

IMO SafetyNET Manual

Submitted by Inmarsat

**SUMMARY**

Executive Summary: This document highlights the changes made to the 2003 SafetyNET Manual as incorporated in the clean text in CPRNW10/4/4

Action to be taken: Paragraph 2

Related documents: CPRNW10/4/4; IMO SafetyNET Manual 2003 Edition

1. The attached version of the SafetyNET Manual shows all changes that have been included in the "Clean" copy in document CPRNW10/4/4. Please note that some changes were done couple of years ago using previous MS Office version and ones are shown as **shaded text** for new wording and ~~striketrough~~ for deleted text. On the latest MS Office version inserted text is shown as **underlined in red** and deleted text is shown in text boxes in **red**. Comments have been inserted throughout the text and they are shown ***[in red italics and in square brackets]***. There remain a few more corrections to be made but these items will be discussed during the meeting.
2. CPRNW is invited to note this information when considering CPRNW10/4/4.

## Foreword

SafetyNET<sup>SM1</sup> is an international automatic direct-printing satellite-based service for the promulgation of navigational and meteorological warnings, meteorological forecasts, search and rescue (SAR) information and other urgent safety-related messages - maritime safety information (MSI) - to ships. It has been developed as a safety service of the ~~International Mobile Satellite Organization's (IMSO)~~ Inmarsat C enhanced group call system to provide a simple and automated means of receiving MSI on board ships at sea and in coastal waters, where appropriate. The information transmitted is relevant to all seagoing vessels and the message-selection features ensure that mariners can receive safety information broadcasts that 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 amended, as a requirement for ships to which the Convention applies. The ability to receive SafetyNET service information ~~will be~~ **is** generally necessary for all ships that sail beyond coverage of NAVTEX<sup>2</sup> and is commended to all Administrations having responsibility for maritime affairs and mariners who require an effective MSI service in waters not served by NAVTEX.

The International SafetyNET Manual is intended for use by seafarers, ship-owners, maritime Administrations, SafetyNET information providers and others concerned with the preparation, broadcast and ~~receiving~~ **reception** of maritime safety information.

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<sup>1</sup> SafetyNET<sup>SM</sup> and FleetNET<sup>SM</sup> are registered trademarks of ~~the International Mobile Satellite Organization.~~ Inmarsat Global Ltd.

<sup>2</sup> NAVTEX is an international automatic direct-printing service for promulgation of navigational and meteorological warnings and urgent information to ships on 518 kHz, using the English language (see the NAVTEX Manual, sales number IB951E).

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## 1 Introduction

**1.1** This Manual describes the structure and operation of the International SafetyNET<sup>SM</sup> <sup>3</sup> 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, SAR information ~~chart correction data~~ and other urgent information in accordance with the requirements of the International Convention for the Safety of Life at Sea (SOLAS), 1974, as amended. It is suitable for use in all sizes and types of ships. Figure 1 illustrates the way the service is structured.

**1.3** SafetyNET is a service of Inmarsat's enhanced group call (EGC) system and was specifically designed for promulgation of maritime safety information (MSI) as a part of the global maritime distress and safety system (GMDSS). The EGC system (technically a part of the Inmarsat C system) provides an automatic, global method of broadcasting messages to all vessels in both fixed and variable geographical areas or to predetermined groups of ships.

**1.4** SafetyNET meets the requirements of SOLAS 1974, as amended, for broadcasting area, regional or local navigational warnings; meteorological warnings and forecasts; ~~chart correction services~~, SAR coordination traffic, and shore-to-ship distress alerts and other safety-related information. 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~~ 76° N and 76° S). In addition to providing services to ships operating in sea area A3, it also provides the means of disseminating MSI to coastal waters not covered by NAVTEX <sup>4</sup> on 518 kHz or as duplication service to NAVTEX.

**1.5** SafetyNET offers the ability to direct a ~~call~~ message to a given geographical area. The area may be fixed, as in the case of a NAVAREA or ~~weather forecast area~~ METAREA, or it may be uniquely defined by the originator or it may be a coastal area. The ~~call~~ uniquely defined areas are ~~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 maritime safety information provider anywhere in the world and broadcast to the appropriate ocean area via an Inmarsat C land earth station. Messages are broadcast according to their priority, i.e. distress, urgency or safety, ~~and routine~~.

**1.7** Aboard ship, SafetyNET messages are received through any one of a number of type-approved ~~items of equipment~~. Inmarsat C or mini-C mobile terminals with EGC SafetyNET capability.

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<sup>3</sup> SafetyNET<sup>SM</sup> and FleetNET<sup>SM</sup> are registered trademarks of Inmarsat Ltd.

<sup>4</sup> NAVTEX is an international automatic direct printing service for promulgation of navigational and meteorological warnings and urgent information to ships on 518 kHz, using the English language (see the NAVTEX Manual, Sales number IB951E).

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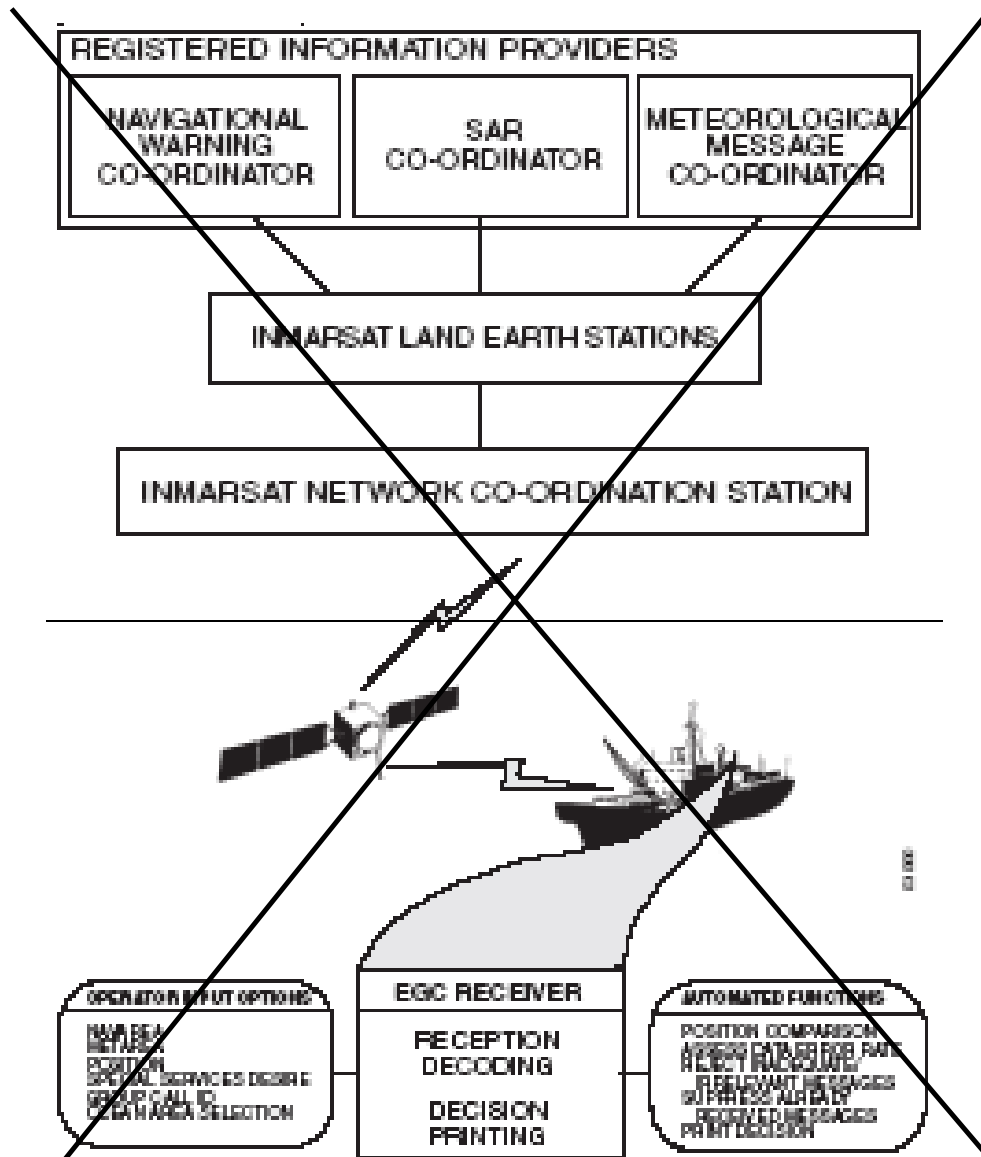


Figure 1 – The International SafetyNET Service system

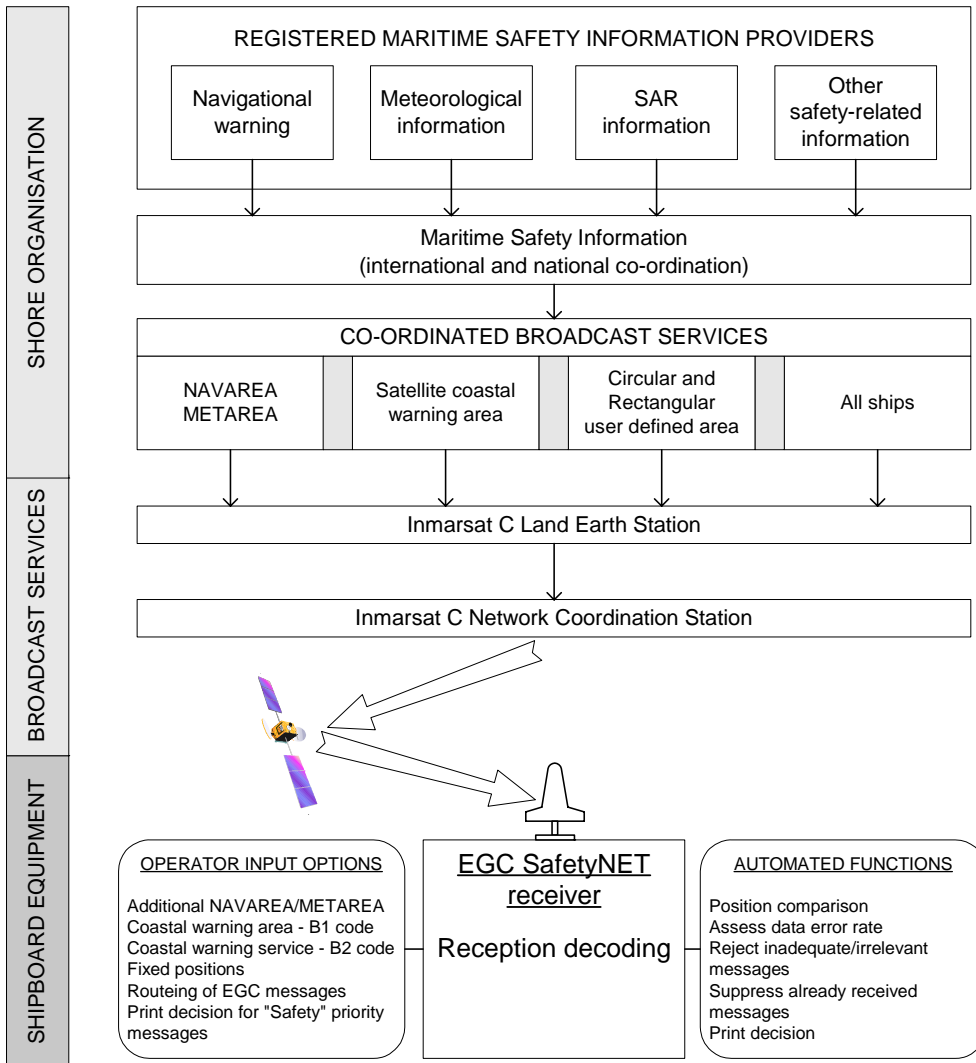


Figure 1 - The International SafetyNET Service system

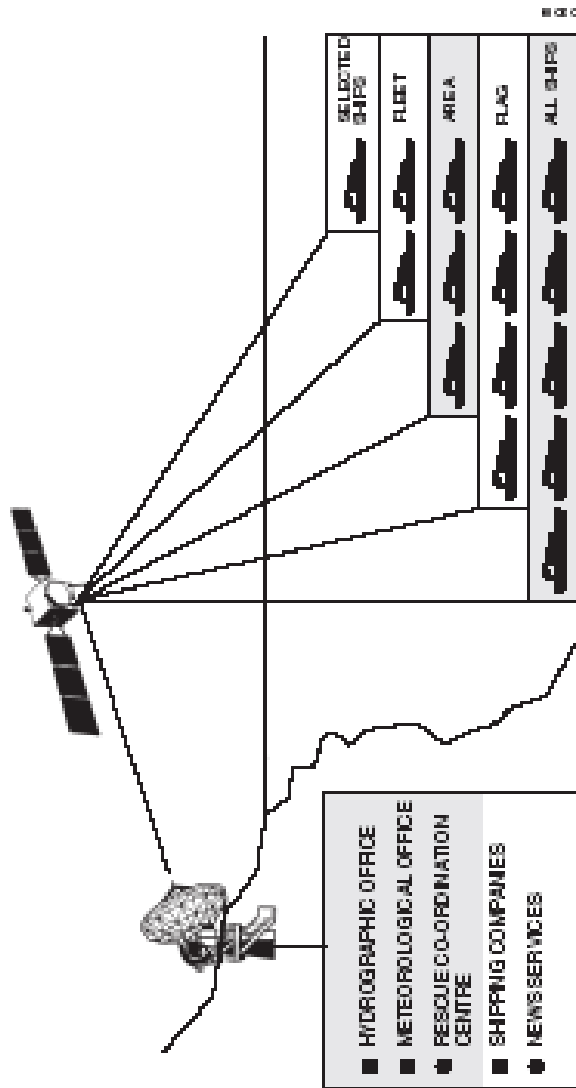


Figure 2 – Basic concept of the Inmarsat enhanced group call system  
The shaded area indicates functions of the SafetyNET service

[The picture should be replaced with added text in the box as below:]

- Hydrographic office
- Meteorological office
- Rescue-coordination centre
- Other safety-related information provider
- Shipping company
- News services
- Other provider of commercial information



## 2 Definitions *(shown in the alphabetical/logical order)*

**2.1 Enhanced Group eCall (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.

**.1 SafetyNET:** The international service for the broadcasting and automatic reception of MSI ~~by means of direct printing~~ through Inmarsat EGC system. SafetyNET receiving capability is part of the mandatory equipment which is required to be carried by certain ships under the provisions of chapter IV of SOLAS Convention 1974, as amended.

**.1 International SafetyNET Service:** The co-ordinated broadcasting and automated reception of MSI via the Inmarsat EGC system, using the English language. ~~to meet the requirements of chapter IV of SOLAS 1974, as amended.~~

**.2 National SafetyNET Service:** The broadcasting and automated reception of MSI via the Inmarsat EGC system, using languages as decided by the Administration concerned, although the use of the English language is encouraged.

**.2 FleetNET:** A commercial service for the broadcasting and automatic reception of fleet management and general public information by means of direct printing through Inmarsat's EGC system. Some receivers for FleetNET may not be able to receive SafetyNET.

**2.2 NAVTEX:** The system for the broadcast and automatic reception of maritime safety information by means of narrow-band direct-printing telegraphy.

**.1 NAVTEX service area:** A unique and precisely defined sea area for which MSI is provided from a particular NAVTEX transmitter.

**.2 International NAVTEX Service:** ~~The system for the broadcasting and automatic reception of MSI by means of narrow band direct printing on 518 kHz, using the English language. NAVTEX receiving capability is part of the mandatory equipment which that is required to be carried in certain ships under the provisions of chapter IV of SOLAS 1974, as amended.~~The co-ordinated broadcasting and automatic reception on 518 kHz of MSI by means of narrow-band direct-printing telegraphy using the English language (as set out in the IMO NAVTEX Manual)

**.3 National NAVTEX service:** The broadcast and automatic reception of MSI by means of narrow-band direct-printing telegraphy using frequencies other than 518 kHz and languages as decided by the Administration concerned, although the use of the English language is encouraged.

**2.3 Inmarsat A:** ~~An analogue satellite communications system for transmission of voice, telex, facsimile or data using directional antennas in the Inmarsat satellite system. Inmarsat A was replaced by the digital version Inmarsat B and therefore it will be withdrawn by Inmarsat on 31 December 2007.~~

**2.3 Inmarsat B:** A digital satellite communications system for transmission of voice, telex, facsimile or data using directional antennas.

**2.4 Inmarsat C:** A digital satellite communications system for store-and-forward ~~telex~~ text or data messaging using small mobile terminals ~~and with omni-directional antennas in the~~

~~Inmarsat satellite system.~~ Inmarsat C is the only system that allows ships to meet the majority of the satellite communication requirements of the GMDSS.

**.1 Inmarsat mini-C:** a family of new, smaller mobile terminals with lower power consumption. Mini-C mobile terminals are based on the same technical requirements as Inmarsat C terminals and, depending on the model, can offer the same communication functions, including Distress alerting and reception of Maritime Safety Information. Some models are approved as GMDSS (SOLAS) compliant terminals.

**2.5 Inmarsat Fleet:** A satellite communication system that provides high-quality voice and flexible data communication services, e-mail and secure internet access for maritime users, comprising a family of Fleet F77, F55 and F33 mobile terminals. The Inmarsat Fleet F77 system provides voice distress and safety functionality and meets the requirements of IMO Resolution A.1001(25) "Criteria for the provision of mobile satellite communication systems in the global maritime distress and safety system (GMDSS)" for four stage prioritisation and pre-emption.

**2.6 Inmarsat FleetBroadband:** A communication service that provides cost-effective high-speed data services and voice, simultaneously, through compact terminals for maritime users.

**2.7 Inmarsat Land Earth Station (LES):** A fixed land station in the Inmarsat satellite communications system ~~which provides interconnection the acting as a gateway between the satellite and shore systems such as telex and telephone~~ the space segment and the terrestrial communication networks.

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**2.8 Inmarsat Network Co-ordination Station (NCS):** A fixed land station in the Inmarsat satellite communications system which controls channel assignments and ~~other communications functions through a satellite for an entire~~ provides network management functions in each satellite ocean region. NCSs also transmit EGC messages on the NCS common channel.

**2.9 Inmarsat Ship Earth Station (SES):** A mobile ~~earth station~~ user terminal in the maritime mobile-satellite service located aboard a ship.

**2.10 Maritime Safety Information (MSI):** Navigational and meteorological warnings, meteorological forecasts and other urgent safety-related messages broadcast to ships<sup>5</sup> (as defined in Regulation IV/2 of the 1974 SOKAS Convention, as amended).

**.1 Meteorological information:** Marine meteorological warning and forecast information in accordance with the provisions of the SOLAS Convention, 1974, as amended.

**.2 Navigational warning:** Message containing urgent information relevant to safe navigation broadcast to ships in accordance with the provisions of the SOLAS Convention, 1974, as amended.

**.3 SAR information:** Distress alert relays and other urgent search and rescue information broadcast to ships.

**.4 Other urgent safety related information:** Maritime safety information broadcast to ships that is not defined as a navigational warning, meteorological information or

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<sup>5</sup> Includes electronic chart correction data (COM 35/17, section 4.4)

SAR information. This may include, but is not limited to, significant malfunctions or changes to maritime communications systems and new or amended mandatory ship reporting systems or maritime regulations affecting ships at sea.

**2.11 METAREA:** A geographical sea area established for the purpose of co-ordinating the broadcast of marine meteorological information.

**2.12 NAVAREA:** A geographical sea area established for the purpose of co-ordinating the broadcast of navigational warnings.

**2.13 Satellite coastal warning area:** A unique and precisely defined sea area within a NAVAREA/METAREA or Sub-Area established by a coastal state for the purpose of co-ordinating the broadcast of coastal maritime safety information through the SafetyNET service.

**2.14 User defined area:** A temporary geographic area, either circular or rectangular, to which maritime safety information is addressed.

**2.15 Registered information provider:** An MSI provider, authorized in accordance with annex 8 [*Check the reference*] of this Manual, which has an agreement with one or more LESs for providing SafetyNET broadcast information.

**2.16 Rescue eCo-ordination eCentre (RCC):** A unit responsible for promoting efficient organization of search and rescue services and for coordinating the conduct of search and rescue operations within a search and rescue region.

**2.17 Sea area A1:** An area within the radiotelephone coverage of at least one VHF coast station in which continuous DSC<sup>64</sup> alerting is available, as may be defined by a Contracting Government.

**2.18 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.

**2.19 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.

**2.20 Sea area A4:** An area outside sea areas A1, A2 and A3.

### 3 General features of the enhanced group call system

**3.1** Inmarsat's EGC system is part of the Inmarsat C system and is complementary to the International NAVTEX Service. The EGC system supports two services:

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<sup>64</sup> Digital selective calling (DSC) means a technique using digital codes which enables a radio station to establish contact with and transfer information to another station or group of stations and complying with the relevant recommendations of the International Radio Consultative Committee ((CCIR) – ‘‘Radiocommunications Bureau of the International Telecommunication Union’’ from 1 March 1993).

.1 SafetyNET for promulgation of MSI; and

.2 FleetNET – for transmission of fleet management and general public information to fleets or groups of ships.

**3.2** Virtually all navigable waters of the world are covered by the operational satellites in the Inmarsat system. Each satellite transmits EGC traffic on a designated channel. Any ship sailing within the coverage area of an Inmarsat satellite will be able to receive all SafetyNET messages broadcast over this channel by that satellite. The EGC channel is optimized to enable the signal to be monitored by a small ~~receive-only~~ Inmarsat C or Mini-C 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.

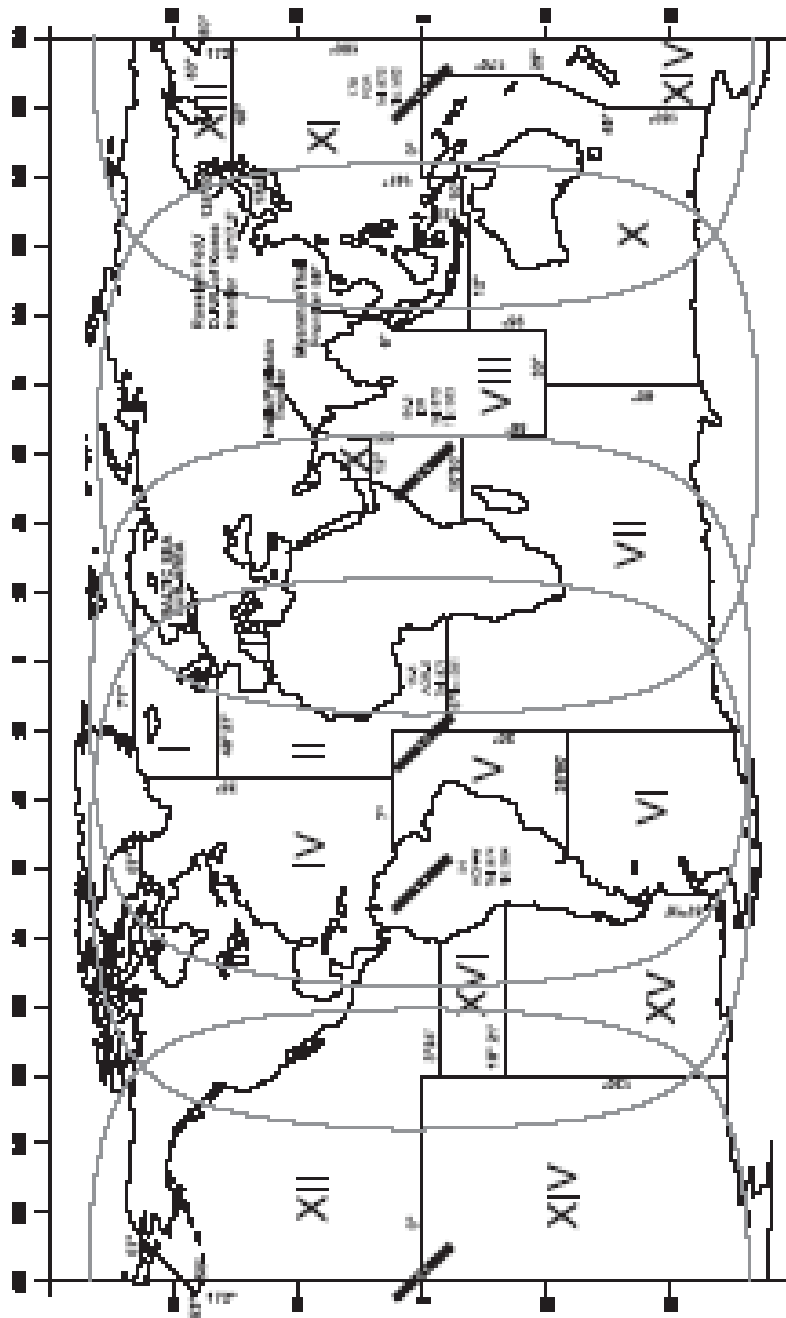
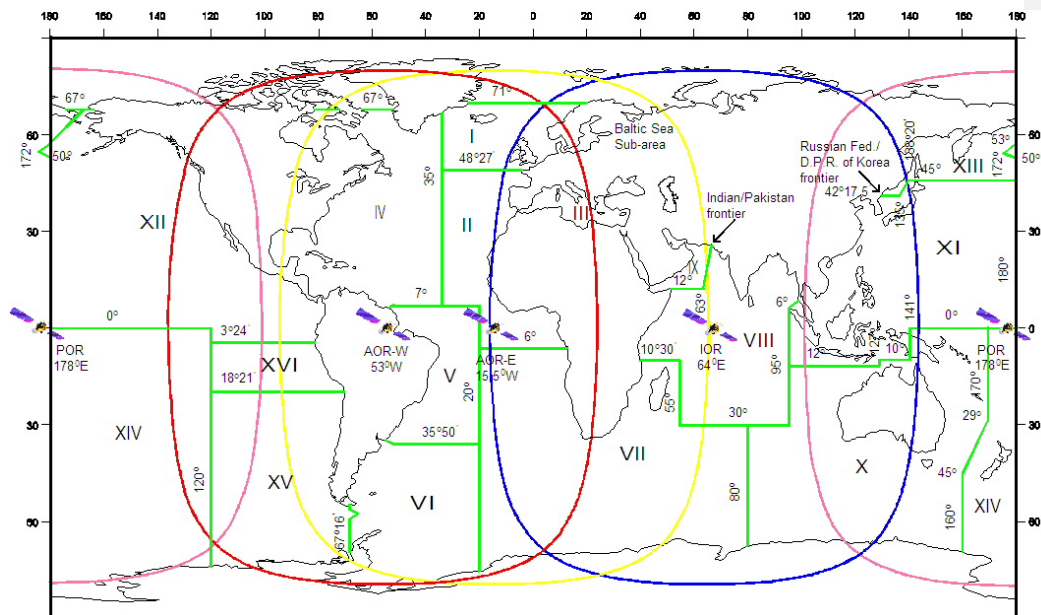


Figure 3 – NAVAREAS/METAREAS with Inmarsat global coverage

Figure 3 – To change satellite location for AOR-W as 53°W and IOR as 64°E. Change format of satellite location as 53°W, etc. Any other changes???



**Figure 3-** NAVAREAs/METAREAs with Inmarsat satellite coverage

**3.3** Messages can be addressed either to geographical areas (*area calls*) or to groups of ships (*group calls*):

.1 *Area calls* can be addressed to a fixed geographical area, such as one of the **+621** NAVAREAs/METAREAs (figure 3), or to a temporary geographical area (rectangular or circular), or coastal area selected by the **originator** MSI provider. Area calls will be received automatically by any ship whose position is inside the selected area and whose receiver has been set to one or more fixed areas, or recognizes a temporary area by the geographic position. To receive Coastal warnings, the EGC receiver should also be set up with appropriate B1 and B2 codes.

.2 *Group calls* will be received automatically by any ship whose receiver acknowledges the unique **Enhanced Network** group **identity** **Identity** (ENID) 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** **no-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 receiving and 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 displayed and printed only by those receivers which recognize the fixed area, or the geographical position or coastal area and subject indicator in the message. The message format includes a preamble which will enable the microprocessor in a ship’s receiver to

decide to display and print only those MSI messages which relate to present position, to intended route, or to fixed and coastal areas programmed by the operator. This preamble also allows suppression of certain types of MSI which are not relevant to a particular ship.

~~4.2~~ As each message will also have a unique identity the printing of messages already received correctly is automatically suppressed.

~~4.32~~ When a message has been received error-free, a permanent record is made of the unique message sequence number, and the LES identifier and the service code 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.~~

~~4.3~~ An EGC receiver is capable of storing at least 255 such message identifications. These message identifications are 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, the oldest message identification shall be erased.

~~4.4~~ Reception of certain types of messages, such as shore-to-ship distress alerts, SAR information, and meteorological and navigational warnings addressed to a geographical area within which the EGC receiver is located is mandatory and cannot be suppressed by ships in the affected area. These messages are identified by service codes (C2) 00, 04, 14, 24, 31, 34 and 44. (Refer to annex 2, paragraph 3.5). *[Check the reference]*

~~4.5~~ SafetyNET messages can be addressed to temporary geographical areas, which may be circular (figure 4) or rectangular (figure 5) in shape. A circular area is described by latitude and longitude of the centre in degrees and a radius of the circle (in nautical miles). ~~from a location specified in degrees of latitude and longitude.~~ A rectangular area is described by latitude and longitude of the southwest corner in degrees of latitude and longitude from the latitude and longitude of the south-west corner of the rectangle. and extension in degrees to the North and East of the rectangle.

~~4.6~~ In the case of a ship in distress, the need may exist to create a temporary geographical area to facilitate the locating of potential assisting ships. One approach might be to transmit a shore-to-ship distress alert to a circular area defined by the position of the casualty and a radius ~~about~~ around the casualty. This ~~can be~~ is done so that only those ships likely to be in the vicinity, potentially in a position to help, are alerted. If no response is received from any ship at the first call, the area can, if necessary, be expanded in steps until an acknowledgement by one or more ships is received.

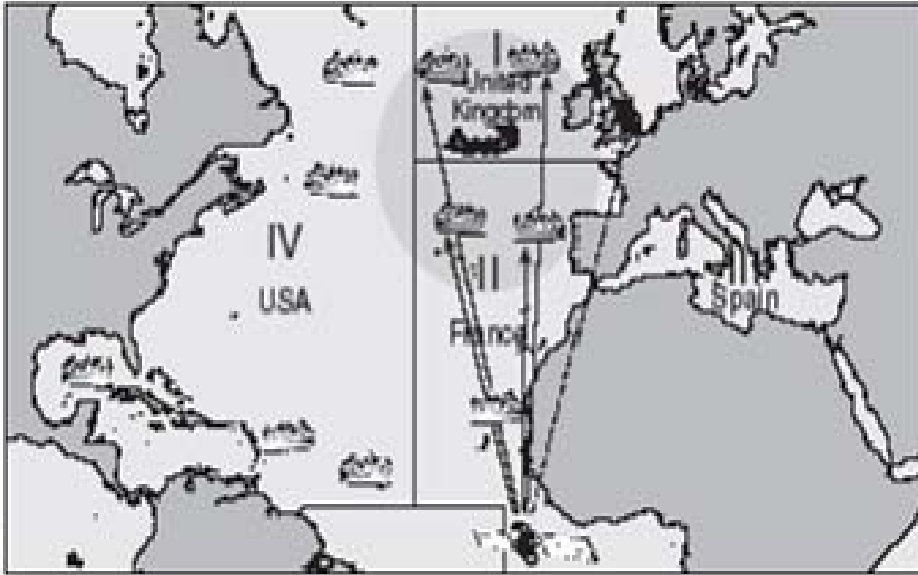


Figure 4 - SafetyNET circular geographic addressing

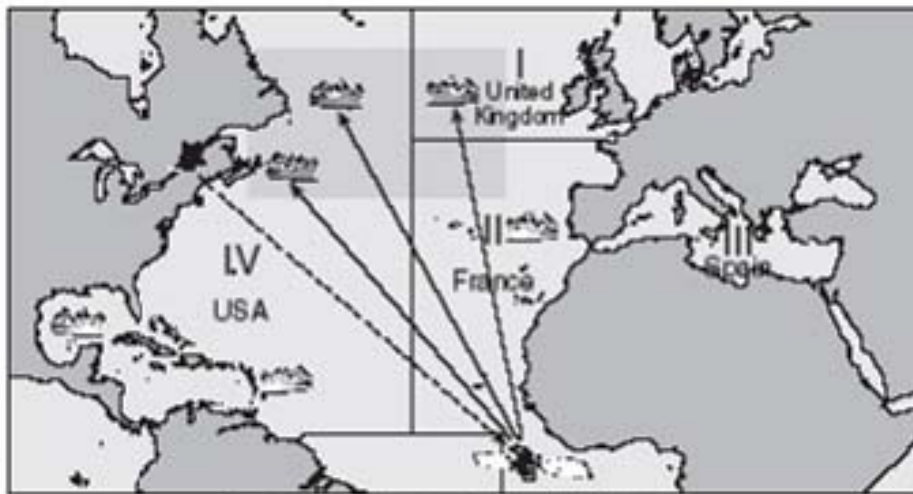


Figure 5 - SafetyNET rectangular geographic addressing

*[Pictures will be replaced with better quality]*

## 5 Promulgation of maritime safety information

**5.1** Maritime safety information is promulgated by various officially registered information providers around the world. Messages for transmission through the SafetyNET service will, in many cases, be the result of co-ordination between authorities. Information providers will be registered and authorized to broadcast via SafetyNET by the International



Maritime Organization (IMO) in accordance with the procedures in annex 8. [Check the reference]. Registered information providers will include, but may not be limited to:

- .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, SAR coordination and other urgent information; and
- .4 the International Ice Patrol for North Atlantic ice hazards;
- .5 anti-piracy centre(s) for piracy countermeasures messages;
- .6 tsunami and other natural disaster warnings centres; and
- .7 security related authorities – ISPS Code

5.2 Broadcasts of MSI in the International SafetyNET Service will be in English; however, there is often a national requirement for broadcasts to be made also in other languages. Guidance on the use of other languages is contained in the relevant technical publications of IMO, the International Hydrographic Organization (IHO) and the World Meteorological Organization (WMO).

5.3 EGC messages include instructions to the LES for processing the messages MSI in the form of a special address header which consists of five or six C-codes as described below:

C0 Ocean Region	C1 Priority	C2 Service Type	C3 Address	C4 Repetition	C5 Presentation
0 - AOR-W 1 - AOR-E 2 - POR 3 - IOR	1 - Safety 2 - Urgency 3 - Distress	00 – All ships (general call)	2 digit – 00	Category (a) - for EGC messages to be repeated a finite number of times.  Category (b) - for EGC messages to be repeated at specified intervals until cancelled by the Information provider	7-bit ASCII (IA5) character code (always 00 for SafetyNET)
		04 - Urgency message, NAV warning to rectangular area	12 digit – rectangular address D <sub>1</sub> D <sub>2</sub> N(S)D <sub>3</sub> D <sub>4</sub> D <sub>5</sub> E(W)D <sub>6</sub> D <sub>7</sub> D <sub>8</sub> D <sub>9</sub> D <sub>10</sub>		
		13 - Coastal Warning	4 digit -X <sub>1</sub> X <sub>2</sub> B <sub>1</sub> B <sub>2</sub>		
		14 - Shore-to-Ship Distress Alert to circular area	10 digit - circular address D <sub>1</sub> D <sub>2</sub> N(S)D <sub>3</sub> D <sub>4</sub> E(W)M <sub>1</sub> M <sub>2</sub> M		
		24 - Urgency message, Met/Nav Warning to circular area	10 digit - circular address D <sub>1</sub> D <sub>2</sub> N(S)D <sub>3</sub> D <sub>4</sub> E(W)M <sub>1</sub> M <sub>2</sub> M <sub>3</sub>		
		31 – MET/NAVAREA Warning or MET Forecast	2 digit – number of NAV/METAREA		
		34 - SAR Coordination to rectangular area	12 digit - rectangular address D <sub>1</sub> D <sub>2</sub> N(S)D <sub>3</sub> D <sub>4</sub> D <sub>5</sub> E(W)D <sub>6</sub> D <sub>7</sub> D <sub>8</sub> D <sub>9</sub> D <sub>10</sub>		
		44 - SAR Coordination to circular area	10 digit - circular address D <sub>1</sub> D <sub>2</sub> N(S)D <sub>3</sub> D <sub>4</sub> E(W)M <sub>1</sub> M <sub>2</sub> M <sub>3</sub>		

**Where:**

- C0 ocean area code - 1 digit (optional code)
  - 0 – Atlantic Ocean Region - West
  - 1 - Atlantic Ocean Region - East
  - 2 – Pacific Ocean Region
  - 3 - Indian Ocean Region
  - 9 – all ocean regions (*Note: availability of C0=9 should be check with LES operator or service provider*)
- C1 priority code 1 digit  
(distress, urgency or safety, ~~routine~~)
- C2 service code 2 digits  
(e.g. meteorological warning or forecast to METAREA, etc.)
- C3 address code 2, 4, 10 or 12 alphanumeric characters or fewer  
(e.g. meteorological warning to circular area – 10 characters)
- C4 repetition rate code 2 digits  
(e.g. transmit once on receipt)
- C5 presentation code 2 digits  
(e.g. International Alphabet Nr 5, odd parity)

**5.4** SafetyNET messages are stored at the LES until transmitted the appropriate number of times, as specified by the C4 code.

**5.5** The ~~originator~~ MSI provider may also cancel a message before the desired number of repetitions has been made by sending an appropriate cancellation message to the LES. Examples of SafetyNET messages are given in annex 4.

**5.6** Messages destined for areas of 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 LES, i.e. one LES in each ocean region. Most authorized MSI providers avoid the necessity of such multiple broadcasts by specifying which satellite will be used to serve particular sea areas and scheduling their broadcasts at fixed times. In an area of overlap coverage from two or three ocean region satellites, unscheduled distress alert relays and urgency warnings will be broadcast over all satellites which cover the affected region. Scheduled broadcasts will be made over nominated satellites and at specified times, as selected by the meteorological and hydrographic services. Tables of these schedules are contained in the Master Plan of Shore-Based Facilities for the Global Maritime Distress and Safety System, as amended, published by IMO <sup>75</sup>

**5.7** In order to ensure the integrity of the MSI being received by mariners, MSI providers must monitor the broadcasts which they originate. Monitoring is especially important in a highly automated system, which is dependent on careful adherence to procedure and format.

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<sup>75</sup> As part of the GMDSS Handbook (IB970E).

This may be accomplished by installation of an EGC receive facility ashore for use by each information provider to:

- .1 check that the message has been broadcast;
- .2 confirm that the message is received correctly;
- .3 ensure that cancellation messages are properly executed; and
- .4 observe any unexplained delay in the message being broadcast.

~~5.8 — When an EGC receive facility is established ashore, the most reliable and highest-quality reception will normally be achieved with the use of a helical directional antenna.~~

## 6 Accessing the SafetyNET service

**6.1** MSI messages are transmitted by telex, data-link or other terrestrial communications ~~Inmarsat A, Inmarsat B or Inmarsat C~~ to LESs providing Inmarsat C services in accordance with national and international routing 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 LES operators.

**6.2** Telex is the standard method for delivery of traffic to the LESs; however, ~~some~~ **all** LESs will have the capability to receive data transmissions from intelligent microcomputers using the X.25 (packet switching protocol) and X.400 message handling standards. EGC messages via two-stage X25 PSDN, TCP/IP interface, Inmarsat C web access and public switched telephone network (PSTN). Each user interface has its own access procedure and syntax command, which should be checked with the Inmarsat C LES operator.

*Note: some LESs may provide e-mail, or internet (direct) drop access to the SafetyNET service that allows registered MSI providers to send EGC messages using e-mail from any computer with access to the internet. Due to the nature of internet, the e-mail service does not guarantee that EGC messages will be received by the addressed LES without delay and hence by ships at sea. In addition, the e-mail service does not support any cancellation procedure, if category (b) repetition codes are used, and MSI providers will need to have a separate or additional agreement/procedure with the LESO to cancel the EGC broadcast. As a result, the international SafetyNET co-ordinating Panel does not recommend MSI providers to use e-mail service and instead use a two-stage registered access procedure only.*

~~**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 LES, may install a ship earth station (SES) on the premises to transmit SafetyNET messages to the serving Inmarsat C LES, 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 LES, 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 Land ~~earth station~~ Earth Station functions

7.1 Messages for transmission via the SafetyNET service are received and processed automatically at the LES. Because the system is automatic, ~~success~~ the quality of service and information depends on accurate preparation of messages.

7.2 Messages are not reviewed for corruption or accuracy at the LES; therefore, the originator must take special care to adhere to the format specified. This dependence on syntax is one reason why MSI providers must monitor the broadcasts they originate.

7.3 Participating LESs transmit SafetyNET messages over an inter-station signalling link to the ocean region network co-ordination station (NCS) for transmission over the broadcast channel (see figure 1).

7.4 Messages will be queued at the LES ~~according to priority~~ and scheduled for ~~retransmission~~ according to priority and instructions contained in the special address headers (C1 – priority code and C4 – repetition code); messages with the highest priority will be transmitted first. Shore-to-ship distress alerts will be broadcast first followed by urgency ~~and then safety priority 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 that~~ arise when deep fades are present). This ensures that there is a high probability of receiving a message correctly at the first transmission, irrespective of ~~the atmospheric conditions or~~ the ship's position within the satellite's coverage.

## 9 Receiving SafetyNET broadcasts

9.1 The basic requirements of the EGC receiver are that it should continuously receive the broadcast channel (the Inmarsat C NCS common channel) and process the messages being transmitted through the satellite. However, certain classes of receiving equipment may not provide wholly uninterrupted monitoring of the broadcast channel. For this reason, authorized MSI providers must repeat their most important unscheduled messages 6 minutes after the first broadcast.

9.2 Although the ~~receiver~~ SES receives all SafetyNET messages on the broadcast channel, it incorporates a microprocessor, which can be programmed to reject some messages for displaying and 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 or coastal) which do not include the ship's position or terminal's setup.

9.3 Messages which have been rejected will not be displayed and 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 for the area within which the ship is located. When a distress or urgency message is received, an audio and visual alarm will be given.

9.4 Although reception of SafetyNET traffic is automatic, the shipboard operator must set up the receiver properly at the start of the voyage:

.1 Selection of the appropriate broadcast channel (this may be an automatic function): In an area of overlap coverage from two or three ocean region satellites, unscheduled distress alert relays and urgency warnings will be broadcast over all satellites which cover the affected region. Scheduled broadcasts will be made over nominated satellites and at specified times, as selected by the meteorological and hydrographic services. Tables of these schedules are contained in the Master Plan of Shore-Based Facilities for the Global Maritime Distress and Safety System, as amended.

.2 The identification code number of an additional NAVAREA(s)/METAREA(s), fixed geographical areas, i.e. NAVAREA/METAREA positions and coastal MSI areas (and subject indicator characters) for which it is desired to receive MSI information must be put entered into the receiver. MSI addressed to the main NAVAREA/METAREA where the ship is located is received by default. An EGC receiver is able to identify which NAVAREA/METAREA the ship is in and receives MSI for that area automatically.

.3 The ship's position must also be keyed in at periodic intervals or automatically provided through an interface with on modern SESs is usually updated automatically from integrated navigational receivers or from the ship's electronic position-fixing system. If there is no an automatic position update, it is recommended that the ship's position in the receiver is be updated at least every 4 hours. If the ship's position has not been updated for more than 24 12 hours or is unknown, all geographically addressed SafetyNET messages within the entire ocean region will be printed out or stored on disk in memory.

9.5 It is recommended that, in order to ensure that all necessary MSI is available before sailing, the EGC receiver remains in operation while the ship is in port.

9.6 If the ship's EGC receive facility is a Class 2 Inmarsat C SES (having a common receiver for Inmarsat C messages and MSI), 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 (having two separate receivers for Inmarsat C messages and MSI) 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, as amended.

*Note: More information on different classes of Inmarsat C SESs and EGC receivers is in annex 6, paragraph 2.2 and figure 6.*

~~9.7~~ If the ship's EGC receive facility shares a directional antenna with an Inmarsat SES (e.g. an Inmarsat A or B 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, as amended.

## 10 Charges for SafetyNET services

10.1 There are no charges to the mariner for ~~receipt~~ reception of SafetyNET messages.

10.2 Message transmission charges apply to MSI providers and are set by national telecommunication service providers and ~~land earth stations~~ LESs offering EGC services.

~~10.3~~ Maritime safety information to be broadcast through the International SafetyNET Service is transmitted to the LES via telex, data link, or an Inmarsat A/Inmarsat B/Inmarsat C transmission, for which the normal charges will apply.

## 11 Planning SafetyNET services

11.1 Hydrographic, meteorological, and search and rescue and other authorities planning to provide MSI to ships at sea should co-ordinate their plans with other national authorities and with IHO, IMO and WMO.

11.2 Prospective registered information providers should contact IMO at an early stage for advice and to obtain authorization to broadcast via SafetyNET. The International Maritime Organization, in co-operation with IHO and WMO, undertakes the co-ordination of times for scheduled transmissions as explained in annex 7 [reference TBC] of this publication.

11.3 Registered information providers should contact the LES operator/s of the LES(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 LES, 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 maritime safety services, **Inmarsat Global Ltd, 99 City Road, London EC1Y 1AX, United Kingdom**. E-mail address: **maritime\_safety@inmarsat.com**

## 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);  
and
- .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:

- .1 develop operating methods for the effective use of the SafetyNET service, including consideration of the need for scheduled broadcasts;
- .2 develop documentation in support of the SafetyNET service, in particular the International SafetyNET Manual;
- .3 advise Land Earth Station (LES) operators and potential registered information providers on all aspects of the Service, including system access and effective operation;
- .4 develop criteria and establish means for the approval and registration of potential information providers;
- .5 co-ordinate the registration of potential information providers; and
- .6 promote a proper understanding of the benefits and use of the International SafetyNET Service among the wider maritime community.

**2 Contact address**

The International SafetyNET Co-ordinating Panel can be contacted at the following address:

The Chairman  
International SafetyNET Co-ordinating Panel  
International Maritime Organization  
4 Albert Embankment  
London SE1 7SR  
United Kingdom

Telephone: +44 (0)20 7735 7611  
Telex: 23588 IMOLDN G  
Telefax: +44 (0)20 7587 3210  
E-mail: info@imo.org

**3 Panel membership**

**3.1** The International SafetyNET 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 Mobile Satellite Organization (IMSO)

**3.2** The following may be represented as observers on the panel:

IHO Commission on Promulgation of Radio Navigational Warnings  
IMO NAVTEX Co-ordinating Panel.

[Expert Team on Maritime Safety Services of the Joint WMO/IOC Commission for Oceanography and Marine Meteorology \(JCOMM\)](#)

[Inmarsat](#)

## Annex 2

### *Annex to IMO Assembly resolution A.664(16) [number TBC]: Recommendation on performance standards for enhanced group call equipment [Proposed changes]*

#### 1 Introduction

1.1 The enhanced group call (EGC) equipment to be used in the ~~Inmarsat system-GMDSS~~ should comply with the general requirements set out in Assembly resolution A.694(17), IEC 61097-4, IEC 60945 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 for later printing, with indication to the operator that the message has been received, ~~for later printing~~, except for the vital messages referred to in paragraphs 3.2 ~~and 3.5~~, which should be stores and printed out upon receipt.

1.3 The equipment should provide a visual indication that the ship's position has not been updated during the last 12 hours. It should only be possible to reset this indication by revalidating the ship's position.

1.34 The EGC installation may be either separate or combined with other installations<sup>85</sup>

#### 2 Technical requirements

The equipment should be type-approved by Inmarsat and should comply with the environmental conditions and electromagnetic compatibility requirements specified in the Inmarsat technical requirements for the EGC receiver.

#### 3 Operation

3.1 Means should be provided to enter the ship's position and current and planned NAVAREA/METAREA area-codes manually so that area group calls can be received. Means should also be provided to enter current and planned coastal warning service coverage areas and different classes of messages. Optionally, the ship's position, as determined by the navigational equipment, may be entered automatically and the area code automatically derived therefrom.

3.2 Provision should be made for a specific aural alarm and visual indication at the position from which the ship is normally navigated, to indicate receipt of a distress or urgency priority enhanced group call message-call or a call having distress category. It should not be possible to disable this alarm and it should only be possible to reset it manually and only from the position where the message is displayed or printed.

3.3 The equipment should indicate when it is not correctly tuned or synchronized to the EGC carrier.

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<sup>85</sup> Elements of other installations, e.g. the antenna, low-noise amplifier and down-converter of the ship earth station, may be shared for the reception of EGC messages.

**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<sup>96</sup> should be under the operator's control except that equipment should always receive ~~be unable to reject relevant~~ navigational warnings, meteorological warnings and forecasts, search and rescue information and ~~certain~~ special warnings shore-to-ship distress alerts, which are directed to a fixed or absolute geographical area within which the ship is operating.

**3.6** Means should be provided not to ~~reprint~~ or store the same message after it has been received without error.

**3.7** The printing device should be capable of printing at least the standard International Alphabet ~~No. Number-5~~ (IA5) character ~~set code~~. Other character ~~sets codes~~ are optionally used according to ISO 2022\* standards or ~~CCITT-ITU-T~~ Recommendation T.61. *[to check if it is T.61 or T.50]*

\* ISO 2022, "Information technology – Character code structure and extension techniques" standards. [to check if it is still valid]

**3.8** The printing device should be able to print at least 40 characters per line.

**3.9** The signal processor and printing device should ensure that if a word cannot be accommodated in full on its line, it should be transferred to the next line. The printing device should automatically feed five lines after completing the printed messages.

3.10 A local audible alarm should be sounded to give advanced warning of the printing device "paper low" condition. It should not be possible to confuse the sound of the "paper low" alarm with that of the distress or urgency alarm upon (caused by) reception of a distress or urgency priority message.

## **4 Power supply**

**4.1** The EGC equipment should normally be powered from the ship's main source of electrical energy. In addition, it should be possible to operate the EGC equipment, and all other equipment necessary for its normal functioning, from an alternative source of energy.

**4.2** Changing from one source of supply to another, or any interruption of up to 60 seconds' duration of the supply of electrical energy, should not require the equipment to be manually re-initialized and should not result in loss of received messages stored in the memory.

## **5 Antenna siting**

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<sup>96</sup> The meaning of the service codes is in accordance with the Recommendation ITU-R M.540-2 1990, Operational and technical characteristics for an automated direct-printing telegraph system for promulgation of navigational and meteorological warnings and urgent information to ships.  
~~The meaning of the service codes is the same as for the NAVTEX system.~~

**5.1** Where an omni-directional 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  $-5^{\circ}$  and in the port and starboard directions down to  $-15^{\circ}$ .

**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  $-5^{\circ}$ .

**5.3** For omni-directional antennas, objects, especially those within 1 m of the antenna, which cause a shadow sector of greater than  $2^{\circ}$ , especially those within 1 m of the antenna, are likely to degrade significantly the performance of the equipment.

**5.4** For directive antennas, objects, especially those within 10 m of the antenna, which cause a shadow sector of greater than  $6^{\circ}$ , especially those within 10 m of the antenna, are likely to degrade significantly the performance of the equipment.

## **Annex 3**

### *The Inmarsat system*

1 There are three essential components of the Inmarsat system:

.1 the Inmarsat space segment – the satellites and their ground support facilities – planned and funded by Inmarsat;

.2 the ground segment – comprises a network of Land Earth Stations (LESs), Network Coordination Stations (NCSs) and the Network Operations Centre (NOC). Each LES which provides an interface between the space segment and the national and international fixed telecommunication networks, and which are generally funded and operated by the LES Operators who are Inmarsat Shareholders and distribute Inmarsat services; and

.3 the Ship Earth Stations (SEs) – the satellite communication terminals which are purchased or leased by individual ship owners/operators, installed on board ships.

2 Shore-to-ship communications are in the 6 GHz band (C-band) from the LES 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 (L-band) from the ship to the satellite and in the 4 GHz band (C-band) from satellite to LES.

### **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). Each ocean region is served by a dedicated satellite. Inmarsat has full contingency plans in place in the unlikely event of any prime satellite outage. These plans are examined exercised regularly and are witnessed by the International Mobile Satellite Organization (IMSO). The high polar regions cannot be seen by geostationary satellites (figure 3).

~~3.3 The Inmarsat Network Operations Centre (NOC) in the United Kingdom functions around the clock co-ordinating the activities of the network co-ordination stations (NCSs) and the LESs in each ocean region.~~

### **4 Land-earth stations. The ground segment**

4.1 The Inmarsat system is connected into the world-wide telecommunication networks via LESs. Many of these LESs provide Inmarsat C EGC services. ~~The wide spread of LESs around the world offers flexibility and the prospect of shorter landlines to access the desired LES.~~

4.2 For each Inmarsat system and ocean region there is a Network Coordination Station (NCS), which monitors and controls communications traffic within its ocean region. Each

NCS communicates with the LESs in its ocean region, the other NCSs and the Network Operations Centre (NOC). Inmarsat C NCSs also transmit EGC SafetyNET and FleetNET messages on the NCS common channel.

**4.3** The Inmarsat Network Operations Centre (NOC) is located in London at the Inmarsat headquarters and functions around the clock, co-ordinating the activities of the NCSs and the LESs in each ocean region.

## **5 Ship Earth Stations**

**5.1** Inmarsat C EGC and mini-C SESs with the EGC function are small, lightweight terminals, with small omni-directional antennas, for providing data and message-type services. EGC receive capability is provided by Class 2 or 3 Inmarsat C SESs. Interfaces via RS232 ports are provided for a dedicated messaging unit, personal computer or any other data terminal equipment for message generation and display. The antenna is small and light enough to be installed on any ship or boat.

**5.2** Class 0 standalone EGC receivers provide the capability to receive SafetyNET and FleetNET messages only; there is no transmit capability for sending outgoing messages. The EGC antenna is identical to an Inmarsat C antenna.

**5.3** The technical requirements of all classes of equipment are ~~found~~ in annex 6 of the present publication. *[Check the reference]*

## Annex 4

### Operational guidance

**1** This annex contains operational guidance for the benefit of registered **information MSI** 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** Types of messages and message formats are detailed in the sub-sections of this annex.

a – Navigational warning service

b – Meteorological service

c – Search and rescue (SAR) services and SAR coordination traffic

d – Piracy countermeasures broadcast messages

e – Chart correction service (to be developed)

f – Weather graphical service (to be developed)

**3** The broadcast parameters are controlled by the use of five or six C-codes which are combined into a generalized message header format as follows:

C<sub>0</sub>:C<sub>1</sub>:C<sub>2</sub>:C<sub>3</sub>:C<sub>4</sub>:C<sub>5</sub>  
(C<sub>0</sub> – optional code and its use depends on the addressed LES)

*(Spaces, colons or other delimiters between these codes will be required, depending on the communication protocol required by the Land Earth Station addressed.)*

*Note: Description of C-codes is given in Chapter 5 “Promulgation of maritime safety information”, paragraph 5.3*

Each C-code controls a different broadcast parameter and is assigned a numerical value according to the options specified in the following sections. An additional C<sub>0</sub> code may be required to identify the ocean region when sending a broadcast message to a LES which operates to more than one ocean region.

**4** The International Maritime Organization (IMO) requires that, in order to allow the use of non-dedicated receive facilities, the majority of broadcasts on the International SafetyNET Service should be made at predetermined 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, maritime safety information (~~MSI~~) providers must install an Inmarsat SafetyNET receiver and monitor broadcasts of messages which they originate.

6 It has been agreed that the indicative key words MAYDAY/ PAN PAN/ SÉCURITÉ 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 SÉCURITÉ 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.

7 For all the services provided described below, a cancellation facility is provided for messages transmitted to a LES with category (b) repetition codes (see section e C, paragraph 3.4.3.2) [Check Reference number]. The CANCEL or DELETE instruction takes the form:

CANCEL (or DELETE) [message reference number] AT [date/time]

where the message reference number is the number given to the message provider by the LES on receipt of the initial message and the date/time is in the form DDHHMMZ MoMoMo YY. For example:

CANCEL [message reference number] 12345 AT 211430 UTC FEB 90 (where 12345 is the reference number given by the LES)

The LES should confirm the message cancellation or deletion.

Note: detailed operational procedure on how to cancel (or delete) an EGC SafetyNET message is usually contained in the instruction (manual) on sending EGC broadcast given to the MSI providers after registration with the LES operator or service provider.

For example:

C<sub>1</sub>:C<sub>2</sub>:C<sub>3</sub>:C<sub>4</sub>:C<sub>5</sub>  
[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 LES 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.

## Section a A

### Navigational warning services



**1** The following guidelines set out the arrangements to be used for promulgating NAVAREA warnings, navigational and coastal warnings via SafetyNET for the GMDSS. They are mandatory for broadcasts in the International SafetyNET Service. Broadcasts originated by the International Ice Patrol also follow the guidelines in this section.

**2** These guidelines are to be read in conjunction with the IMO/IHO World-Wide Navigational Warning Service (WWNWS) Guidance Document (IMO Assembly resolution A.706(17), as amended).

**3** In order to ensure uniformity of the navigational warning product throughout the world, the following standard C-codes ~~are to~~ shall be used for warnings issued under the auspices of the WWNWS.

**3.1 C<sub>1</sub> – Message priority**

Normally C<sub>1</sub> = 1 (safety)  
 Exceptionally C<sub>1</sub> = 2 (urgency) (at discretion of the registered information MSI provider).

**3.2 C<sub>2</sub> – Service code**

NAVAREA warnings	C <sub>2</sub> = 31
Coastal warnings	C <sub>2</sub> = 13 (B broadcasts using NAVTEX codes to coastal areas where NAVTEX is not provided, or where NAVTEX broadcasts are to be duplicated)
(Urgency) navigational warnings to rectangular area	C <sub>2</sub> = 04 <i>[new service code is proposed for nav warnings as defined in the Inmarsat-C SDM]</i>

**3.3 C<sub>3</sub> – Address code**

NAVAREA warnings	C <sub>3</sub> = the two digits of the NAVAREA number, with a leading zero where necessary, e.g. 01 or 13
Coastal warnings	C <sub>3</sub> = four alphanumeric characters X <sub>1</sub> X <sub>2</sub> B <sub>1</sub> B <sub>2</sub> . X <sub>1</sub> X <sub>2</sub> to identify the NAVAREA and B <sub>1</sub> B <sub>2</sub> to emulate NAVTEX relevant codes. B <sub>1</sub> codes are allocated by IMO in accordance with the procedure for allocating NAVTEX transmitter identities laid down in the NAVTEX Manual. B <sub>2</sub> is the subject indicator character and will always be A or L.
Navigational warnings to Rectangular area	C <sub>3</sub> = 12 alphanumeric characters

The circular address will consist of 12 alphanumeric characters as follows:

$D_1D_2LaD_3D_4D_5LoD_6D_7D_8D_9D_{10}$

Where:

$D_1D_2La$  (three characters) is the latitude of south-west corner of the rectangle in degrees, and La whether north (N) or south (S). A leading zero should be used for latitudes less than 10°.

$D_3D_4D_5Lo$  (four characters) is the longitude south-west corner of rectangle 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°.

$D_6D_7$  (two characters) is extent of rectangle in latitude to the North (degrees).

$D_8D_9D_{10}$  (three characters) is extent of rectangle in latitude to the East (degrees).

*Example:* A rectangle whose south-west corner is latitude 12°S and longitude 130°E, extending 25° North and 10° East, is coded as:

12S130E25010

### 3.4 $C_4$ – Repetition code

Urgent navigational warnings should be transmitted as soon as possible after receipt. They should be repeated on a scheduled broadcast, once a day for six weeks unless previously cancelled. The following examples of repetition codes should be used as appropriate.

- |  |  |
|--|--|
| <b>3.4.1</b> Initial unscheduled broadcast of NAVAREA warnings, and coastal warnings with urgency priority | $C_4 = 11$ (transmit on receipt, repeated 6 minutes later) |
| <b>3.4.2</b> Scheduled broadcast of NAVAREA warnings with safety priority                                  | $C_4 = 18$ (repeat broadcast every 24 hours, no echo)      |

*Note: the term “echo” here and further down in the text is associated with using  $C_4$  repetition codes, category (b), and means an automatic repeated broadcast in 6 minutes after initial broadcast.*

- |  |  |
|--|--|
| <b>3.4.3</b> Scheduled broadcast of coastal warnings with safety priority: | $C_4 = 42$ (repeat broadcast every 4 hours, no echo) |
|--|--|

### 3.5 $C_5$ – Presentation code

Always C<sub>5</sub> = 00, International Alphabet Number 5.

4 NAVAREA warnings should be considered for repromulgation in adjacent NAVAREAs in accordance with paragraph 6.2.6 of the IMO/IHO WWNWS Guidance Document. *[Check the reference]*

5 In a similar way, ~~NAVTEX information~~ coastal warnings, which must be received in by ships before they enter a NAVTEX coastal area, ~~from an area not covered by NAVTEX~~ should be passed to the NAVAREA Co-ordinator for broadcast to the ~~surrounding~~ adjacent NAVAREA as a NAVAREA warning or as a coastal warning where the service is available.

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 if C<sub>4</sub> = 18 repetition code is used). 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 or requires duplication) as apply to NAVTEX broadcasts. These standards are laid down in the NAVTEX Manual.

8 An example of a NAVAREA warning ~~message~~ submission is:

```
0:1:31:04:18:00
SÉCURITÉ
[text]
NNNN
Cancell 16392 AT271435 UTC JUL 90
```

9 An example of a coastal warning ~~message~~ submission is:

```
1:1:13:03MA:42:00
SÉCURITÉ
[text]
NNNN
```

## **Section b B**

### *Meteorological services*

1 The following ~~guidelines~~ set out the arrangements to be used for ~~the broadcast~~ promulgating ~~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~~ forecasts and warnings globally, the following ~~standard~~ C-codes should be used for meteorological ~~forecasts and warnings issued~~ ~~services~~ via SafetyNET for the GMDSS.

### 3.1 $C_1$ – Message priority

Always  $C_1 = 2$  (urgency) for warnings

*Note: to be used for urgent tropical cyclone warnings ~~only~~, or urgent warnings with force 12 Beaufort or above, only. All other warnings to be classified as safety ( $C_1 = 1$ ).*

Always  $C_1 = 1$  (safety) for forecasts ~~and warnings (see note above).~~

### 3.2 $C_2$ – Service code

Meteorological warnings or forecasts to METAREA  $C_2 = 31$

Meteorological or forecasts to coastal area  $C_2 = 13$  (broadcast using NAVTEX relevant codes  $B_1$  and  $B_2$  to coastal areas where NAVTEX is not provided or where NAVTEX broadcasts are to be duplicated)

Meteorological warnings to circular area:  $C_2 = 24$

[Urgency] Meteorological warnings or forecasts to area to rectangular area  $C_2 = 04$  [new service code is proposed to be used for Arctic areas as temporary solution]

### 3.3 $C_3$ – Address code

Meteorological warnings ( $C_1 = 1$  or 2) to circular area (service code  $C_2 = 24$ ):  $C_3 = 10$  alphanumeric characters.

The circular address will consist of 10 characters as follows:

$$D_1D_2LaD_3D_4D_5LoR_1R_2R_3$$

Where:

$D_1D_2La$  (three characters) is latitude of centre in degrees, and La whether north (N) or south (S). A leading zero should be used for latitudes less than  $10^\circ$ .

$D_3D_4D_5Lo$  (four characters) is longitude of centre in degrees, and Lo whether east (E) or west (W) of the prime meridian. One or two leading zeros should be used for longitudes less than  $100^\circ$ .

$R_1R_2R_3$  (three characters) is radius of circle in nautical miles, up to 999.

*Example:* A circle centred at latitude  $56^0N$  longitude  $34^0W$  with radius of 10 nautical miles is coded as:

56N034W010

Meteorological warnings or forecasts ( $C_2 = 31$ )

$C_3 =$  the two digits denoting the area of broadcast responsibility (of the METAREA), number with a leading zero where necessary, e.g., 01, 06, 13.

Coastal warnings or forecasts ( $C_2 = 13$ ) ~~broadcasts using NAVTEX  $B_1B_2$  codes to coastal areas where NAVTEX is not provided or where NAVTEX broadcasts are to be duplicated~~

$C_3 =$  four alphanumeric characters  $X_1X_2B_1B_2$ .  $X_1X_2$  to identify the METAREA and  $B_1B_2$  to emulate NAVTEX relevant codes. Note that  $B_1$  codes will be allocated by IMO in accordance with the procedure for allocating NAVTEX transmitter identities laid down in the NAVTEX Manual.  $B_2$  is subject indicator character and will always be B or E. ~~The METAREA  $X_1$  and  $X_2$  codes and the NAVTEX  $B_1$  and  $B_2$  codes are sent to the LES as a four character group, in the order  $X_1X_2B_1B_2$ .~~

### 3.4 $C_4$ – Repetition code

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

Meteorological warning

$C_4 = 11$  (On receipt followed by repeat 6 minutes later) Note: a 6 minute repeat or echo is used to ensure that the warning is received by the maximum number of ships.

Meteorological forecast

$C_4 = 01$  (Transmit once on receipt.)

### 3.5 $C_5$ – Presentation code

Always  $C_5 = 00$ , International Alphabet Number 5.

Example of meteorological warning to METAREA (see note below):

1:1:31:01:11:00  
SÉCURITÉ  
[text]  
NNNN

Example of meteorological warning to circular area (i.e. only intended to be received by ships within the area of the address) (*see note below*):

```
1:2:24:20N065W500:11:00  
PAN PAN  
[text]  
NNNN
```

NB: PAN PAN is used for messages with urgency priority (C1 = 2).

Example of meteorological forecast (*see note below*):

```
3:1:31:08:01:00  
SÉCURITÉ  
[text]  
NNNN
```

Example of meteorological warning or meteorological forecast to coastal area (*see note below*):

```
3:1:13:10GE:01:00  
SÉCURITÉ  
[text]  
NNNN
```

Note: Broadcast text is to be as required by WMO Manual on Marine Meteorological Services. *[Check the reference document]*

## Section e C

### *Search and rescue services*

**1** The following guidelines set out the arrangements to be used by rescue co-ordination centres (RCCs) for initiating transmission of shore-to-ship distress alert relays and shore-to-ship search and rescue information. Transmissions should be in accordance with the relevant procedures of the International Telecommunication Union (ITU) Radio Regulations (RR), the International Convention on Maritime Search and Rescue, 1979, as amended, and the IAMSAR Manual. *[Check the reference documents]*

**2** In order to ensure uniformity of the search and rescue broadcast product throughout the world, the following C-codes should be used as described in this annex.

#### **Shore-to-ship distress alert relays**

**3** As a general principle, distress alert relays should be addressed to a circular area around the estimated or known position of the distressed vessel. The radius of the circle should be chosen to take account of the accuracy of the datum position, the expected density of shipping in the vicinity and the fact that the position can only be defined in the message address to the nearest whole degree of latitude and longitude. The distress alert relay message must be broadcast via all satellites which cover the area concerned. Shore-to-ship distress

alert relays sent by the International SafetyNET Service should contain the identification of the unit in distress, its approximate position and other information which might facilitate rescue (RR N3118). C-codes should be as follows:

### 3.1 $C_1$ – Message priority

$C_1 = 3$  (distress)

### 3.2 $C_2$ – Service code

$C_2 = 14$  (shore-to-ship distress alert to circular areas)

Messages addressed to circular areas will only be printed out by EGC receivers with positional data that are located inside the circle or which have not had their position in their receiver kept up to date.

### 3.3 $C_3$ – Address code

In messages addressed to service code  $C_2 = 14$ , the  $C_3$  code will be a circular address, consisting of ten characters, as follows:

3.3.1 Latitude ( $D_1D_2La$ ) of vessel in distress in degrees (two digits) and whether north (N) or south (S): e.g., 39N (three characters total). Include a leading zero for latitudes less than 10°.

3.3.2 Longitude ( $D_3D_4D_5Lo$ ) of vessel in distress in degrees (three digits) and whether east (E) or west (W) of the prime meridian: e.g. 059W. Include a leading zero or zeros for longitudes less than 100° or 10° as appropriate: e.g., use 099 for 99° and 008 for 8°.

3.3.3 Alert radius ( $R_1R_2R_3$ ) around distressed vessel in nautical miles. To ensure that position inaccuracies of both the distressed vessel and nearby vessels to which the message is intended do not affect receipt of messages, radius values of 200 nautical miles or larger should normally be used. Note that if a vessel's own position information is not entered into its SafetyNET receiver, every shore-to-ship distress alert relay message transmitted to the Inmarsat ocean region will be received and printed.

### 3.4 $C_4$ – Repetition code

$C_4 = 11$  (transmit on receipt followed by automatic repeat 6 minutes later)

The 6 minute repeat, or echo, is used to ensure that the information is received by the maximum number of ships (estimated >99%).

~~3.4.1 The following repetition codes may be available at some land earth stations (LESs) and may exceptionally be used for search and rescue broadcasts.~~

~~3.4.2 Repetition codes ( $C_4$ )~~

The C<sub>4</sub> repetition codes are divided into two categories:

- (a) for messages that are required to be repeated a finite number of times; and
- (b) for messages that are required to be repeated at specified intervals until cancelled by the information provider

3.4.2.1 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: LES operators may offer other codes.

3.4.2.2 Category (b) repetition codes:

A category (b) repetition code allows a message to be repeated indefinitely or until cancelled by the message provider. The repetition period can be set at between 1 and 120 hours. In addition, each transmission can be echoed after a fixed period of 6 minutes. The repetition codes are of the form:

Multiplier 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:

- 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:

- 2 — 1 hour delay; no echo
- 3 — 1 hour delay; with echo
- 4 — 6 hour delay; no echo
- 5 — 6 hour delay; with echo
- 6 — 12 hour delay; no echo
- 7 — 12 hour delay; with echo



- 8 — 24 hour delay; no echo
- 9 — 24 hour delay; with echo

The various combinations are shown in the table below:

Delay	Multiplier					Echo
	1	2	3	4	5	
2	1	2	3	4	5	No
3	1	2	3	4	5	Yes
4	6	12	18	24	30	No
5	6	12	18	24	30	Yes
6	12	24	36	48	60	No
7	12	24	36	48	60	Yes
8	24	48	72	96	120	No
9	24	48	72	96	120	Yes

Examples:

- 1 — Code 19 means “repeat broadcast every 24 hours with an echo 6 minutes after each broadcast”.
- 2 — Code 38 means “repeat broadcast every 72 hours with no echo”.

### 3.5 C<sub>5</sub> – Presentation code

Always C<sub>5</sub> = 00, International Alphabet Number 5.

### 3.6 Example of a shore-to-ship distress alert relay message:

3:14:56N043W250:11:00  
 MAYDAY RELAY  
 [text]  
 NNNN

### 3.7 General (all ships) call **General (all ships) call**

4. 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. 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<sub>1</sub> - C<sub>5</sub> codes for general calls are always as follows:

- C<sub>0</sub> = 0 (1, 2 or 3)
- C<sub>1</sub> = 3 (distress) or 2 (urgency)
- C<sub>2</sub> = 00
- C<sub>3</sub> = 00

C<sub>4</sub> = 11  
C<sub>5</sub> = 00

An example of a general call is:

0:3:00:00:11:00  
MAYDAY RELAY  
[text]  
NNNN

### Search and rescue co-ordination traffic

**45** Search and rescue co-ordination messages should be addressed to circular or rectangular areas for the intent of co-ordinating the search and rescue of a vessel in distress. Priority of the message will be determined by the phase of the emergency.

#### 45.1.1 C<sub>1</sub> – Message priority

C<sub>1</sub> = 3 (distress), 2 (urgency) or 1 (safety)

#### 45.1.2 C<sub>2</sub> – Service code

Search and rescue coordination to rectangular area C<sub>2</sub> = 34

Search and rescue coordination to circular area C<sub>2</sub> = 44

#### 45.1.3 C<sub>3</sub> – Address code

Search and rescue coordination to rectangular area (C<sub>2</sub> = 34). C<sub>3</sub> = 12 alphanumeric characters

*Note: See section A, paragraph 3.3 for description of rectangular addressing*

Rectangular addresses will consist of 12 characters as follows:

~~D<sub>1</sub>D<sub>2</sub>L<sub>a</sub>D<sub>3</sub>D<sub>4</sub>D<sub>5</sub>L<sub>o</sub>D<sub>6</sub>D<sub>7</sub>D<sub>8</sub>D<sub>9</sub>D<sub>10</sub>, where:~~

~~D<sub>1</sub>D<sub>2</sub> is latitude of south-west corner of the rectangle in degrees.~~

~~L<sub>a</sub> is hemisphere N or S.~~

~~D<sub>3</sub>D<sub>4</sub>D<sub>5</sub> is longitude of south-west corner of rectangle in degrees, with leading zeros if required.~~

~~L<sub>o</sub> is longitude E or W.~~

~~D<sub>6</sub>D<sub>7</sub> is extent of rectangle in latitude (degrees).~~

~~D<sub>8</sub>D<sub>9</sub>D<sub>10</sub> is extent of rectangle in longitude (degrees).~~

~~E.g. a rectangle whose south-west corner is 12° S and 124° E, extending 10° north and 10° east, is coded as:~~

~~12S124E10010~~

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

Search and rescue coordination to circular area ( $C_2 = 44$ )  $C_3 = 10$  alphanumeric characters

*Note:* See section B, paragraph 3.3 for description of circular addressing.

#### ~~45.1.4~~ $C_4$ – Repetition code

$C_4 = 11$  (transmit on receipt followed by automatic repeat or echo 6 minutes later)

#### ~~45.1.5~~ $C_5$ – Presentation code

Always  $C_5 = 00$ , International Alphabet Number 5.

### Shore-to-ship urgency and safety traffic

~~56~~ 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:

#### ~~56.1~~ $C_1$ – Message priority

$C_1 = 2$  (urgency) or 1 (safety)

#### ~~56.2~~ $C_2$ – Service code

$C_2 = 31$

Messages addressed to a NAVAREA in this way are only to be broadcast over the single satellite nominated by IMO to serve that NAVAREA.

#### ~~56.3~~ $C_3$ – Address code

$C_3 = X_1X_2$

$X_1X_2 =$  the two digits of the NAVAREA number, with a leading zero where necessary, e.g. 01 or 13.

#### ~~56.4~~ $C_4$ – Repetition code

Unscheduled broadcasts of urgency and safety traffic should be made using the 6 minute repeat or echo facility to increase the probability of reception as follows:

$C_4 = 11$  (transmit on receipt followed by repeated or echo 6 minutes later)

**56.5** *C<sub>5</sub> – Presentation code*

Always C<sub>5</sub> = 00, International Alphabet Number 5.

**Overlap in satellite ocean regions**

**67** 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 5 paragraph 6 above for guidance on broadcasting urgency and safety traffic.

**Overlap in NAVTEX coverage areas**

**78** If the area surrounding the vessel in distress is also in a NAVTEX coverage area, the same information should be broadcast to that area over NAVTEX.

~~**Section d**~~

~~*Chart correction services*~~

~~It is expected that corrections for official electronic chart databases will be broadcast via SafetyNET in due course. However, the standards for this service have not yet been developed. [The section is moved after the section D]~~

**Section e D**

*Piracy countermeasures broadcast messages*

**1** There are two kinds of MSI broadcast messages associated with piracy countermeasures: the daily situation report (SITREP) and a piracy attack warning. Specific guidance on drafting and broadcasting these messages is given below.

**2** The daily situation report should be broadcast via SafetyNET at a regular time around 0800 local time daily. The following paragraphs provide specific guidance on broadcast procedures.

**3** The daily situation report should be broadcast to a rectangular area enclosing the region of probable pirate attacks (based on historical data) plus a margin of 700 nautical miles (24 hours' steaming by a fast ship) in every direction.

**4** The following ~~standard~~ C-codes illustrate those to be used for SafetyNET broadcasts of the daily situation report:

C <sub>1</sub> = 1	Safety
C <sub>2</sub> = 04	Navigational warning to rectangular area
C <sub>3</sub> = 10S090E35040	Rectangular area bounded by 10°S, 25°N, 090°E and 130°E
C <sub>4</sub> = 18	Broadcast every 24 hours (no echo) until cancelled

C<sub>5</sub> = 00

International Alphabet Number 5

**5** Piracy attack warnings are to be broadcast, generally as a coastal warning, only when the area is not served by NAVTEX, immediately on receipt of the source information and at the next scheduled broadcast. Further broadcasts will not normally be necessary unless the information is being updated significantly. Subject indicator character 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:

**6.1** *Daily situation report*

*[date/time of origin]*

PIRACY COUNTERMEASURES MESSAGE *[consecutive number]*  
SOUTHEAST ASIA, INCLUDING MALACCA STRAIT, SINGAPORE  
STRAIT AND PHILIPPINES

1. LAST REPORTED ATTACK *[date]* IN *[position]* ON *[type and size of vessel]*. *[amplifying remarks: number of pirates / type of pirate vessel / nature of attack, etc.]*

2. ATTACKS CONCENTRATED IN PHILLIP CHANNEL BETWEEN *[position]* AND *[position]*. REPORTED ATTACKS ALWAYS HAPPEN AT NIGHT .

3. VESSELS ADVISED TO MAINTAIN ANTI-PIRACY WATCHES. ALL SUSPICIOUS OR UNEXPLAINED CRAFT MOVEMENTS OR PIRACY ATTACKS SHOULD BE IMMEDIATELY REPORTED TO REGIONAL PIRACY CENTRE, KUALA LUMPUR. TELEPHONE +60 3 2010014, FAX +60 3 2385769, TELEX MA 31880.  
NNNN

**6.2** *Piracy attack warning*

*[date/time of origin]*

PIRACY ATTACK WARNING *[consecutive number]*  
*[specific area]*

1. PIRATE ATTACK REPORTED *[date/time group]* IN *[position]*

2. *[brief description of pirate vessel]*

3. *[last observed movements of pirate vessel, if significant]*

4. FURTHER ATTACKS PROBABLE. SHIPS IN VICINITY TAKE PRECAUTIONS.  
NNNN

**7** Date/time should always be quoted in the form DDHHMMUTC MoMoMo YY, e.g.

251256UTC JUN 9308.

*Note:* UTC (Universal Co-ordinated Time) is the same time-zone as GMT (Z).

**8** Geographical positions should be quoted in the standard format  $D_1D_2M_1M_2La$   
 $D_3D_4D_5M_3M_4Lo$  where:

$D_1D_2$  = degrees latitude  
 $M_1M_2$  = minutes latitude  
 $La$  = hemisphere (N or S)  
 $D_3D_4D_5$  = degrees longitude (with leading zeros if required)  
 $M_3M_4$  = minutes longitude  
 $Lo$  = longitude (E or W)

as in the example:

5419N10327E

Notes:

1. Decimals of minutes will seldom be necessary or appropriate for reports of this kind.
2. Where the name of a geographical feature is used instead of a geographical position, a name should be chosen that appears on all commonly used charts of the area. Local knowledge should not be required for understanding the message.

### **Section d E**

#### *Chart correction services*

It is expected that ~~Corrections for official electronic chart databases will~~ **may** be broadcast via SafetyNET in ~~due course~~ the future. However, the standards for this service have not yet been developed.

### **Section F**

#### *Weather graphical services*

Weather graphical data may be broadcast via SafetyNET in the future and the service is under evaluation.

### **Section G**

#### *Repetition codes (C<sub>4</sub>)*

*[the section is moved from the previous location and text is edited]*

**1** The section describes all repetition codes ~~which may be available at land earth stations~~  
~~Inmarsat C (LESS), and should~~ which shall be used for various EGC SafetyNET broadcasts.

**2** The C<sub>4</sub> repetition codes are divided into two categories:

- (a) for messages that are required to be repeated a finite number of times; and
- (b) for messages that are required to be repeated at specified intervals until cancelled by the information provider

**2.1** *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).

**2.2** *Category (b) repetition codes:*

A category (b) repetition code allows a message to be repeated indefinitely or until cancelled by the message provider. The repetition period can be set at between 1 and 120 hours. In addition, each transmission can be echoed after a fixed period of 6 minutes. The repetition codes are of the form:

Multiplier 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:

- 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:

- 2 1 hour delay; no echo
- 3 1 hour delay; with echo
- 4 6 hour delay; no echo
- 5 6 hour delay; with echo
- 6 12 hour delay; no echo
- 7 12 hour delay; with echo
- 8 24 hour delay; no echo
- 9 24 hour delay; with echo

The various combinations are shown in the table below:

Delay	Multiplier					Echo
	1	2	3	4	5	
2	1	2	3	4	5	No
3	1	2	3	4	5	Yes

<b>4</b>	6	12	18	24	30	No
<b>5</b>	6	12	18	24	30	Yes
<b>6</b>	12	24	36	48	60	No
<b>7</b>	12	24	36	48	60	Yes
<b>8</b>	24	48	72	96	120	No
<b>9</b>	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”.



**Annex 5**  
*Procedure for amending the International  
SafetyNET Manual*  
*[TBC by IMSO/IHO/WMO]*

- 1** Proposed amendments to the International SafetyNET Manual should be submitted to the IMO Maritime Safety Committee for evaluation.
- 2** The agreement of the International Hydrographic Organization, IMSO, 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 and Search and Rescue with the ensuing editorial tasks.

## Annex 6

### *EGC receiver specifications*

*[To discuss and decide which information to leave/cross out.  
Some information is already given in previous chapters]*

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.

Enhanced Group Call (EGC) receive facilities ~~will be~~ **are** used by SOLAS Convention ships as well as ships not required to comply with the requirements of the SOLAS Convention, as amended. It should be noted that EGC receive facilities intended to meet 1974 SOLAS Convention requirements must comply with the IMO Performance Standards contained in annex 2 of the present publication.

**The specific guidance given in this annex has been carefully coordinated to ensure that the automatic functions of the SafetyNET receiver work properly and in a predictable way when combined with the automatic functions of the Land Earth Station. Land eEarth sStations providing Inmarsat C services for the GMDSS must comply with all relevant aspects of the Inmarsat C SDM, including the provision of all SafetyNET message addressing facilities and options.**

## **Technical requirements for Enhanced Group Call receivers for SOLAS-compliant SESs**

### **1 EGC SafetyNET receivers for SOLAS installations**

#### **1.1 Background**

The global maritime distress and safety system (GMDSS) is a radiocommunication system based on satellite and terrestrial technology, designed to improve communications relating to distress and ~~the~~ safety of life at sea. It was adopted by the International Maritime Organization (IMO) in 1988, in the form of Amendments to the International Convention for the Safety of Life at Sea (SOLAS), 1974 and came into effect on 1 February 1992. Implementation was completed on 1 February 1999.

It is the responsibility of national Administrations to determine whether a radio installation on board a ship meets the SOLAS requirements. This is done by national Type Acceptance or Approval testing of the sub-systems included in the installation and by inspection of the complete installation by a radio surveyor.

National Type Acceptance testing for SOLAS equipment ~~will is~~ **is** usually ~~be~~ based on GMDSS specifications and procedures prepared by IMO and the International Electrotechnical Commission (IEC) on their behalf, although other national or regional specifications may be invoked as well.

The major IMO and IEC documents, which are identified in section 1.2, not only summarize the general requirements for GMDSS equipment, but also the special requirements for EGC SafetyNET EGC receivers for use in SOLAS installations, as specified by IMO/IEC.

To the extent possible, the technical requirements for EGC SafetyNET EGC receivers for use in SOLAS installations have been harmonized with the above-mentioned specifications, and conflicts between the documents should not arise. A number of the Inmarsat specifications have been completely revised to reflect the latest IMO/IEC requirements, for example, the electromagnetic compatibility and environmental requirements.

## 1.2 Principal relevant documents

For Inmarsat C and EGC GMDSS SESs, the principal relevant documents in addition to the Inmarsat C SDM are: [bullet numbers are changed]

- .1 Performance Standards for Enhanced Group Call Equipment – Annex: Recommendation on Performance Standards for Enhanced Group Call Equipment, published by IMO as resolution A.664(16) [number to be changed].
- .2 General Requirements for Shipborne Radio Equipment Forming Part of the Global Maritime Distress and Safety System (GMDSS) and for Electronic Navigational Aids, published by IMO as resolution A.694(17) [number to be changed].
- .3 Carriage of Inmarsat Enhanced Group Call SafetyNET receivers under the Global Maritime Distress and Safety System (GMDSS), published by IMO as Resolution A.701(17).
- .4 Performance Standards for Inmarsat Standard-C Ship Earth Stations Capable of Transmitting and Receiving Direct-printing Communications – Annex: Recommendation on Performance Standards for Inmarsat Standard-C Ship Earth Stations Capable of Transmitting and Receiving Direct-printing Communications, published by IMO as resolution A.807(19), as amended by resolution MSC.68(68), annex 4.
- .5 Shipborne Radio Equipment Forming Part of the Global Maritime Distress and Safety System and Marine Navigational Equipment, published by the IEC as IEC 60945.
- .6 Global Maritime Distress and Safety System (GMDSS) – Part 4: Inmarsat-C Ship Earth Station and Inmarsat Enhanced Group Call (EGC) Equipment – Operational and Performance Requirements, Methods of Testing and Required Test Results, published by the IEC as IEC 61097-4.
- .7 Maritime Design and Installation Guidelines (DIGs), Annex B, issue 6 of April 2008 published by Inmarsat at [www.inmarsat.com/Maritimesafety/DIGs.pdf](http://www.inmarsat.com/Maritimesafety/DIGs.pdf)

## 2 Introduction

## 2.1 Enhanced Group Calls

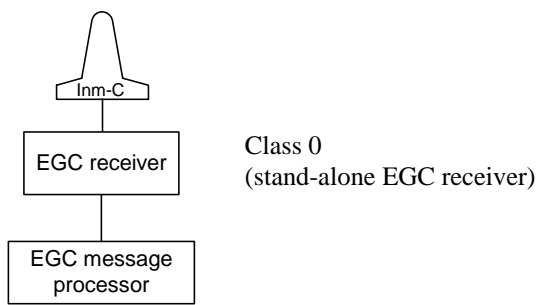
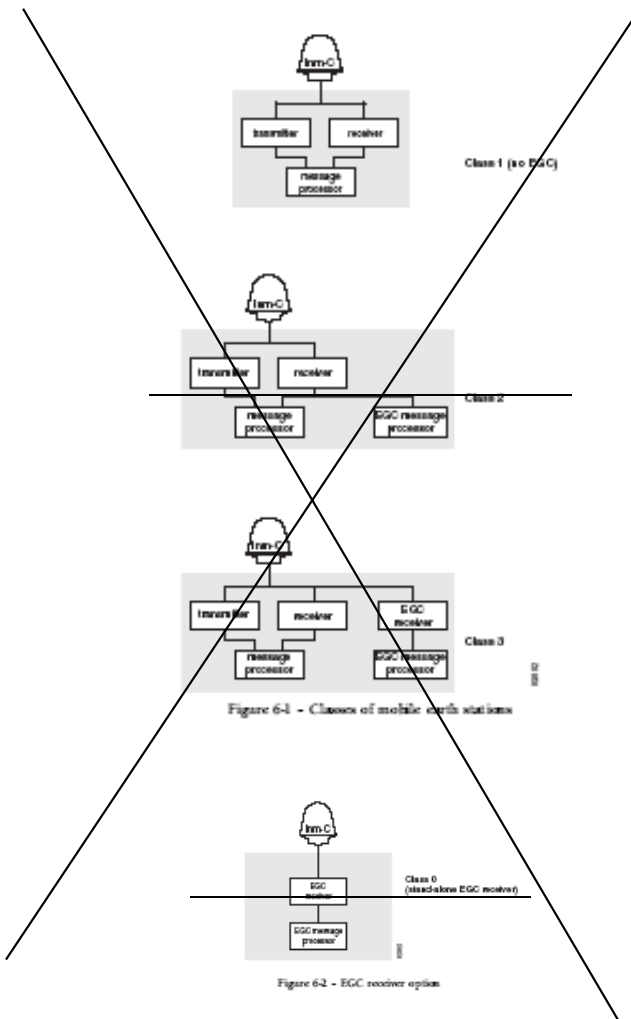
Enhanced Group Calls are a message broadcast service transmitted over the Inmarsat C communications system. The service allows terrestrial information providers to pass messages or data to Class 2 or Class 3 SESs with EGC receivers or Class 0 stand-alone EGC receivers through the Inmarsat C LESs. Enhanced Group Call messages are sent to land earth stations (LESs) by information providers using terrestrial facilities such as telex, PSTN, PSDN. The messages are processed at the addressed LESs and forwarded to the Network Coordination Station (NCS) which transmits them on the common channel.

In addition to Inmarsat system messages, there are two primary services offered by EGC: SafetyNET service and FleetNET service. SafetyNET is a service provided in the GMDSS for the dissemination of maritime safety information (MSI), such as navigational warnings, meteorological warnings and forecasts and other urgent safety related information. FleetNET is a commercial communication service allowing terrestrial information providers to send messages to pre defined groups of subscribers. Both the SafetyNET and FleetNET services make use of flexible addressing techniques to allow the reception of messages from a variety of service providers depending on the particular requirements of the user. The SafetyNET service utilizes a geographical area addressing technique to direct messages to SESs within a defined boundary. SafetyNET is not generally used to send messages to individual receivers. The FleetNET service employs closed user groups and unique receiver addressing to provide secure transmission of messages from the terrestrial information provider to the desired service recipient(s). *[propose deleting since the information is already available]*

## 2.2 EGC receiver

An EGC receiver is defined as a single-channel receiver with a dedicated message processor. ~~Mobile Ship~~ earth stations of Class 2 and 3 provide an EGC capability in addition to To-~~MobileShip~~ and From-~~MobileShip~~ messaging capabilities as indicated in figure 6-1. Class 0 SESs are self-contained EGC receivers as shown in figure 6-2.

*Note: Most of the existing models of Inmarsat C and mini-C Maritime terminals on the market are Class 2 SESs.*



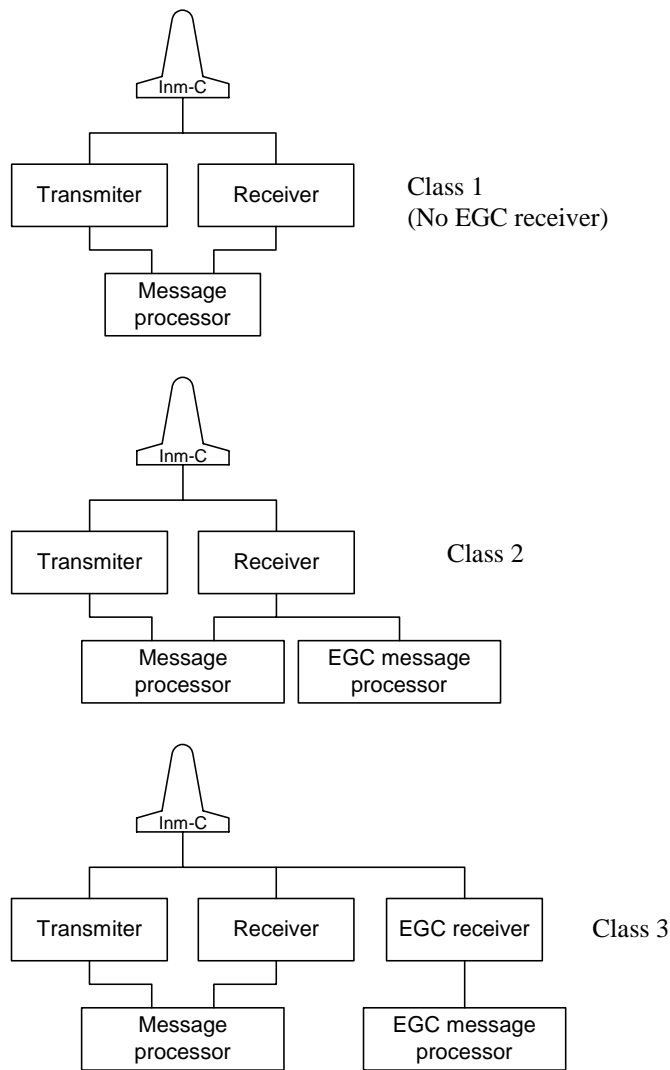


Figure 6 – Classes of Inmarsat C Mobile Earth Stations

### 2.3 Type approval

The Inmarsat C SDM presents the technical requirements and recommendations for an EGC receiver. These requirements must be satisfied before the equipment can be utilized in the Inmarsat system. Procedures for type approval by Inmarsat of a manufacturer's design are provided in a complementary document entitled Type Approval Procedures for Inmarsat C [Mobile Ship](#) Earth Stations, published by Inmarsat.

## 3 General requirements

### 3.1 Mandatory capabilities

The mandatory capabilities of SOLAS-compliant SafetyNET receivers for SOLAS applications are:

- .1 Continuous reception of an NCS common channel and processing of the information according to the EGC message protocol; a Class 2 Inmarsat C SES shall continuously receive the NCS common channel when not engaged in general communications;
- .2 Automatic recognition of messages directed to fixed and absolute geographical areas and service codes as selected by the receiver operator or based upon input(s) from navigational equipment;
- .3 SafetyNET receivers shall meet the requirements of IEC 61097-4 and IEC 60945; and
- .4 Where automatic updates are not available, provision shall be made for a visual indication that the ship's position has not been updated during the last 12 hours. It shall only be possible to reset this indication by revalidating the ship's position.

~~3.2 Optional capabilities [propose deleting since the information is already available]~~

~~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; and~~
- ~~(c) automatic response to group ID updates directed to that EGC receiver, adding or deleting group IDs as commanded.~~

**4 NCS common channel selection**

**4.1 General**

EGC receivers are equipped with facilities for storing up to 20 NCS channel numbers. Four of these are permanently assigned global beam channel numbers and frequencies as follows:

NCS	NSC 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

These four channel numbers are stored in ROM and are not alterable.

#### **4.2** *NCS scanning*

Automatic NCS scanning, ~~either as a result of high Bulletin Board Error Rate (BBER) or on a regular basis~~, is prohibited in SOLAS SafetyNET receivers. ~~Instead, when the BBER is 80% or more out of the last hundred received bulletin board packets,~~ In the event of a low signal strength from the satellite, an alarm shall be raised and the operator is advised to initiate NCS scanning manually.

### **5** **Message-processing requirements**

~~The requirements of this section may be amended to comply with future recommendations of IMO.~~

#### **5.1** *General*

Acceptance or rejection of the EGC service code types is under operator control except that receivers shall always receive navigational warnings, meteorological warnings, SAR information and To-Ships distress alerts ~~which that~~ are directed to a geographical area within which the receiver is situated.

#### **5.2** *Display devices*

##### **5.2.1** Message display

~~It is recommended that the EGC receiver have a printer.~~ The display, ~~or printer if fitted~~, shall be capable of presenting at least 40 characters per line of text. The EGC receiver ensures that if a word cannot be accommodated in full on one line it shall be transferred to the next line.

##### **5.2.2** Status display

~~For receive only EGC receivers, a~~ An indication of EGC carrier frame synchronization (or loss of synchronization) ~~is required as a minimum.~~ shall be provided.

#### **5.3** *Printer requirements*

~~A printer is required~~ For a SOLAS SafetyNET receiver, ~~the printer requirements apply.~~ Received EGC messages may be stored for later printing with an indication to the operator that the message has been received. However, distress or urgency priority calls are directly printed as well as stored. Means are also provided not to print or store the same EGC message after it has been received error-free and printed.

Messages are not printed until completely received, even in the case of multi-packet messages.

A local audible alarm is sounded to give advanced warning of a printer “paper-low” condition.



All SafetyNET messages are annotated with the date and time (UTC) and date of reception. This information is displayed or printed with the message. ~~Note that UTC can be deduced from the NCS frame number.~~

#### **5.4** *Character codes*

For the EGC service, the International Reference Version of the International Alphabet 5 (IA5), also known as ASCII (a standard alphanumerical character set based on 7-bit codes) as defined in ITU-T Red Book Recommendation T.50, is used.

#### **5.5** *Operator control*

The following control functions and displays are provided as a minimum:

- .1 selection of EGC carrier frequency;

For SOLAS SafetyNET receivers:

- .2 means of inputting the following information:
  - .1 mobile's SES's position co-ordinates;
  - .2 current and planned (additional) NAVAREA/METAREA; and
  - .3 current and planned Coastal service coverage areas (B<sub>1</sub> character); and
  - .4 coastal warning indicator character (B<sub>2</sub> character).

Receivers are fitted with operator controls to allow the operator to select desired geographical areas and message categories as described in section 5.7. Details of the geographical areas and message categories which have been selected for reception by the operator are readily available.

Attention is drawn to the additional requirements of IEC 61097-4, section 3.5.2 for SOLAS SafetyNET receivers.

#### **5.6** *EGC receiver memory capacity requirements*

Both temporary and non-volatile memory is required in an EGC receiver for the following purposes:

- .1 message buffering;
- .2 maintaining message identification records;
- .3 storing position co-ordinates and NAVAREA/METAREA geographical area data; and
- .4 storing expansion of NCS common channel numbers.

### 5.7 EGC receiver addressing

The five basic methods of addressing EGC receivers are:

- .1 all-mobiles call;
- .2 Inmarsat system message addressing;
- .3 group addressing;
- .4 unique addressing; and
- .5 geographical area addressing including coastal addressing.

The type of address used in the header of an EGC packet is uniquely determined by the service code field.

### 5.8 Message sequencing identification

All messages are transmitted with a unique sequence number, and the originating LES ID and service code. Each subsequent transmission of the message will contain the original sequence number. This facility allows multiple printing of repeated messages to be inhibited.

### 5.9 Geographical area addressing

Geographical area addressing refers to messages transmitted to SESs in a particular area. The area may be expressed in terms of a fixed, pre-defined area such as the NAVAREA/METAREA, or Coastal warning coverage area, or in terms of an absolute geographical address expressed as latitude and longitude coordinates on the surface of the earth. An absolute geographical area address is a representation of a closed boundary on the surface of the earth given in the address field of the message header. The receiver recognizes two forms of absolute geographical addressing: rectangular and circular. Each form is specified in terms of an absolute position in latitude and longitude and further parameters that completely specify the boundary.

In order to process a geographical area address, the receiver must be programmed with the SESs current position. The position may be entered automatically from an integrated or external navigation aid or entered manually. The receiver shall provide notification to the operator when the position has not been updated for four hours. If the SES's position has not been updated for more than 12 hours, or is unknown, ~~because the equipment has been powered off,~~ all SafetyNET messages with priorities higher than routine will be printed or stored in memory.

A geographical area address is considered valid for a particular SES if its current position falls inside or on the boundary specified by the address. It is a mandatory requirement that the operator be able to select more than one area, so that messages directed to other area(s) of interest can be provided. It is recommended that the operator be able to select at least four areas.

~~5.10 Maritime requirements~~ [*propose deleting since it is covered above, paragraph 4 “Operation of the International SafetyNET Service”*]

~~When a message has been received error free and .....~~

~~The EGC receiver is capable of internally storing at least 255 such message identifications. These message identifications are 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, the oldest message identification shall be erased. 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 shall be stored in memory and the information used to inhibit the printing of repeated transmissions of the same message. IEC 61097-4, section 3.4.10 refers.~~

## 6 Testing functions

It is recommended that all receivers 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 malfunction.

### 6.1 Link performance monitoring

~~Means are provided for demonstrating that the receiver is functioning correctly and alerting the operator in the event of a malfunction.~~ The SafetyNET EGC receiver continuously monitors the received bulletin board error rate (BBER) as a measure of link performance whenever it is tuned and synchronized to a NCS (or LES) TDM. The receiver stores a count of the number of bulletin boards received in error out of the last 100 received. This count is continuously updated frame by frame.

## 7 Alarms and indications

The following alarms and indications are provided at a SOLAS SafetyNET receiver and meet the operational requirements for alarms stated in IEC 60945.

### 7.1 Distress/Urgency priority call alarm

For SOLAS SafetyNET receivers:

Provision is made for a specific audible alarm and visual indication at the position from which the ship is normally navigated to indicate receipt of a distress or urgency priority call; for both EGC messages ~~or~~ and individually addressed messages. It is not possible to disable this alarm and it is only possible to re-set it manually, and then only from the position where the message is displayed or printed. IEC ~~40974~~ 60945, section 3.4.6 refers.

### 7.2 Other alarms and indications [*Check the reference numbers below*]

- .1 High BBER: section 6.1 refers;

- .2 Printer paper low: section 5.3 refers;
- .3 Receiver fault indication;
- .4 Loss of receiver synchronisation: section 6.1 refers; and
- .5 Position update: section 5.9 refers.

It is recommended that any of these conditions generate a common alarm signal at the SafetyNET receiver (separate from distress alarm caused by a distress alert initiation or a distress priority message initiation or reception), which is capable of being extended to a remote alarm panel (e.g. by means of relay contacts) should this be required

Additional alarms and indications may be provided at the manufacturer's discretion.

## **8 Electromagnetic compatibility**

The interference and electromagnetic compatibility requirements of IEC 60945, section 3.5 applies. *[Check the reference]*

## **9 Environmental conditions**

SOLAS SafetyNET receivers shall operate satisfactorily under the environmental conditions specified in the SDM. The latest issues of IEC 61097-4 and IEC 60945 apply.

## **10 Optional features**

**10.1** Reception of SafetyNET or FleetNET service only. Manufacturers may choose to produce receivers capable of receiving both SafetyNET and FleetNET. In case of conflict between the two sets of technical requirements, the SafetyNET requirements shall apply.

## **11 Navigational interface**

In order that a receiver's position may be automatically updated, receivers may be equipped with an interface to navigational instruments. A suggested standard interface is in IEC 61162, Part 1 (NMEA 0183) Standard for Interfacing Electronic Marine Navigational Devices.

*Note: The majority of modern maritime Inmarsat C and mini-C SESs have an integrated navigational receiver.*

**Annex 7**

***IMO requirements for the availability of the EGC receive facility***

*[Deleting of the Annex is proposed since it was worded before Inmarsat C service started and it does not “work”]*

1—~~At the 34th [January 1988 [or 1989 – to check] and Inm-C commercial service started in January 1991] session of the Sub-Committee on Radiocommunications, IMO decided that “the EGC receiver should normally be available for reception of maritime safety information for at least 98% of the time. This will permit the use of Inmarsat-C Class 2 equipment. Where 98% availability cannot be achieved because the equipment is expected to be used for other purposes, the Sub-Committee recommends that Administrations should consider requiring the carriage of a second EGC receive facility.”~~

2—~~In reaching this conclusion, the Organization had regard to the estimated availability of different types of EGC receive facilities as summarized in the following table:~~

Equipment	Inmarsat-C traffic/day (either direction)	Availability of EGC receiver
Inmarsat-C Class 2 (switchable Inmarsat-C/EGC operation)	1 call 5 calls 10 calls	99.87% 99.36% 98.73%
Inmarsat-C Class 3 dedicated integral EGC receiver	any	100%
Inmarsat-C and EGC Rx (separate)	any	100%

3—~~These availability estimates have been taken into account when deciding the need to repeat broadcasts of “vital” messages.~~

**Annex 8**  
*Authorization and registration  
of information providers*  
*[TBC by the SafetyNET Panel]*

Two distinct and separate processes must be completed before an information provider will be granted access to the SafetyNET broadcast service. They have been established to protect the integrity of the SafetyNET information service and clearly establish a qualification to the special SafetyNET tariff. They are:

**1 Authorization**

**1.1** Authorization is carried out by IMO and ~~Inmarsat~~ in consultation with IHO and WMO as appropriate.

**1.2** In order to obtain authorization to broadcast maritime safety information through the International SafetyNET Service, an information provider must apply to the relevant international organization for approval to participate in the internationally co-ordinated service:

Meteorological authorities – to WMO;

Hydrographic authorities – to IHO;

Search and rescue authorities – to IMO;

The International Ice Patrol – to IMO;

Others – to IMO

**2.1.3** 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; and

.2 the need to minimize duplication of information as much as possible.

**3.1.4** The relevant international organization will inform IMO and ~~Inmarsat~~ of approved applications.

**4.2 Certification**

**4.2.1** On receipt of such authorization, the International SafetyNET Coordinating 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 ~~land earth station~~ (LES) operators. A specimen Certificate of Authorization is shown at the end of this annex. *[TBC with the SafetyNET Panel]*

4.2 ~~Inmarsat~~ [XXX] will maintain the master list of all registered information providers and circulate the list to IMO, IHO, WMO and all Inmarsat-C LES operators.  
*[TBC wit the SafetyNET Panel]*

### **53 Registration**



**53.1** After receiving a Certificate of Authorization, an information provider may conclude an agreement with any Inmarsat C LES operator(s), serving the required ocean region(s), to obtain access to the system.

**53.2** This will involve, in addition to the contractual aspects, registration of the information provider's identity which must be programmed into the LES control equipment.

**53.3** LES operators will only register information providers who have received a Certificate of Authorization.

[Sample certificate must be changed]

Sample Certificate

	<b>IMO</b>		<b>Inmarsat</b>
4 Albert Embankment, London SE1 7SR United Kingdom		99 City Road, London EC1Y 1AX United Kingdom	
TO: Director-General Meteorological Office London Road Bracknell, Berkshire RG12 2SZ United Kingdom			
Date: 9 March 1992			
<b>Certificate of Authorization to Participate as an Information Provider in the International SafetyNET<sup>SM</sup> Service</b>			
This is to certify that the METEOROLOGICAL OFFICE is authorized to provide meteorological information for broadcast in the International SafetyNET <sup>SM</sup> Service in accordance with annex 4 of the <i>International SafetyNET Manual</i> .			
A. C. FULLER Chairman International SafetyNET Co-ordinating Panel			
Certificate No.	14		
[MSO/0586]			
International Maritime Organization (IMO)		International Mobile Satellite Organization (Inmarsat)	
Telephone:		Telephone:	
National	020 7735 7611	National	020 7728 1000
International	+44 (0)20 7735 7611	International	+44 (0)20 7728 1000
Facsimile	+44 (0)20 7587 3210	Facsimile	+44 (0)20 7728 1044
Telex	23588 IMOLDN G	Telex	297201 INMSAT G