forms could be advantageously used by these administrations as the form of certification specified in No. **S18.8**,

considering further

that the Administrative Radio Conference (Geneva, 1959), formulated:

a) a set of principles for the draft of a standard licence form (see Annex 1);

b) specimens of a ship station licence and of an aircraft station licence (see Annexes 2 and 3),

considering also

changes in radio systems and shipborne radiocommunication equipment introduced in connection with the implementation of the Global Maritime Distress and Safety System (GMDSS),

recommends

1 that administrations which find these forms practicable and acceptable should adopt them for international use;

2 that administrations should, as far as possible, endeavour to bring their national licence forms into line with these standard forms.

[1] Throughout this Recommendation, references to ship stations may include references to ship earth stations and references to aircraft stations may include references to aircraft earth stations.

This text is reproduced from Final Acts of the World Radiocommunication Conference (WRC-97)

ANNEX 1 TO RECOMMENDATION 7 (Rev.WRC-97)

Principles for the formulation of standard ship and aircraft station licences

The Administrative Radio Conference (Geneva, 1959), considered that, in formulating standard ship and aircraft station licences, the following set of principles should be applied:

1 The licence should, as far as possible, be prepared in tabular form, and each line and column of the table clearly numbered or lettered.

2 The licence for ship stations and the licences for aircraft stations should be as similar as possible.

3 The size of the licence should be international standard A4.

4 The licence should be designed in a form which facilitates its display on board a ship or an aircraft.

5 The licence should be printed in Latin characters in the national language of the country which issues it. Those countries whose national language cannot be written in Latin characters should use their national language and, in addition, English, Spanish or French.

6 The title “Ship Station Licence” or “Aircraft Station Licence” should appear at the top of the licence in the national language as well as in English, Spanish and French.

These principles were used in formulating the two standard forms which are given in Annexes 2 and 3.

ANNEX 2 TO RECOMMENDATION 7 (Rev.WRC-97)

(Full name of the authority issuing the licence, in the national language)

.....*

SHIP STATION LICENCE
LICENCE DE STATION DE NAVIRE
LICENCIA DE ESTACIÓN DE BARCO

No. .....
Period of validity .....

In accordance with *(Title of the National Regulation)* and with the Radio Regulations which complement the Constitution and the Convention of the International Telecommunication Union now in force, this authorization is herewith issued for the installation and for the use of the radio equipment described below:

1	2			3	4
Name of ship	Identification of the ship station			Holder of licence	Accounting authority identification code, or additional information including accounting information if required
	Call sign	MMSI	Other identification *(optional)*		

	Equipment	Type or description of equipment	Frequencies
5	Transmitters		**
6	Other equipment *(optional)*		

For the Issuing Authority:

.....
Place Date Authentication

* The words "Ship Station Licence" written in the national language, if this is not English, Spanish or French.

** Specifically or by reference to List V, columns 8 and 9.

ANNEX 3 TO RECOMMENDATION 7 (Rev.WRC-97)

(Full name of the authority issuing the licence, in the national language)

.....*

AIRCRAFT STATION LICENCE
LICENCE DE STATION D'AÉRONEF
LICENCIA DE ESTACIÓN DE AERONAVE

No. .....
Period of validity .....

In accordance with *(Title of the National Regulation)* and with the Radio Regulations which complement the Constitution and the Convention of the International Telecommunication Union now in force, this authorization is herewith issued for the installation and for the use of the radio equipment described below:

1	2	3	4
Nationality and registration mark of the aircraft	Call sign or other identification	Type of aircraft	Owner of aircraft

		a	b	c	d
	Equipment	Type	Power (W)	Class of emission	Frequency bands or assigned frequencies
5	Transmitters				**
6	Survival craft transmitters *(when applicable)*				**
7	Other equipment	*(Optional)*			

For the Issuing Authority:

.....
Place Date Authentication

* The words "Aircraft Station Licence" written in the national language, if this is not English, Spanish or French.

** Specifically or by reference.

Annex 10-22

RECOMMENDATION 34 (WRC-95)

Principles for the allocation of frequency bands

The World Radiocommunication Conference (Geneva, 1995),

considering

a) that ITU should maintain an international Table of Frequency Allocations covering the usable radio-frequency spectrum;

b) that it may be desirable, in certain cases, to allocate frequency bands to the most broadly defined services in order to improve flexibility of use but without detriment to other services;

c) that the development of common worldwide allocations is desirable in order to improve and harmonize utilization of the radio-frequency spectrum;

d) that adherence to these principles for the allocation of spectrum will allow the Table of Frequency Allocations to focus on matters of regulatory significance while enabling greater flexibility in national spectrum use,

recommends that future world radiocommunication conferences

1 should, wherever possible, allocate frequency bands to the most broadly defined services with a view to providing the maximum flexibility to administrations in spectrum use, taking into account safety, technical, operational, economic and other relevant factors;

2 should, wherever possible, allocate frequency bands on a worldwide basis (aligned services, categories of service and frequency band limits) taking into account safety, technical, operational, economic and other relevant factors;

3 should take into account relevant studies by the Radiocommunication Sector and the reports of the relevant Conference Preparatory Meetings (CPM),

recommends administrations

in making proposals to world radiocommunication conferences, to take account of *recommends* 1 to 3,

instructs the Director of the Radiocommunication Bureau and requests the ITU-R study groups

1 when carrying out technical studies relating to a frequency band, to examine the compatibility of a broad definition of services with the existing utilizations and the possibility of aligning allocations on a worldwide basis, having regard to *considerings a)*, *b)*, *c)* and *d)* and *recommends* 1, 2 and 3 above;

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2 to conduct these studies, where appropriate in cooperation with the International Civil Aviation Organization (ICAO) and the International Maritime Organization (IMO);

3 to submit a report to future world radiocommunication conferences containing the results of these studies,

invites

the relevant CPM and Radiocommunication Study Groups to identify areas for study and to undertake the studies necessary to determine the impact on existing services of those agenda items of future world radiocommunication conferences which involve broadening the scope of existing service allocations,

instructs the Secretary-General

to communicate this Recommendation to ICAO and IMO.

Annex 10-23

RECOMMENDATION 316 (Rev.Mob-87)

Use of ship earth stations within harbours and other waters under national jurisdiction[1]

The World Administrative Radio Conference for the Mobile Services, Geneva, 1987,

recognizing

that permitting the use of ship earth stations within harbours and other waters under national jurisdiction belongs to the sovereign right of countries concerned,

recalling

that WARC-79, allocated the bands 1 530-1 535 MHz (with effect from 1 January 1990), 1 535-1 544 MHz and 1 626.5-1 645.5 MHz to the maritime mobile-satellite service and the bands 1 544-1 545 MHz and 1 645.5-1 646.5 MHz to the mobile-satellite service,

noting

that the international agreement on the use of INMARSAT ship earth stations within the territorial sea and ports has been adopted and this Agreement is open to accession, ratification, approval or acceptance, as appropriate,

considering

a) that the maritime mobile-satellite service, which is at present in operation worldwide, has improved maritime communications greatly and has contributed much to the safety and efficiency of ship navigation, and that fostering and developing the use of that service in future will contribute further to their improvement;

b) that the maritime mobile-satellite service will play an important role in the Global Maritime Distress and Safety System (GMDSS);

c) that the use of the maritime mobile-satellite service will be beneficial not only to the countries having ship earth stations at present but also to those considering the introduction of that service,

is of the opinion

that all administrations should be invited to consider permitting, to the extent possible, ship earth stations to operate within harbours and other waters under national jurisdiction in the bands 1 530-1 535 MHz (with effect from 1 January 1990), 1 535-1 545 MHz and 1 626.5-1 646.5 MHz

[1] WRC-97 made editorial amendments to this Recommendation.

This text is reproduced from Final Acts of the World Administrative Radio Conference for the Mobile Services (MOB-87)

recommends

1 that all administrations should consider permitting, to the extent possible, ship earth stations to operate within harbours and other waters under national jurisdiction, in the above-mentioned frequency bands;

2 that administrations should consider the adoption, where required, of international agreements on this matter.

Annex 11

Resolutions of the 1979 SAR Conference relevant to the GMDSS

Annex 11-1 – Resolution 5 – Frequencies for maritime search and rescue

Annex 11-2 – Resolution 6 – Development of a global maritime distress and safety system

Annex 11-1
RESOLUTION 5

Frequencies for Maritime Search and Rescue

THE CONFERENCE,

NOTING that the World Administrative Radio Conference, 1979, will decide on measures which could have a far-reaching effect on the frequency spectrum,

BEARING IN MIND that the frequencies used in the present maritime distress system do not make adequate provision for ships in distress at a distance of more than approximately 150 miles from the coast,

RECOGNIZING that all maritime radiocommunications, whether making use of distress or public correspondence frequencies, can have distress and safety implications,

URGES the World Administrative Radio Conference, 1979:

(a) to allocate one frequency, to be reserved exclusively for distress and safety purposes, in each of the 4, 6, 8, 12 and 16 MHz maritime mobile bands using A3J class of emission for use in all ITU Regions and to include guard bands on each side of these frequencies; the use of digital selective calling should be permitted on these frequencies; and

(b) to recognize that all telecommunications to and from ships at sea may comprise elements of importance to search and rescue, and to support proposals for adequate frequency allocations to the maritime mobile service.

Annex 11-2
RESOLUTION 6

Development of a Global Maritime Distress and Safety System

THE CONFERENCE,

HAVING concluded the International Convention on Maritime Search and Rescue, 1979, which establishes an international plan for the co-ordination of search and rescue operations,

RECOGNIZING that the existence of an effective distress and safety communications network is important for the efficient operation of the search and rescue plan,

BEING AWARE that the Inter-Governmental Maritime Consultative Organization has under continuous review the maritime distress and safety system and has adopted Resolutions dealing with the communications aspects of the system,

CONSIDERING that a global maritime distress and safety system should provide, among other things, the essential radio elements of the international search and rescue plan,

INVITES the Inter-Governmental Maritime Consultative Organization to develop a global maritime distress and safety system that includes telecommunications provisions for the effective operation of the search and rescue plan prescribed by the Annex to the International Convention on Maritime Search and Rescue, 1979.

How to Search the GMDSS Handbook on CD-ROM (page 1 of 3)

Brief explanation of the program for searching and displaying the GMDSS information

Below are set out some of the features for finding information using Acrobat Reader with Search 4.0 or higher.

The program used to store the GMDSS texts is Adobe Acrobat 5.0. You will find comprehensive information about Acrobat Reader by clicking on Help at the top right of your screen. All the pages of the GMDSS Handbook plus the menus for finding these are stored in one PDF file (Acrobat portable document file) on this CDROM,

The GMDSS Handbook on CD-ROM is best used with Acrobat Reader with Search 5.0. If you do not have this program on your computer you can install it by going to Start, Run and <CD drive letter>:\ACROBAT\RP500ENU.EXE

This online manual consists of the following items:

1. **Contents "How to Search the GMDSS Handbook"**
2. **Buttons in Acrobat Reader 5.0**
3. **Links**
4. **Example of Split Screen with Thumbnails**
5. **Example of Split Screen with Bookmarks**

How to Search the GMDSS Handbook (page 2 of 3)

The buttons on the third and fourth row at the top of the screen (in Acrobat Reader 5.0) have the following functions

 Open a PDF file

 Save a Copy (of this PDF file)

 Print

 Find (Not Recommended) - does a linear search

 Search - uses the available index to search

 Show/Hide Navigation Pane - toggle between Full Screen Page and Split Screen - Bookmarks/Thumbnails

 First Page - takes you to the first page of the file you are viewing

 Previous Page

 Next Page

 Last Page

 Go to Previous View - if you have used a link you can go back to where you came from

 Go to Next View - after moving back you can use this to move forward again

 Hand Tool - turns your pointer into a hand to move the page on your screen (default)

 Zoom in Tool - turns your pointer into a magnifying glass to zoom in on part of the screen

 Text Select Tool - allows you to mark part of the text for copying and pasting

 Graphics Select Tool - allows you to mark images (in the text) for copying and pasting

 Visit Adobe on the World Wide Web - a link to Adobes Web site

 Zoom Out (Percentage Zoom indicated to the right of this button)

 Zoom In (Percentage Zoom indicated to the left of this button)

 Actual Size - displays page at 100% size

 Fit Window - displays the whole page

 Fit Width - displays the page at full width

 Reflow text

 Rotate page

Page 1 - Contents “How to Search the GMDSS Handbook”

Page 3 - Links

How to Search the GMDSS Handbook (page 3 of 3)

Links

This GMDSS Handbook contains several hundred links in the text:

1. Links in Contents pages to relevant chapters
2. Links in the text to Annexes
3. Links in the text to other text on remote pages

Page 1 - Contents “How to Search the GMDSS Handbook”

Page 2 - Buttons in Acrobat Reader 5.0

About the International Maritime Organization IMO

IMO is a technical organization established in 1958. Today, it has 159 Member States plus two Associate Members. Formal arrangements for co-operation and/or consultative status have been established with a large number of international organizations. The Organization's chief task, especially in the early years, was to develop a comprehensive body of international conventions, codes and recommendations which could be implemented by all Member Governments. This international approach is essential, or the effectiveness of IMO measures depends upon how widely they are accepted and how they are implemented. The fact that the most important IMO conventions are now accepted by countries whose combined merchant fleets represent 98% of the world total indicates how successful this policy has been.

The governing body of IMO is the Assembly, which meets every two years. In between Assembly sessions a Council, consisting of 32 Member States elected by the Assembly, acts as governing body. The technical work of IMO is carried out by a series of committees. The Maritime Safety Committee is the most senior of these and has sub-committees dealing with the following subjects: safety of navigation, radiocommunications, life-saving, search and rescue, standards of training and watchkeeping, carriage of dangerous goods, ship design and equipment, fire protection, stability and load lines, fishing vessel safety, containers and cargoes, bulk chemicals and flag State implementation. The Maritime Environment Protection Committee deals with pollution prevention. IMO also has a Legal Committee, originally established to deal with legal problems resulting from the Torrey Canyon pollution disaster of 1967 but later made a permanent body. The Technical Co-operation Committee handles IMO's growing technical co-operation programme, which is designed to help Member Governments implement the technical measures adopted by the Organization, and the Facilitation Committee deals with measures to simplify the documentation and formalities required in international shipping. The Secretariat consists of some 300 international civil servants headed by a Secretary-General. The IMO Headquarters is in London, just across the River Thames from the Houses of Parliament.

The objective of IMO's publishing activities is to provide the world maritime community with the numerous texts (conventions, codes, recommendations, guidelines, etc.) prepared by the Organization as part of its work programme. The world-wide dissemination of this information plays an important role in the promotion of maritime safety and the prevention of marine pollution. Today, IMO has over 200 titles available in English. The majority are translated into French and Spanish and an increasing number into Arabic, Chinese and Russian. Since October 1993 IMO has also launched several electronic publications, 'The Computerized IMDG Code' (available on CD and diskette), 'The IMO-Vega Database' (CD only), the IMO Resolutions database (CD only),the GMDSS Manual (CD only), Ships’ Routeing (CD only), the IAMSAR Manual (CD only), IMO Labels and Symbols (CD only), MARPOL on CDROM (CD only) and SOLAS (CD only). A catalogue of publications (on paper and on diskette) is available on request.

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