IMO

COM/Circ.102/Rev.2
7 July 1993

Ref. A1/A/5 INMARSAT

INMARSAT EGC SAFETYNET SYSTEM

INTERNATIONAL SAFETYNET MANUAL

1   The Maritime Safety Committee, at its sixty-second session (24 to 28 May 1993), noted amendments to the International SafetyNET Manual prepared by the COM Sub-Committee (COM 38/27, paragraph 4.39 to 4.41) and the LSR Sub-Committee (LSR 24/26, annex 6) and approved the revised text, annexed hereto, for circulation to Member Governments. The Secretariat was instructed to publish it as an IMO publication.

2   Member Governments are invited to convey any experience and comments they may have on the using of the SafetyNET system to the IMO SafetyNET Co-ordinating Panel.

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W/5450N/jn

IMO

Inmarsat

International SafetyNET℠

MANUAL

International Maritime Organization, London
International Maritime Satellite Organization, London

FOREWORD

SafetyNET[SM]* 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 Inmarsat's Enhanced Group Call (EGC) 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 sea-going 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.

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*   SafetyNET[SM] and FleetNET[SM] are registered servicemarks of the International Maritime Satellite Organization (Inmarsat).
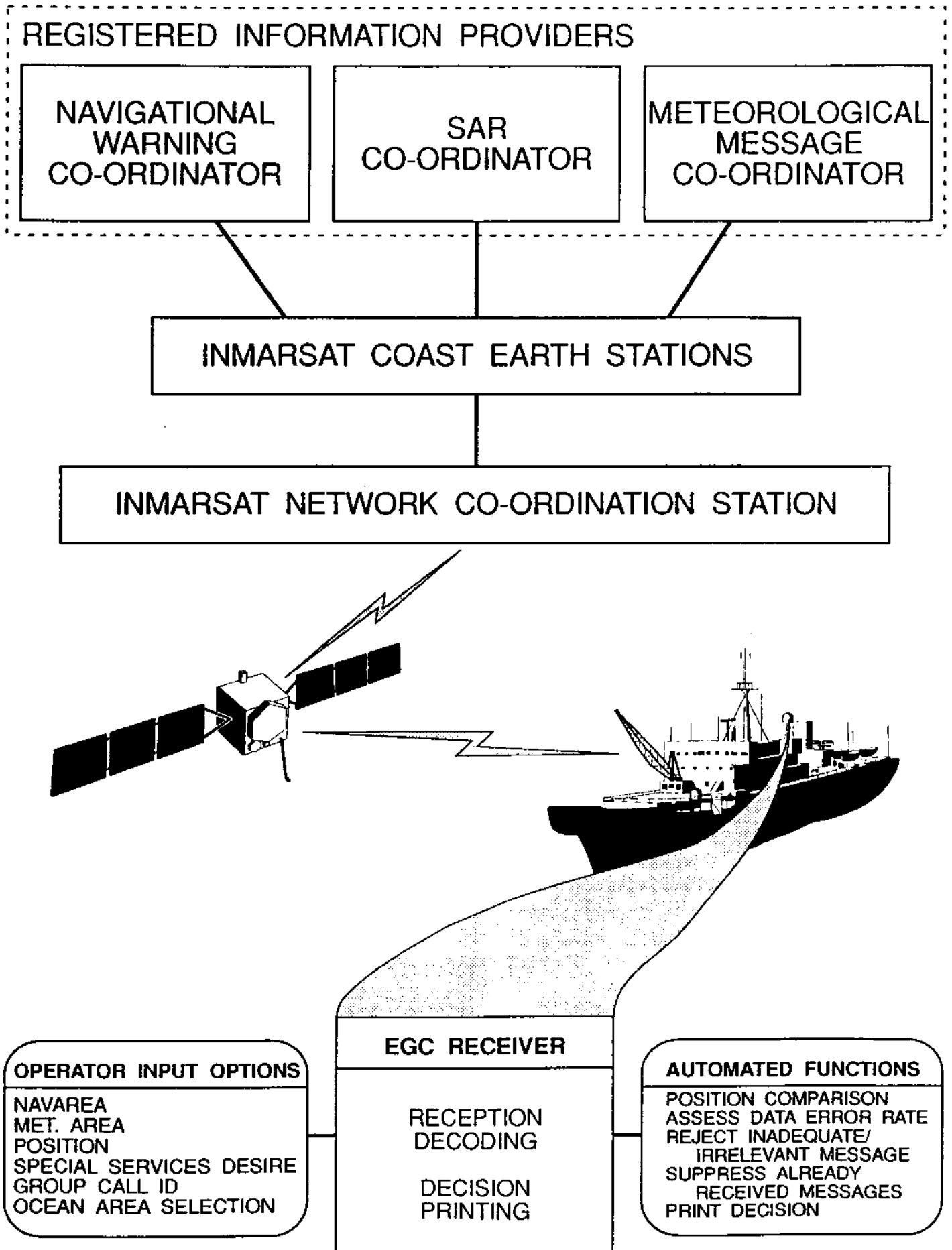
CONTENTS

Figure 1

The International SafetyNET Service System

REGISTERED INFORMATION PROVIDERS

| NAVIGATIONAL WARNING CO-ORDINATOR | SAR CO-ORDINATOR | METEOROLOGICAL MESSAGE CO-ORDINATOR |

INMARSAT COAST EARTH STATIONS

INMARSAT NETWORK CO-ORDINATION STATION

EGC RECEIVER

OPERATOR INPUT OPTIONS

NAVAREA
MET. AREA
POSITION
SPECIAL SERVICES DESIRE
GROUP CALL ID
OCEAN AREA SELECTION

RECEPTION
DECODING

DECISION
PRINTING

AUTOMATED FUNCTIONS

POSITION COMPARISON
ASSESS DATA ERROR RATE
REJECT INADEQUATE/
   IRRELEVANT MESSAGE
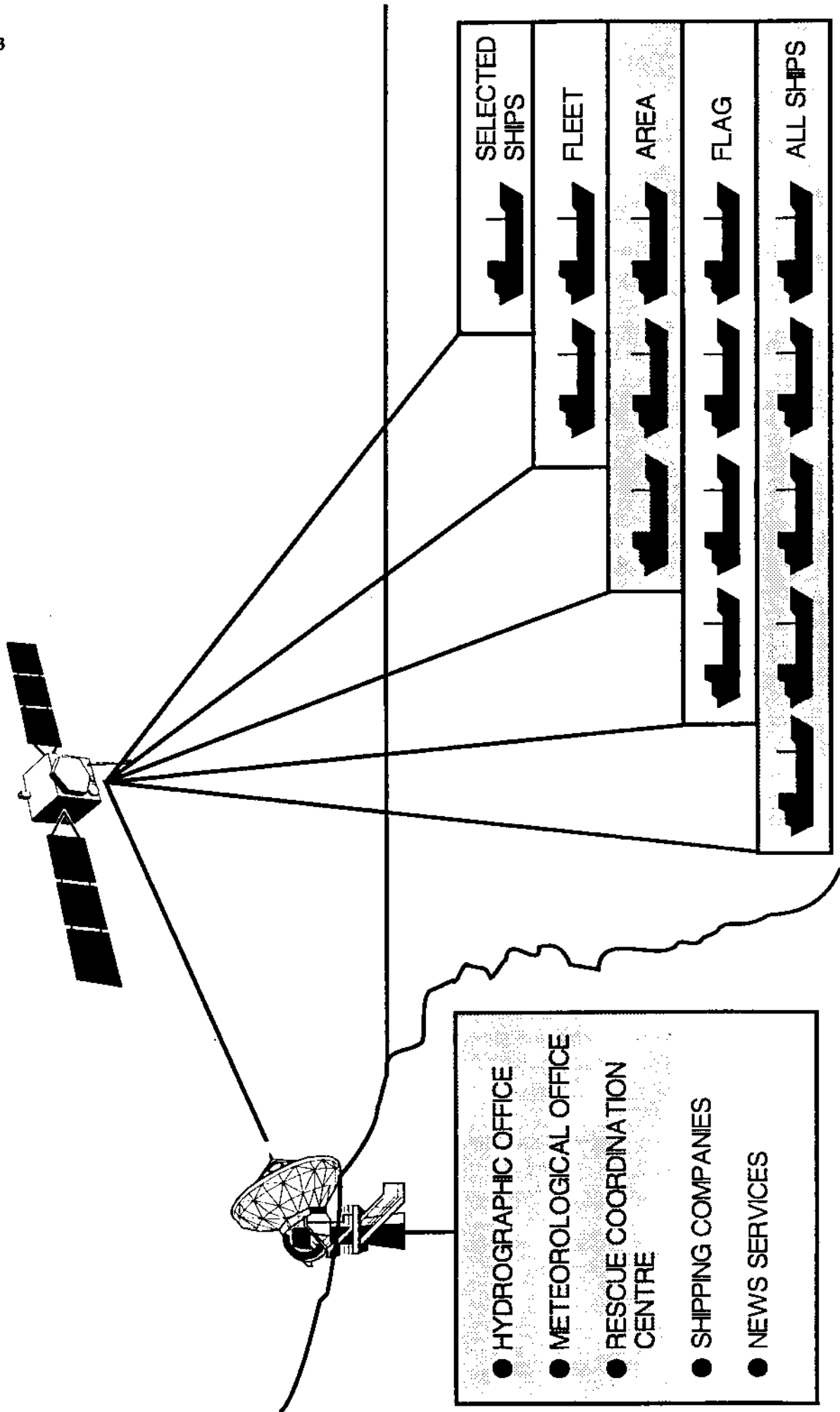SUPPRESS ALREADY
   RECEIVED MESSAGES
PRINT DECISION

1   INTRODUCTION

1.1   This manual describes the structure and operation of the International SafetyNET 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 the International Convention for the Safety of Life at Sea (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 Maritime Safety Information 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. This 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, urgent, safety, and routine. (See Annex 6, para 1.3.1).

1.7   Aboard ship, SafetyNET messages are received through any one of a number of type-approved equipments.

Figure 2

Basic Concept of the Inmarsat Enhanced Group Call System
The shaded area indicates functions of the SafetyNET Service

- HYDROGRAPHIC OFFICE
- METEOROLOGICAL OFFICE
- RESCUE COORDINATION CENTRE
- SHIPPING COMPANIES
- NEWS SERVICES

SELECTED SHIPS

FLEET

AREA

FLAG

ALL SHIPS

2   DEFINITIONS

2.1   **Coast Earth Station (CES):** A land station in the Inmarsat satellite communications system which provides inter-connection 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 broadcast and automatic receipt of fleet management and general public information by means of direct-printing through Inmarsat's enhanced group call 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 omni-directional antennas in the Inmarsat satellite system.

2.6   **International NAVTEX Service:** The system for the broadcast and automatic reception of Maritime Safety Information 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 the International Convention for the Safety of Life at Sea (SOLAS), 1974, as amended.)

2.7   **International SafetyNET Service:** The co-ordinated broadcast and automated reception of Maritime Safety Information via the Inmarsat Enhanced Group Call system using the English language to meet the requirements of Chapter IV of the International Convention for the Safety of Life at Sea (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 broadcast and automated reception of Maritime Safety Information via the Inmarsat Enhanced Group Call 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.

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[*] Reference is made to the NAVTEX Manual approved by the Organization (IMO Publication 951 88.08.)

[**] Includes electronic chart correction data. (COM35/17 section 4.4).

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 CES's 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 broadcast and automatic reception of Maritime Safety Information by means of direct-printing through Inmarsat's enhanced group call 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 the International Convention for the Safety of Life at Sea (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.

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* "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 ITU from 01 March 1993).

3 GENERAL FEATURES OF THE ENHANCED GROUP CALL (EGC) 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 Maritime Safety Information; 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 geographic 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.

.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 Maritime Safety Information messages which relate to present position, intended route, or to fixed areas programmed by the operator. This preamble also allows suppression of certain types of Maritime Safety Information 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, 44. (Refer to Annex 2 paragraph 3.5).

4.5 SafetyNET messages can be addressed to temporary geographic 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 Southwest corner of the rectangle.

4.6 In the case of a ship in distress, the need may exist to create a temporary geographic area to facilitate locating 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 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 (MSI)

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 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, IHO and WMO.

5.3   Messages include instructions to the CES for processing the messages in the form of a special address header which consists of 5 "C" codes as described below (see Annex 6):

-    C1 is priority code -   1 digit
        (Distress, urgency, safety, routine)

-    C2 is service code -   2 digits
        (e.g. Meteorological forecast, etc.)

-    C3 is address -   12 digits or less
        (e.g. Meteorological warning to circular area)

-    C4 is repetition rate -   2 digits
        (e.g. Transmit once on receipt)

-    C5 is presentation code -   2 digits
        (e.g. International Alphabet number 5 odd parity)

5.4   SafetyNET messages are stored at the coast earth station until transmitted the appropriate number of times as specified by the C4 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 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 for 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 2 or 3 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 Maritime Safety Information 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.

Figure 3

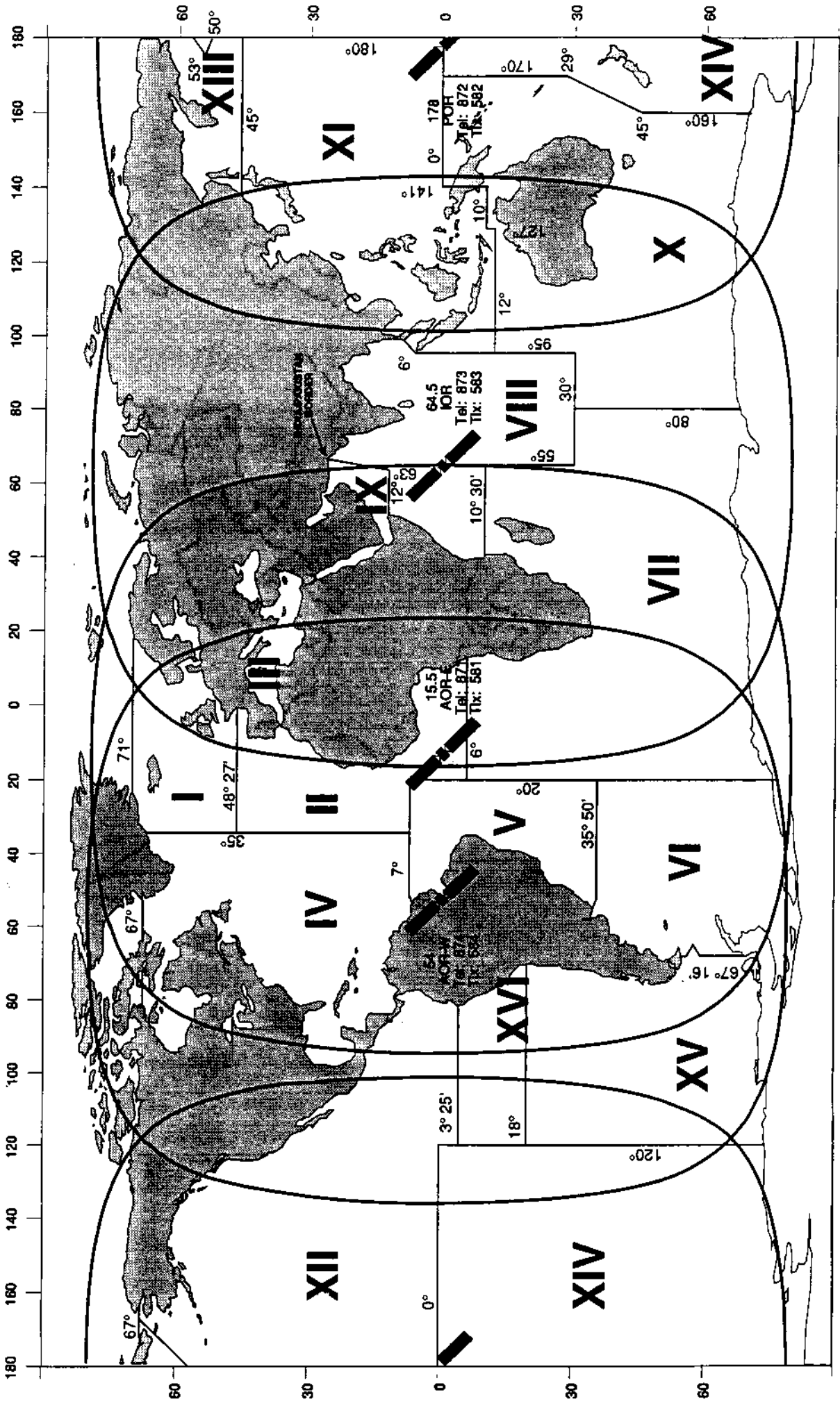Inmarsat global coverage showing 0° elevation contours
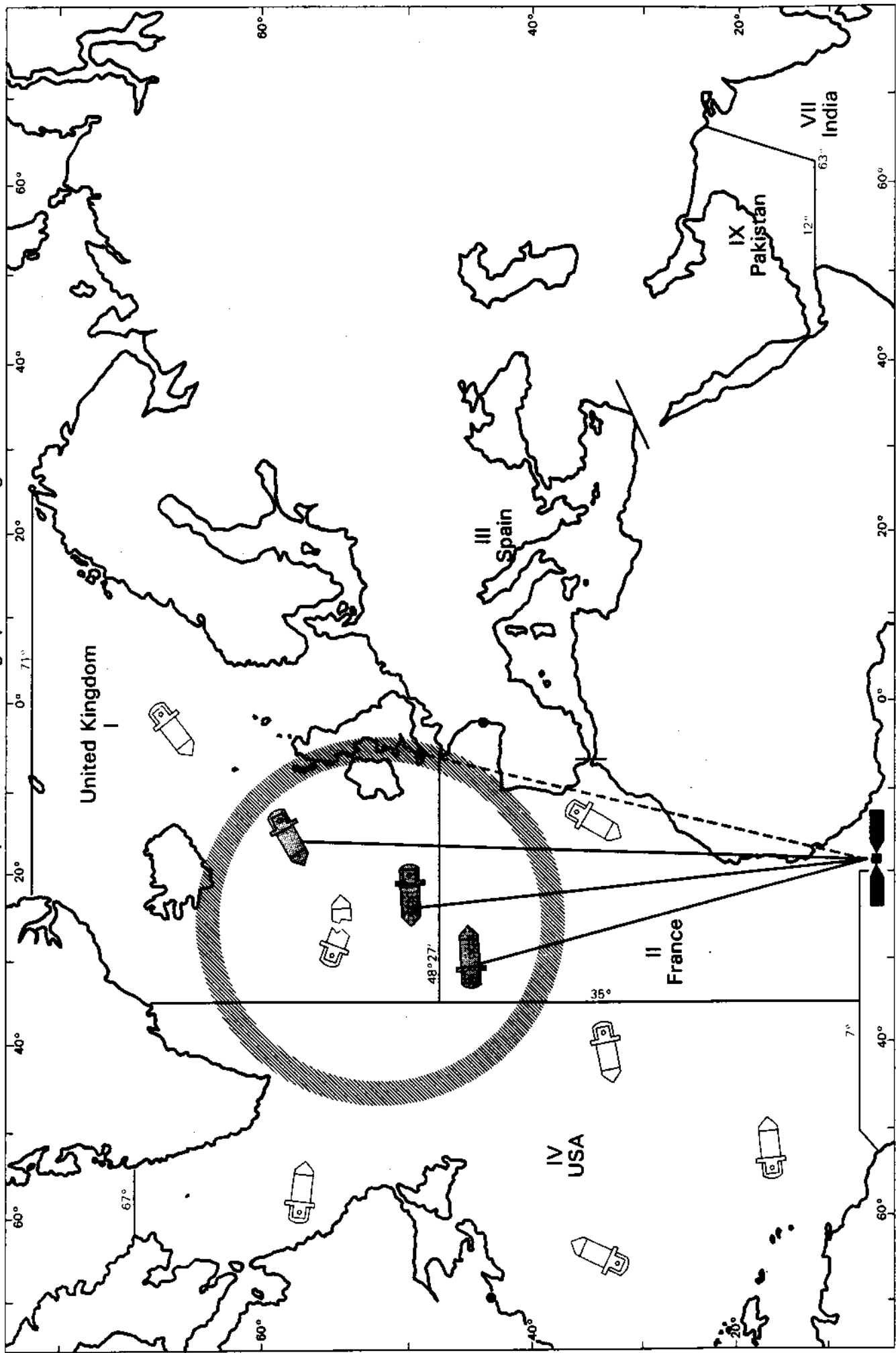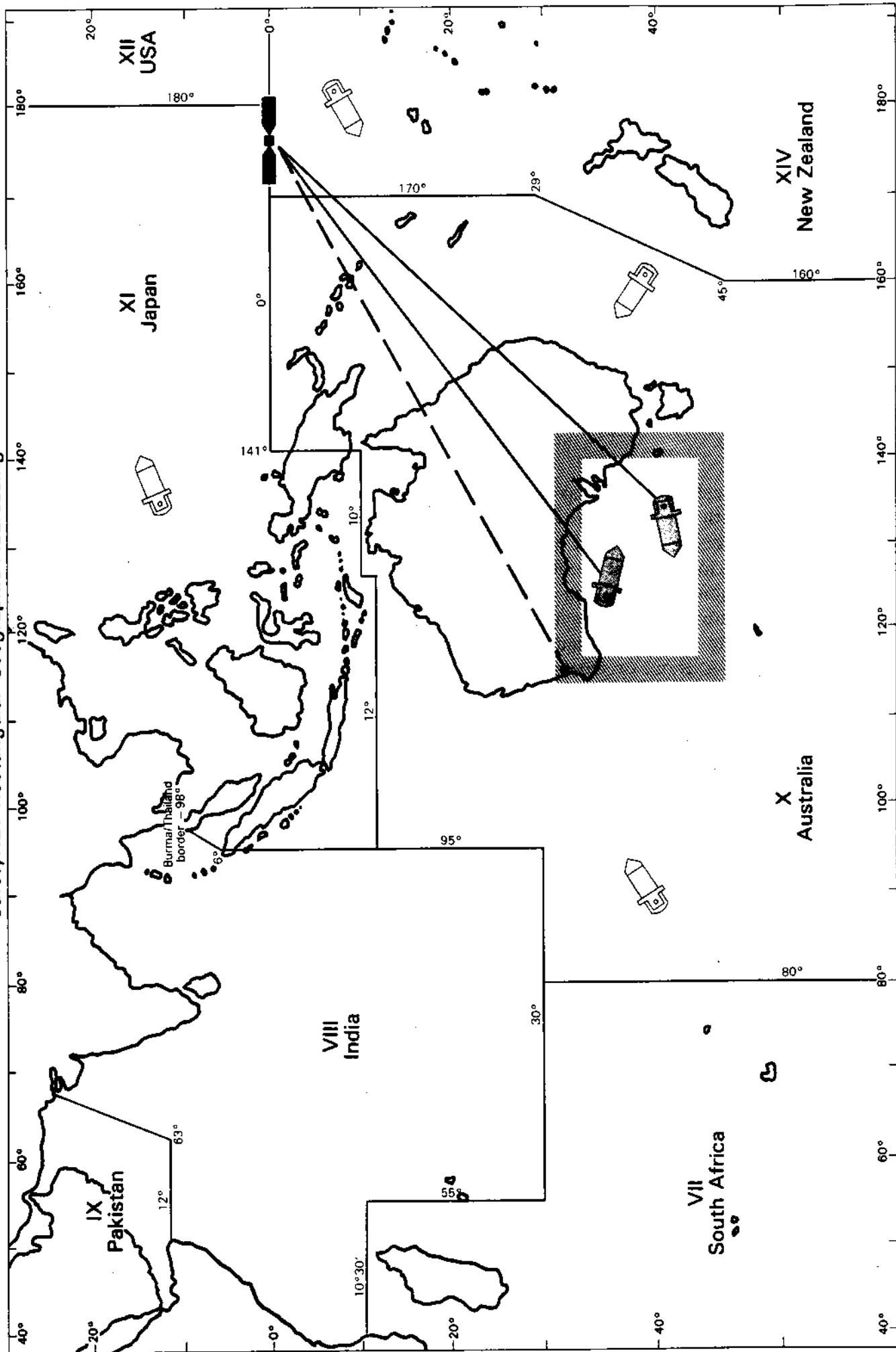
Figure 4
SafetyNET Circular Geographic Addressing

Figure 5
SafetyNET Rectangular Geographic Addressing

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 Coast Earth Stations 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 coast earth station (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 micro computers 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 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. It is this dependence on syntax that is one reason why MSI providers must monitor the broadcasts that 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. (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 (C1 and C4); 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 shall 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 2 or 3 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. NAVAREAS/METAREAS 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 Maritime Safety Information is available before sailing, the EGC receiver remain in operation while the ship is in port.

9.6 If the ships 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 ship earth station (e.g. 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 MSI 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 SafetyNET SERVICES

11.1 Hydrographic, meteorological and search and rescue authorities planning to provide Maritime Safety Information 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. IMO , 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 coast earth station(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 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.

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 Co-ordinating Panel
See Annex 1, paragraph 2.

.2 Those authorities known to produce Lists of Radio Signals.

ANNEX 1

INTERNATIONAL SafetyNET 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 SafetyNET Broadcast Co-ordinating Panel can be contacted at the following address:

> The Chairman
> SafetyNET Broadcast Co-ordinating Panel
> International Maritime Organization
> 4 Albert Embankment
> London SE1 7SR
> United Kingdom
>
> Telephone: +44 71 735 7611
> Telex: 23588 IMOLDN G
> Telefax: +44 71 587 3210

3   Panel Membership

   .1   The 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)

   .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

IMO ASSEMBLY RESOLUTION A.664(16)
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 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 be 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 enhanced group call receiver.

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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 enhanced group call messages.

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. 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.

3.2 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 distress category. It should not be possible to disable this alarm. It should be possible only to reset this alarm manually.

3.3 The equipment should indicate when it is not correctly tuned or synchronised 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 print the same message after the message has been received without errors.

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 its line, it should be transferred to the next line. The printing device should automatically feed 5 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.

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* The meaning of the service codes is the same as for the NAVTEX system (see Annex 6, Section 1.3.3.4).

4.2   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.

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 10m of the antenna, which cause a shadow sector of greater than 6°, 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 activities of the Network Co-ordination Stations (NCS), and the coast earth stations (CES). The NCS are special CES in each ocean region which control communications through the satellite.

4   **Coast Earth Stations (CES)**

The Inmarsat system is connected into the worldwide telecommunications networks via Signatory-owned coast earth stations. Many of these coast earth stations provide Inmarsat-C/EGC services. The wide spread of coast earth stations around the world offers flexibility and the prospect of shorter landlines to access the desired CES.

5   **Ship Earth Stations (SES)**

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 ship earth stations are small, lightweight terminals, with
        small omni-directional antennas, for providing message-type services. EGC
        receive capability is included in the software of Class 2 Inmarsat-C SES's.
        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   Stand-alone 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 5 "C" Codes which are combined into a generalized message header format as follows:

        C1:C2:C3:C4:C5

        (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 fully tabulated in Annex 6. An additional code may be required to identify the ocean region when sending a broadcast message to a coast earth station which operates to more than one ocean region.

4.   The International Maritime Organization 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 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, 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.

Annex 4, 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 IHO/IMO World Wide Navigational Warning Service (WWNWS) Guidance Document (IMO Res 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.

   1) **C1 - Message Priority**

   Normally C1 = 1, Safety.
   Exceptionally C1 = 2, Urgency   (at discretion of Registered Information Provider).

   2) **C2 - Service Code**

   NAVAREA Warnings   - C2 = 31

   Coastal Warnings   - C2 = 13 - Broadcasts using NAVTEX codes to coastal areas where NAVTEX is not provided, or where NAVTEX broadcasts are to be duplicated.

   3) **C3 - Address Code**

   NAVAREA Warnings   - C3 = the 2 digits of the NAVAREA Number, with a leading Zero where necessary, e.g., 01 or 13.

   Coastal Warnings   - C3 = X1,X2 to identify the NAVAREA and B1,B2 to emulate NAVTEX as specified in para 1.3.3.4 of Annex 6. Note that B1 codes will be allocated by IMO in accordance with the procedure for allocating NAVTEX transmitter identities laid down in the IMO NAVTEX Manual (IMO Pub. 951 88.08). B2 will always be A.

4) **C4 - 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:

1) Initial unscheduled broadcast of NAVAREA and Coastal Warnings with Urgency priority: C4 = 11, on receipt repeated 6 minutes later.

2) Scheduled Broadcast of NAVAREA Warnings with Safety priority: C4 = 18, repeat broadcast every 24 hours, no echo

3) Scheduled broadcast of Coastal Warnings with Safety priority: C4 = 42, repeat broadcast every 4 hours, no echo

5) **C5 - Presentation Code**

Always C5 = 00, International Alphabet number 5.

4. NAVAREA Warnings should be considered for repromulgation in adjacent NAVAREAs in accordance with para 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 IMO NAVTEX Manual (IMO Pub. 951 88.08).

8.   Example NAVAREA warning message is as follows:

       1:31:04:18:00
       SECURITE
       (TEXT)
       NNNN
       CANCEL 16392 AT 271435z JUL 90

9.   Example Coastal warning message is as follows:

       1:13:03MA:42:00
       SECURITE
       (TEXT)
       NNNN

Annex 4, 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.

　　1)　C1 - Message Priority

　　　　Always C1 = 2 URGENCY for Warnings
　　　　　　　Note: to be used for urgent tropical cyclone warnings only.
　　　　　　　All other warnings to be classified as Safety (C1 = 1).

　　　　Always C1 = 1 SAFETY for Forecasts and Warnings (see Note).

　　2)　C2 - Service Code

　　　　Meteorological Warnings (C1 = 1 or 2) to **Circular Area**　- C2 = 24

　　　　Meteorological Warnings or Forecasts to **METAREA**　　- C2 = 31

　　　　Meteorological Warnings or Forecasts to **Coastal Areas**　- C2 = 13

　　3)　C3 - Address Code

　　　　Meteorological Warnings (C1 = 1 or 2) to **Circular Area** (Service Code C2 = 24) C3 = 10 characters.

　　　　Address code for circular areas is fully described in Annex 6 para 1.3.3.5 but repeated here for ease of reference:

　　　　Circular address will consist of 10 numbers as follows:

　　　　$D1D2LaD3D4D5LoR1R2R3$ where

　　　　$D1D2La$ (3 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.

　　　　$D3D4D5Lo$ (4 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.

　　　　$R1R2R3$ (3 characters) is Radius of circle in nautical miles, up to 999.

Example.

A circle centred at Latitude 56 N Longitude 34 West with radius of 10 NM is coded as:

56N034W010

Meteorological Warnings (C2 = 31) C3 = the 2 digits denoting the area of broadcast responsibility (the METAREA), with a leading zero where necessary, e.g., 01, 06, 13.

Coastal Warnings (C2 = 13) - broadcasts using NAVTEX codes to coastal areas where NAVTEX is not provided or where NAVTEX broadcasts are to be duplicated. C3 = X_1,X_2 to identify the METAREA and B_1,B_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 IMO NAVTEX Manual (IMO Publication 951 88.08). B_2 will always be B or E. The METAREA X_1 and X_2 codes and the NAVTEX B_1 and B_2 are sent to the CES as a 4 character group, in the order $X_1X_2B_1B_2$.

4) <u>C4 - Repetition Code</u>

Category (a) repetition codes are used for meteorological information as follows:

Meteorological Warning   C4 = 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   C4 = 01 Transmit once on receipt.

5) <u>C5 - Presentation Code</u>

Always C5 = 00, International Alphabet number 5.

<u>EXAMPLES</u>

1. Meteorological Warning to METAREA.

1:31:01:11:00
SECURITE
(TEXT)
NNNN

See Note.

2. 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 (C1 = 2).

See Note.

3. 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.

Annex 4, Section c
SEARCH AND RESCUE SERVICES

1   The following guidelines set out the arrangements to be used by Rescue
        Co-ordination Centres 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 Telecommunications
        Union (ITU), Radio Regulations (RR), the International Convention on Maritime
        Search and Rescue, 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:

   .1   C1 - Message Priority

        C1 = 3, Distress

        If the Rescue Co-ordination Centre determines that the transmission is of an
        Urgency category rather than Distress in accordance with RR Article N40,
        C1 = 2, Urgency may be used instead (see also Section 4 below).

   .2   C2 - Service Code

        C2 = 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   C3 - Address Code

        In messages addressed to Service Code C2 = 14, the C3 Code will be a circular
        address, consisting of ten digits, as follows:

        .1   Latitude $[D_1 D_2 L_l]$ of vessel in distress in degrees (two digits) and whether
             north (N) or south (S): e.g., 39N (3 characters total). Include a leading
             zero for latitudes less than 10 degrees.

.2 Longitude $[D_3D_4D_5L_x]$ 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 degrees or 10 degrees as appropriate; e.g., use 099 for 99 degrees and 008 for 8 degrees.

.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.

.4 <u>C4 - Repetition Code</u>

C4 = 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%).

.5 <u>C5 - Presentation Code</u>

Always C5 = 00, International Alphabet number 5.

.6 Example of a shore-to-ship distress alert relay message:

```
ZCZC
3:14:56N043W250:11:00
MAYDAY RELAY
TEXT
NNNN
```

.7 <u>GENERAL (All Ships) CALL</u>

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 1.3.2). 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:

```
ZCZC
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:

.1   C1 - Message Priority

C1 = 2, Urgency; 1, Safety or 0, Routine

.2   C2 - Service Code

C2 = 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.

.3   C3 - Address Code

C3 = X_1X_2 X_1X_2 = the 2 digits of the NAVAREA Number, with a leading Zero where necessary, e.g., 01 or 13.

.4   C4 - Repetition Code

Unscheduled broadcasts of urgency and safety traffic should be made using the echo facility to increase the probability of reception as follows:

C4 = 11, on receipt repeated 6 minutes later.

.5   C5 - Presentation Code

Always C5 = 00, International Alphabet number 5.

5   **Overlap in satellite ocean regions.** 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.

6   **Overlap in NAVTEX Coverage Areas.** 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.

Annex 4, 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).

Annex 4, Section e
PIRACY COUNTER MEASURES BROADCAST MESSAGES

1   There are two kinds of Maritime Safety Information 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 are to be used for SafetyNET broadcasts of the Daily Sitrep:

C1 = 1		Safety
C2 = 04		Navigational Warning to Rectangular Area
C3 = 10S090E35040		Rectangular Area bounded by 10S, 25N, 090E and 130E
C4 = 18		Broadcast every 24 hours (no echo) until cancelled
C5 = 00		

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. B2 = 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:

.1   **Daily situation report**

ZCZC [DATE/TIME OF ORIGIN]

PIRACY COUNTERMEASURES MESSAGE [CONSECUTIVE NUMBER].

SOUTHEAST ASIA, INCLUDING MALACCA STRAIT, SINGAPORE STRAIT
AND PHILLIPINES.

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

.2   **Piracy Attack Warning**

ZCZC [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 following 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 following standard format:

D_1D_2-M_1M_2La $D_3D_4D_5$-M_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 following example: 54-19N 103-27E

Note:	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 SafetyNET MANUAL

1   Proposed amendments to the 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   <u>ADDRESSING THE SafetyNET MESSAGE</u>

1.1   Introduction

       This section describes the way in which International SafetyNET Service messages are
       transmitted to coast earth stations by Registered Information Providers for subsequent
       transmission over the satellite system.

1.2   Routing 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 of
       this Annex.

1.3   Addressing SafetyNET Messages.

       After gaining access to the coast earth station, 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 5 special codes, called
       "C" codes, as described in the following paragraphs. At some CESs, the 5 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 coast earth stations which operate in more than one
       ocean region.

C codes are transmitted to the coast earth station in the following 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	- 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 alpha-numeric 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 given below:

1:31:01:11:00
SECURITE
(TEXT)
NNNN

This example code is for Safety priority ($C_1 = 1$) EGC call containing a WMO type Meteorological Warning ($C_2 = 31$) to 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 5 ($C_5 = 00$).

1.3.1   Priority Codes (C_1)

Format as received at coast earth station - 1 digit.

The C_1 code is used to indicate to the coast earth station 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)   00   **General Call**
              C_3 Code -   00

(b)   04   **Urgency Messages (PAN PAN/XXX), Navigational Warnings to Rectangular Areas**
              C_3 Code -   12 digits

(c)   13   **Coastal Warnings**
              C_3 Code -   4 digits

(d)   14   **Shore-to-ship Distress Alert to Circular Areas**
              C_3 Code -   10 digits

(e)   24   **Urgency Messages (PAN PAN/XXX), Meteorological and Navigational Warnings to Circular Areas**
              C_3 Code -   10 digits

(f)   31   **Meteorological and Navarea Warnings and Meteorological Forecasts to NAVAREA/METAREA**
              C_3 Code -   2 digits

(g)   34   **Search and Rescue Co-ordination to Rectangular Areas**
              C_3 Code -   12 digits

(h)   44   **Search and Rescue Co-ordination to Circular Areas**
              C_3 Code -   10 digits

(i)   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)   **Service Code 00 -   General Call**

Used to address messages to all ships in the region. C$_3$ = 00.

(b)   **Service Code 04 -   Urgency   Messages   (PAN   PAN/XXX),
                               Navigational   Warnings   to   Rectangular
                               Areas**

Rectangular addresses will consist of 12 characters as follows:
D$_1$ D$_2$ L$_a$ D$_3$ D$_4$ D$_5$ L$_o$ D$_6$ D$_7$ D$_8$ D$_9$ D$_{10}$

D$_1$ D$_2$ is latitude of southwest corner of the rectangle in degrees.

L$_a$ is hemisphere N or S.

D$_3$ D$_4$ D$_5$ is longitude of southwest corner of rectangle in degrees, with leading zeros if required.

L$_o$ is longitude E or W.

D$_6$ D$_7$ is extent of rectangle in latitude (degrees).

D$_8$ D$_9$ D$_{10}$ is extent of rectangle in longitude (degrees).

A rectangle whose southwest 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)   **Service Code 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 4 characters. The order of transmission is X$_1$X$_2$B$_1$B$_2$.

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) **Service Code 14 - Shore-to-Ship Distress Alert to Circular Areas**

The circular address consists of 10 characters as follows:
$D_1 D_2 L_a D_3 D_4 D_5 L_o R_1 R_2 R_3$.

$D_1 D_2$ is latitude of centre in degrees with leading zero if required.

L_a is hemisphere N or S.

$D_3 D_4 D_5$ is longitude of centre in degrees with leading zero if required.

L_o is longitude E or W.

$R_1 R_2 R_3$ is radius of circle in nautical miles (up to 999).

A circle with a radius of 10 nautical miles is coded as:
56N034W010 (a circle centred at 56N 34W with radius 10 miles).

Note: Latitude and Longitude are limited by values from 00 to 90° latitude and 000 to 180° longitude.

(e) **Service Code 24 - Urgency Messages (PAN PAN/XXX), Meteorological and Navigational Warnings to Circular Areas**

See 1.3.3 (d) for description of circular addressing.

(f) **Service Code 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 2 digits $X_1 X_2$, where $X_1 X_2$ is the numerical designation of the area.

(g)   **Service Code 34 - Search and Rescue Co-ordination to Rectangular Area**

See 1.3.3 (b) for description of rectangular addressing.

(h)   **Service Code 44 - Search and Rescue Co-ordination to Circular Areas**

See 1.3.3 (d) for description of circular addressing.

(i)   **Service Code 73 - Chart Correction Services**

(To be developed)

1.3.4 Repetition Codes (C_4)

The C_4 repetition codes are divided into 2 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 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 x 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 hours delay; no echo
5	6 hours delay; with echo
6	12 hours delay; no echo
7	12 hours delay; with echo
8	24 hours delay; no echo
9	24 hours delay; with echo

The various combinations are shown in the table below:

	MULTIPLIER					
DELAY	**1**	**2**	**3**	**4**	**5**	**ECHO**
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 Time

where Message Reference Number is the number given to the message provider by the CES on receipt of the initial message and Time is of the form:
DDHHMMZ space MMM space YY

Cancel (Message Reference Number) at 211430Z 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 the System Definition Manual (SDM) for the Inmarsat-C Communications System (Release 2.0).

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 shall comply with the IMO Performance Standards contained in Annex 2.

CHAPTER 8: TECHNICAL REQUIREMENTS FOR AN ENHANCED GROUP CALL RECEIVER

CONTENTS

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, or Inmarsat-A and Inmarsat-B MESs equipped with EGC receivers.

EGC messages are sent to Land Earth Stations by terrestrial based Information Providers using terrestrial facilities such as Telex. The messages are processed at the LESs, and forwarded to an NCS which transmits them on an NCS common channel.

There are two basic services offered by EGC; the SafetyNET™ service and the FleetNET™ service. SafetyNET™ is a service provided primarily for the dissemination of maritime safety information, 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 a 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. MES 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 Enhanced Group Call (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".
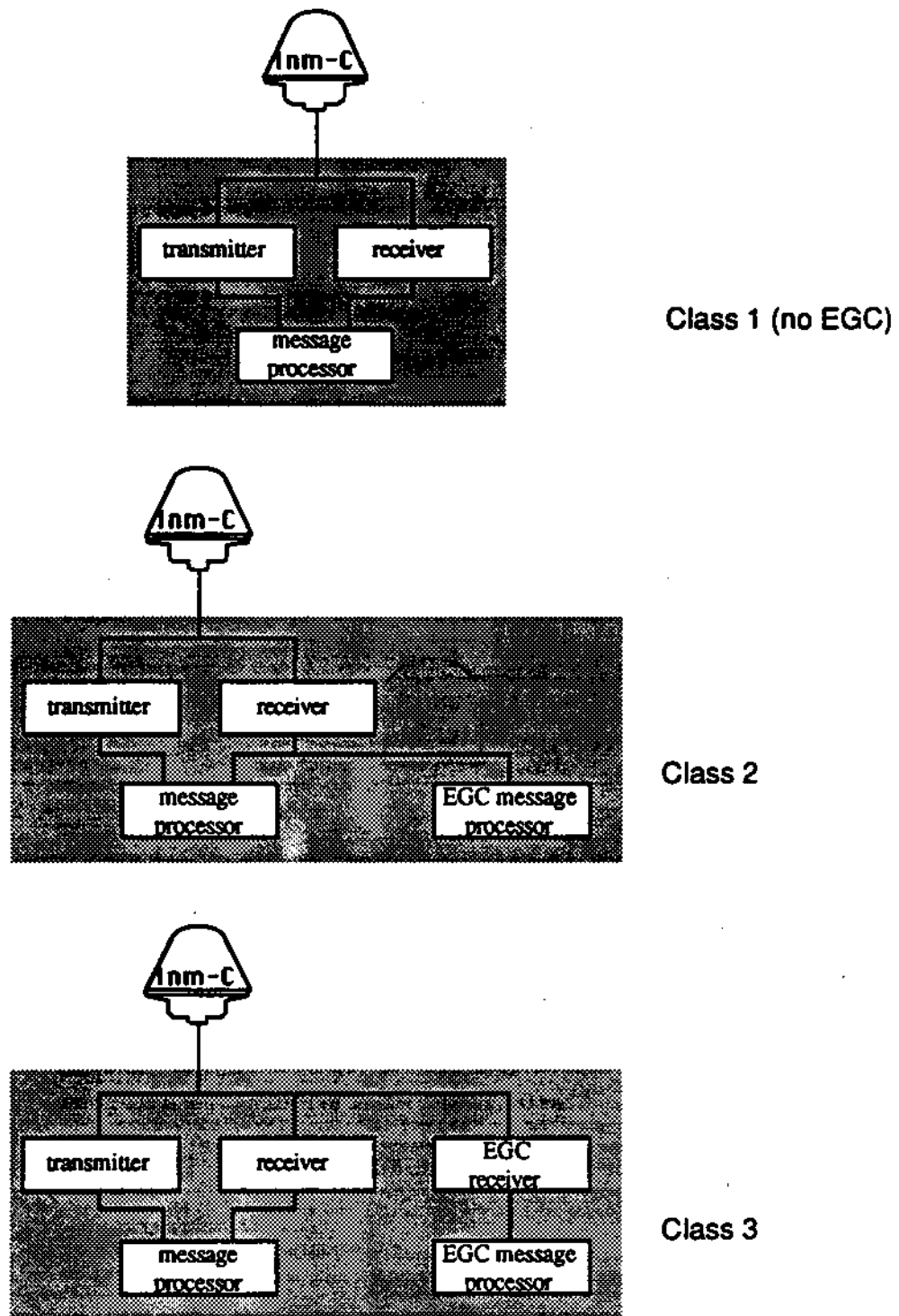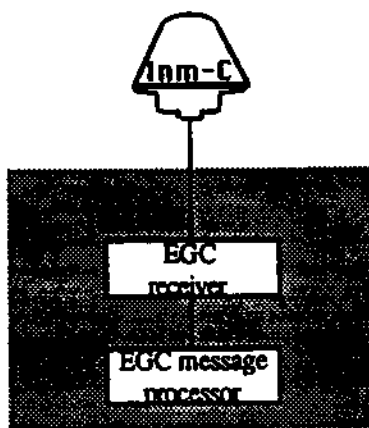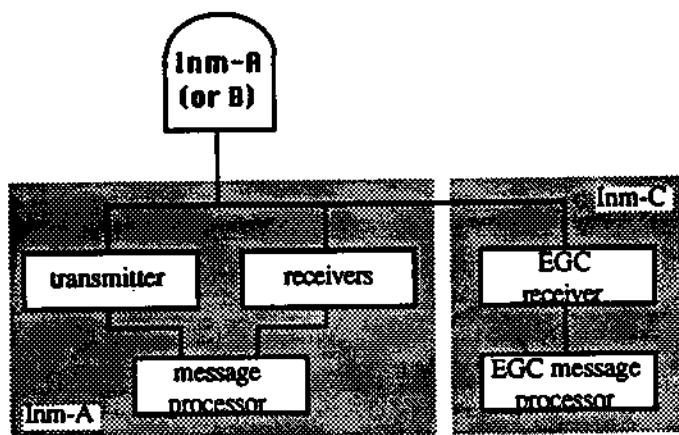
FIGURE 8-1   CLASSES OF MOBILE EARTH STATIONS

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 stand alone 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:

$$PEP = \frac{(\text{Total packets transmitted} - \text{Total packets received correctly})}{\text{Total packets transmitted}}$$

The limits for the maximum acceptable PEP for a range of equivalent unfaded power flux densities (PFD) at the antenna are as follows:

PFD (dBW/m2)	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 (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, SAR 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.

It is recommended that EGC equipment capable of receiving messages composed using International Telegraph Alphabet No. 2 (ITA2) do not make use of national options for character Nos. 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 synchronisation (or loss of synchronisation) 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 coordinates;
      (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 coordinates and Navarea geographical area data;

      (iv)   for storing group IDs; and

      (v)   for storing expansion NCS common channel numbers.

7.5.1   Message Buffer
A message buffer memory with a capacity of not less than 32768 bytes shall be provided.

7.5.2   Non-volatile Memory
EGC receivers shall use non-volatile memory for storing ENIDs and expansion NCS common channel numbers. Provision for storing at least 64 16-bit ENIDs and 16 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 coordinates 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;

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 MESs 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 MESs 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 has been 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 are 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 urgent 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 25mm of ice (EME);

(e)   Precipitation: up to 100mm/hour (EME);

(f)   Wind: normal operation with relative
                                             average wind speeds up to 100 knots (EME);

(g)   Solar Radiation: Maximum flux density 1200 W/m^2
                                             Spectral composition:

Infra Red	51%
Visible	44.5%
Ultra Violet	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	2.54mm peak amplitude
10 – 100	1.0 g peak acceleration

See Figure 8-3, curve (a).

Note: 1g = 9.807 m/s^2

Acceptable alternative levels for Internally Mounted Equipment only:

Frequency Range (Hz)	Level
2 – 15.8	1.00mm 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;
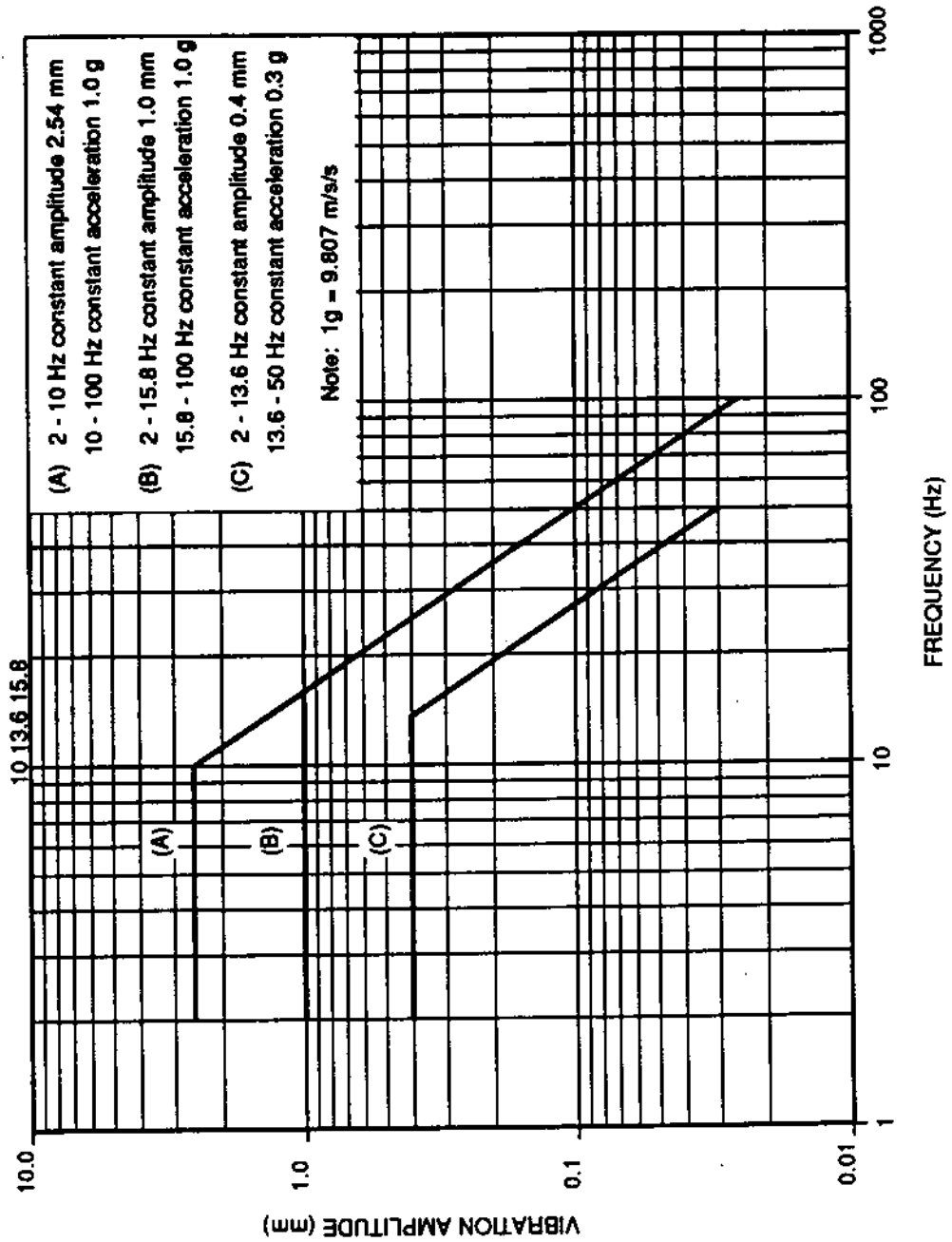
Note: Consideration will be given to the relaxation of these conditions if necessary, in respect of a printer if this is an integral part of the equipment (IME only). An example of acceptable minimum conditions with respect to printer operation is given below:

Frequency Range (Hz)	Level
2 – 13.6	0.4mm 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/hr).

FIGURE 8-3   VIBRATION TEST CURVES

(A) 2 - 10 Hz constant amplitude 2.54 mm
     10 - 100 Hz constant acceleration 1.0 g

(B) 2 - 15.8 Hz constant amplitude 1.0 mm
     15.8 - 100 Hz constant acceleration 1.0 g

(C) 2 - 13.6 Hz constant amplitude 0.4 mm
     13.6 - 50 Hz constant acceleration 0.3 g

Note: 1g = 9.807 m/s/s

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 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 so that the EGC receiver will not require an antenna and low noise down converter. 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:

EGC RECEIVE AVAILABILITY

EQUIPMENT	Inmarsat-C TRAFFIC/DAY (EITHER DIRECTION)	AVAILABILITY OF EGC RECEIVER
Inmarsat-C	1 call	99.87%
CLASS 2	5 calls	99.36%
(SWITCHABLE	10 calls	98.73%
Inmarsat-C/EGC OPERATION)		
Inmarsat-C CLASS 3 DEDICATED INTEGRAL EGC RECEIVER	ANY	100%
Inmarsat-C & 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

AUTHORISATION 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 **Authorisation**

.1 Authorisation is carried out by IMO and Inmarsat in consultation with IHO and WMO as appropriate.

.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 coordinated 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**

.1 On receipt of such authorization, the International SafetyNET 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 operators. A specimen Certificate of Authorization follows this Annex.

.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 providers' 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.

Annex 9 - Sample Certificate

IMO

4 Albert Embankment, London SE1 7SR
United Kingdom

Inmarsat

40 Melton Street, London NW1 2EQ
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]