Draft Iridium EGC Manual

Submitted by Iridium Satellite LLC

SUMMARY

Executive Summary: This document describes amendments to the Draft Iridium EGC Manual made since WWNWS 9

Action to be taken: Paragraph 8

Related documents: Draft Iridium EGC Manual (Annex A attached)

1. The document describes amendments made to the Draft Iridium EGC Manual since it was reviewed by WWNWS 9.

2. Since WWNWS 9, IMSO has submitted its second operational assessment of the Iridium system to the IMO. One of IMSO's observations was that there was a need for IMO to make available a generic, or Iridium-specific MSI manual.

3. IMSO also suggested that IMO, together with the IHO, the WMO and IMSO, should consider renaming and transforming the International SafetyNET Coordinating Panel so as to accommodate additional new satellite communication systems recognized by IMO.

4. At MSC 99, the IMO adopted resolution MSC.451(99), "Statement of recognition of the maritime mobile satellite services provided by Iridium Satellite LLC".

5. The Draft Iridium EGC Manual has been amended to reflect the decision taken by MSC 99 to recognize Iridium's services for use in the GMDSS. It also has a new Annex describing the ship-borne terminal. This is the performance standard adopted by MSC 98 as resolution MSC.434.(98).

6. The draft has had references to C-Codes deleted. It is not necessary to input C-Codes into the graphical user interfaces demonstrated by Iridium, or SafetyNET II. However if these are retained, and are an operational requirement for users, then there is a need to ensure commonality of deployment in both systems, and so we suggest these should be in a joint manual.

7. The WWNWS Sub-Committee and WWMIWS Committee are invited to:
    a. Review the revised Draft Iridium EGC Manual;
    b. Decide whether it should retain references to C-Codes, and if so, whether these should be moved to an Annex, or whether it would be more appropriate to add these to a future edition of a joint manual;
    c. Agree the final text for forwarding to NCSR 6, with a view to publication.

ANNEX

IRIDIUM GLOBAL SATELLITE EGC SYSTEM MANUAL

[2019][2020] EDITION

Foreword

SOLAS regulation IV/12.2 states that "Every ship, while at sea, shall maintain a radio watch for broadcasts of maritime safety information on the appropriate frequency or frequencies on which such information is broadcast for the area in which the ship is navigating".

In 2013, a submission was made to the MSC at its ninety-second session, for evaluation of the "Iridium" mobile-satellite system against the criteria for provision of mobile satellite communication systems in the GMDSS. In 2018, the MSC at its ninety-ninth session adopted resolution MSC.451(99), Statement of recognition of the maritime mobile satellite service provided by Iridium Satellite LLC".

An operational Manual, similar to the International SafetyNET Manual, is necessary. Due to differences in the structure and operation of the Iridium mobile-satellite system compared with the Inmarsat system generally and SafetyNET in particular, this Manual has been produced to describe the Iridium system and its capability for promulgating MSI and SAR communications. This Manual has been prepared with the cooperation of IHO WWNWS-SC and WMO-JCOMM ETMSS. This Manual should be read alongside the Joint IMO/WMO/IHO Manual on Maritime Safety Information, in its most recent edition, which provides detailed guidance on MSI and SAR communication composition and promulgation.

1 General information

1.1 The Iridium global satellite enhanced group calling (EGC) system is a satellite-based service for the promulgation of Maritime Safety Information (MSI), navigational and meteorological warnings, meteorological forecasts, Search and Rescue (SAR) information and other urgent safety-related messages to ships.

1.2 The Iridium EGC system 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.

1.3 This Manual describes the structure and operation of the Iridium EGC system. It is intended primarily for national Administrations and registered information providers, but may also be useful to the mariner who requires more operational information than is found in manufacturers' equipment manuals.

2 Iridium global satellite EGC system

2.1 Introduction

2.1.1 The Iridium global satellite EGC system provides shipping with navigational and meteorological warnings, meteorological forecasts, shore-to-ship distress alerts, SAR information 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 provides an automatic method of broadcasting messages to both fixed and variable geographical locations in all sea areas, including the means of disseminating MSI to coastal

warning areas not covered by the International NAVTEX service. It is suitable for use in all sizes and types of ships. Figures 1 and 2 illustrate the way the system is structured.

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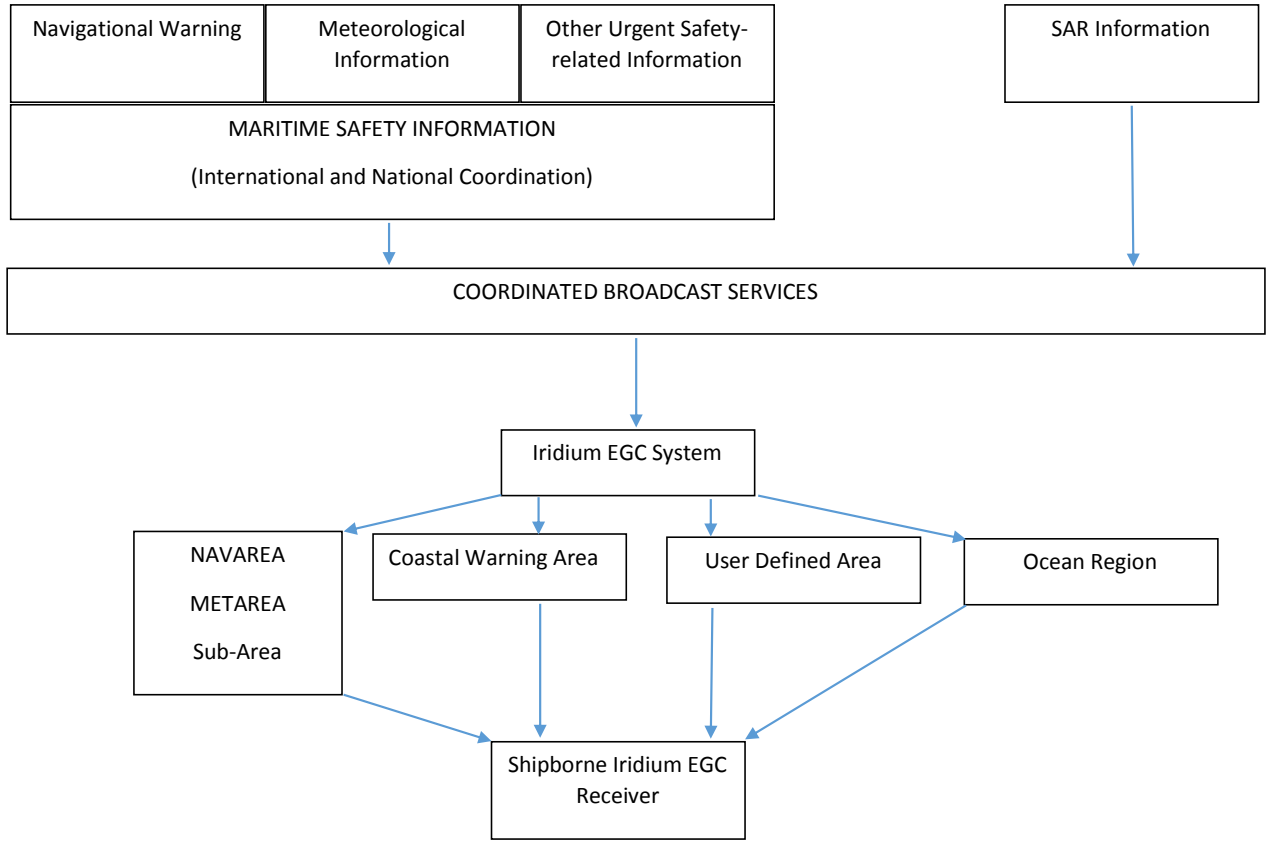

Figure 1 – The Iridium EGC System

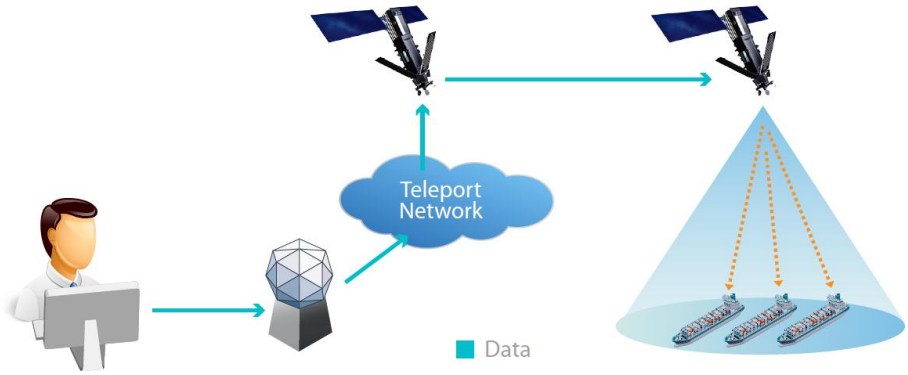

Figure 2 – Basic concept of the Iridium EGC system

2.1.2 The Iridium EGC system offers the ability to direct a message to a given geographical area. The area may be fixed, as in the case of a NAVAREA/METAREA or coastal warning area; or it may be a user defined area (circular or rectangular). A user defined area 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 satellite ocean region or NAVAREA/METAREA. The basic concept of the system is shown in Figure 2 above.

2.1.3 Messages are submitted by registered information providers via an Iridium gateway. Messages are broadcast according to their priority, i.e. distress, urgency or safety. Aboard ship, messages are received by type-approved Iridium maritime mobile terminals.

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Commented [A4R3]: Figure 2 will be updated with new spacecraft. The network overview image is now in Figure 7 in Annex 3, and the animated depiction of the constellation has been included there as Figure 8 as well.

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2.2 Definitions

*[**NOTE 1** - The definitions below are copied verbatim from the SafetyNET Manual, 2018 edition—and are provided as a "place holder." We may need to redefine sea areas A3 and A4 for the published version of this manual, and create new definitions for "international satellite EGC service" and "national satellite EGC service" used in paragraph 7.2. We may also need to delete or modify references to Inmarsat.]*

*[**NOTE 2** – We also need to include Iridium-specific terms which differ from equivalent Inmarsat terms, such as "Gateway", "Satellite Network Operations Center" and "Teleport" instead of "Land Earth Station" and "Network Coordination Station" so these have been added as "NN" below]*

2.2.1 For the purposes of this manual, the following definitions apply:

.1 *Coastal warning* means a navigational warning or in-force bulletin promulgated as part of a numbered series by a National Coordinator. Broadcast should be made by the International NAVTEX service to defined NAVTEX service areas and/or by the International SafetyNET service to coastal warning areas. In addition, Administrations may issue coastal warnings by other means.

.2 *Coastal warning area* means a unique and precisely defined sea area within a NAVAREA/METAREA or Sub-area established by a coastal state for the purpose of

coordinating the broadcast of coastal maritime safety information through the SafetyNET service.

.3 *Enhanced Group Call (EGC)* means the system for broadcasting messages via the mobile satellite communications system operated by Inmarsat Global Limited. EGC is a part of the Inmarsat C system and supports two services: SafetyNET and FleetNET.

.4 *FleetNET* means the 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.

.5 *Global Maritime Distress and Safety System (GMDSS)* means the global communications service based upon automated systems, both satellite and terrestrial, to provide distress alerting and promulgation of maritime safety information for mariners.

.6 *HF NBDP* means High Frequency narrow-band direct-printing, using radio telegraphy as defined in Recommendation ITU-R M.688.

.7 *In-force bulletin* means a list of serial numbers of those NAVAREA, Sub-area or coastal warnings in force issued and broadcast by the NAVAREA Coordinator, Sub-area Coordinator or National Coordinator.

.8 *Inmarsat C* means the digital satellite communications system for store-and-forward text or data messaging using mobile terminals with omni-directional antennas. Inmarsat C is the only system that allows ships to meet the majority of the satellite communication requirements of the GMDSS including distress alerting, reception of maritime safety information and general communications.

.9 *Inmarsat mini-C* means smaller terminals, based on the same technical requirements as Inmarsat C terminals. Some models are approved as GMDSS compliant terminals.

.10 *Inmarsat Fleet* means the digital satellite communication system that provides 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 resolution A.1001(25).

.11 *Inmarsat FleetBroadband* means the communication service that provides voice and high-speed data services, simultaneously, through compact terminals for maritime users.

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

.13 *International SafetyNET service* means the coordinated broadcast and automatic reception of maritime safety information via the Inmarsat Enhanced Group Call (EGC) system, using the English language, in accordance with the provisions of the International Convention for the Safety of Life at Sea, 1974, as amended.

.14 *Issuing Service* means a National Meteorological Service which has accepted responsibility for ensuring that meteorological warnings and forecasts for shipping

are disseminated through the Inmarsat SafetyNET service to the METAREA for which the Service has accepted responsibility under the broadcast requirements of the GMDSS.

.15 *Land Earth Station (LES)* means a fixed terrestrial station acting as a gateway between terrestrial communication networks and the Inmarsat satellites in the maritime mobile-satellite service. This may also be referred to as a Coast Earth Station (CES).

.16 *Land Earth Station Operator (LESO)* means an Inmarsat service provider which owns and operates the LES.

.17 *Local warning* means a navigational warning which covers inshore waters, often within the limits of jurisdiction of a harbour or port authority.

.18 *Maritime safety information (MSI)* means navigational and meteorological warnings, meteorological forecasts and other urgent safety-related messages broadcast to ships.

.19 *Maritime safety information service* means the internationally and nationally coordinated network of broadcasts containing information which is necessary for safe navigation.

.20 *METAREA* means a geographical sea area established for the purpose of coordinating the broadcast of marine meteorological information. The term METAREA followed by a roman numeral may be used to identify a particular sea area. The delimitation of such areas is not related to and shall not prejudice the delimitation of any boundaries between States (see figure N).

.21 *METAREA Coordinator* means the authority charged with coordinating marine meteorological information broadcasts by one or more National Meteorological Services acting as Preparation or Issuing Services within the METAREA.

22 *Meteorological information* means the marine meteorological warnings and forecast information in accordance with the provisions of the International Convention for the Safety of Life at Sea, 1974, as amended.

.23 *Mobile Earth Station (MES)* means a mobile user terminal in the Inmarsat maritime mobile-satellite service. This may also be referred to as Ship Earth Station (SES).

.24 *National Coordinator* means the national authority charged with collating and issuing coastal warnings within a national area of responsibility.

.25 *National NAVTEX service* means the broadcast and automatic reception of maritime safety information by means of narrow-band direct-printing telegraphy using frequencies other than 518 kHz and languages as decided by the Administration concerned.

.26 *National SafetyNET service* means the broadcast and automatic reception of maritime safety information via the Inmarsat EGC system, using languages as decided by the Administration concerned.

.27 *NAVAREA* means a geographical sea area established for the purpose of coordinating the broadcast of navigational warnings. The term NAVAREA followed by a roman numeral may be used to identify a particular sea area. The delimitation of

such areas is not related to and shall not prejudice the delimitation of any boundaries between States (see figure N).

.28 *NAVAREA Coordinator* means the authority charged with coordinating, collating and issuing NAVAREA warnings for a designated NAVAREA.

.29 *NAVAREA warning* means a navigational warning or in-force bulletin promulgated as part of a numbered series by a NAVAREA Coordinator.

.30 *Navigational warning* means a message containing urgent information relevant to safe navigation broadcast to ships in accordance with the provisions of the International Convention for the Safety of Life at Sea, 1974, as amended.

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

.32 *NAVTEX Coordinator* means the authority charged with operating and managing one or more NAVTEX stations broadcasting maritime safety information as part of the International NAVTEX service.

.33 *NAVTEX service area* means a unique and precisely defined sea area for which maritime safety information is provided from a particular NAVTEX transmitter.

.34 *Network Coordination Station (NCS)* means a fixed land station in the Inmarsat satellite communications system which controls channel assignments and provides the network management functions for each of the four satellite ocean regions. NCSs also transmit EGC messages on the NCS common channel.

.35 *Other urgent safety-related information* means maritime safety information broadcast to ships that is not defined as a navigational warning or meteorological 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.

.36 *Registered information provider* means a maritime safety information provider (MSI provider), authorized in accordance with Annex 2 of the International SafetyNET Manual, which has an agreement with one or more LES(s) for providing SafetyNET services.

.37 *Rescue Coordination Centre (RCC)* means 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. Note: the term RCC will be used within this Manual to apply to either joint, aeronautical or maritime centres; JRCC, ARCC or MRCC will be used as the context warrants.

.38 *SafetyNET* means the international service for the broadcast and automatic reception of maritime safety information via the Inmarsat EGC system. SafetyNET receiving capability is part of the mandatory equipment which is required to be carried by certain ships in accordance with the provisions of the International Convention for the Safety of Life at Sea, 1974, as amended.

.39 *SAR information* means distress alert relays and other urgent search and rescue information broadcast to ships.

.40 *Satellite Ocean Region* means the area on the earth's surface within which a mobile or fixed antenna can obtain line-of-sight communications with one of the four

primary Inmarsat C geostationary satellites. This area may also be referred to as the "footprint":

- Atlantic Ocean Region – East (AOR-E)

- Atlantic Ocean Region – West (AOR-W)

- Indian Ocean Region (IOR)

- Pacific Ocean Region (POR)

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

.42 *Sea Area A2* means 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.

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

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

.45 *Sub-area* means a subdivision of a NAVAREA/METAREA in which a number of countries have established a coordinated system for the promulgation of maritime safety information. The delimitation of such areas is not related to and shall not prejudice the delimitation of any boundaries between States.

.46 *Sub-area Coordinator* means the authority charged with coordinating, collating and issuing Sub-area warnings for a designated Sub-area.

.47 *Sub-area warning* means a navigational warning or in-force bulletin promulgated as part of a numbered series by a Sub-area Coordinator. Broadcast should be made by the International NAVTEX service to defined NAVTEX service areas or by the International SafetyNET service (through the appropriate NAVAREA Coordinator).

.48 *User defined area* means a temporary geographic area, either circular or rectangular, to which maritime safety information is addressed.

.49 *UTC* means Coordinated Universal Time which is equivalent to GMT (or ZULU) as the international time standard.

.50 *World-Wide Met-ocean Information and Warning Service (WWMIWS)* means the internationally coordinated service for the promulgation of meteorological warnings and forecasts.

.51 *World-Wide Navigational Warning Service (WWNWS)* means the internationally and nationally coordinated service for the promulgation of navigational warnings.

.52 In the operating procedures *coordination* means that the allocation of the time for data broadcast is centralized, the format and criteria of data transmissions are compliant as described in the *Joint IMO/IHO/WMO Manual on Maritime Safety*

Information and that all services are managed as set out in resolutions A.705(17), as amended, A.706(17), as amended, and A.1051(27), as amended.

.13 *International satellite EGC service* means the coordinated broadcast and automatic reception of maritime safety information via a recognized mobile satellite Enhanced Group Call (EGC) system, using the English language, in accordance with the provisions of the International Convention for the Safety of Life at Sea, 1974, as amended.

.26 *National satellite EGC service* means the broadcast and automatic reception of maritime safety information via a recognized mobile satellite EGC system, using languages as decided by the Administration concerned.

.NN *Gateway* means a terrestrial part of the Iridium mobile-satellite system which acts as a switching centre between the Iridium network and other communication networks.

.NN *Satellite Network Operations Center (SNOC)* means a terrestrial part of the Iridium mobile-satellite system which controls the Iridium satellites and manages the Iridium system overall.

.NN *Teleport* means a terrestrial part of the Iridium mobile-satellite system which communicates between the Iridium satellites, and the gateway and SNOC terrestrial parts.

NOTE 3 - It needs to be decided whether this manual refers to "ship earth station" as used in SOLAS, or "maritime mobile terminal" as used in resolution A.1001(25) - the SafetyNET Manual uses more than one term for the ship-borne equipment.]

2.2.2 METAREA Limits

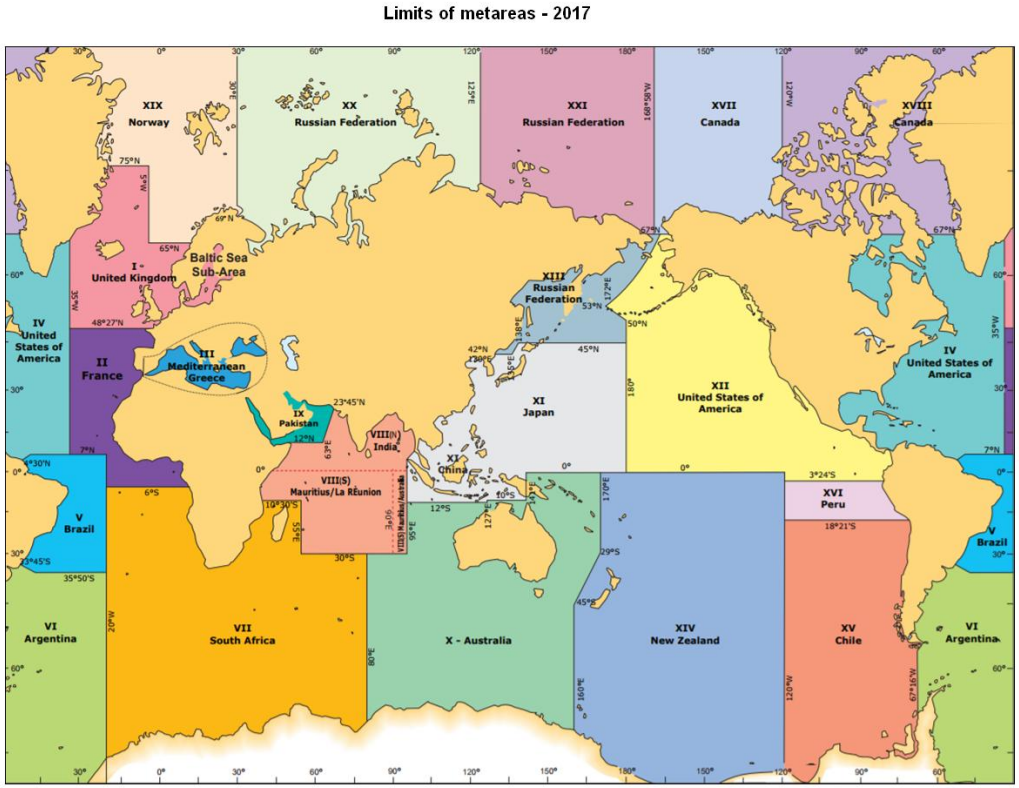

Figure 3 – METAREAs for coordinating and promulgating meteorological warnings and forecasts. The delimitation of such areas is not related to and shall not prejudice the delimitation of any boundaries between States.

2.2.3 NAVAREA Limits

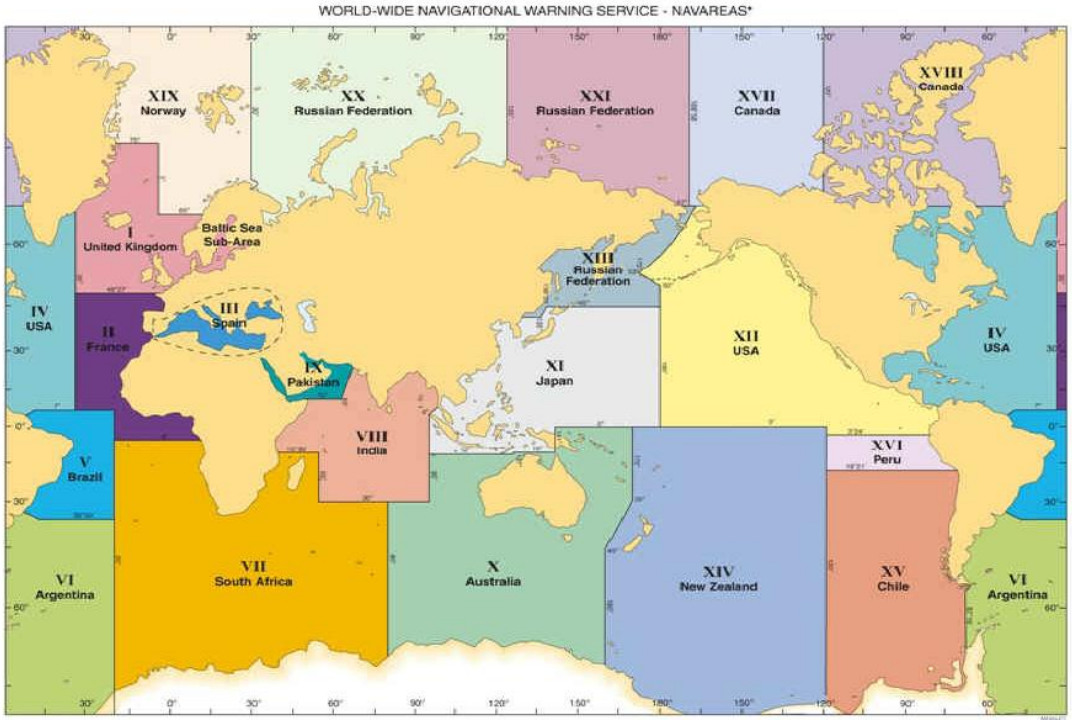

Figure 4 – NAVAREAs for coordinating and promulgating navigational warnings under the World-Wide Navigational Warning Service. The delimitation of such areas is not related to and shall not prejudice the delimitation of any boundaries between States

3 General features of the Iridium global satellite EGC system

3.1 All navigable waters of the world are covered by satellites in the Iridium global satellite system. Each satellite transmits enhanced group call (EGC) messages on a designated channel; this channel is optimized to enable the signal to be received by Iridium terminals with EGC capability. Reception of EGC messages is normally not affected by the position of the ship within the ocean region, atmospheric conditions or time of day.

3.2 Area calls are addressed to a geographical area, whereas group calls are addressed to groups of ships:

.1 *Area calls* can be addressed to a fixed geographical area (NAVAREA/METAREA or coastal warning area) or to a user defined area selected by an MSI provider. Area calls will be received automatically by any receiver within the area. To receive coastal warnings, the EGC receiver must be set up with appropriate B_1 and B_2 codes – where the B_1 code is the designator of the defined area and the B_2 code is the subject indicator (see section 13.4).

.2 *Group calls* will be received automatically by any ship whose EGC receiver acknowledges the unique group identity associated with a particular message.

3.3 The Iridium network enables the promulgation of Maritime Safety Information (MSI), SAR information and other urgent safety related messages to vessels. Messages are initiated via a secure, web-based portal that Iridium will make available to MSI providers (see example in Annex 3 below), or by such other means of access as may be agreed. Using the portal registered information providers will input the text of the message and specify the delivery characteristics for each message. The delivery characteristics that the registered information providers specify include message priority, geographic region for distribution, frequency of distribution, and termination of distribution.

3.4 Registered information providers may elect to have a direct connection to the Iridium gateway using a VPN or dedicated circuit(s). Utilizing this interface, the message priority, delivery area, frequency of distribution and termination of distribution are specified by the message originator when the message is sent to an Iridium gateway for delivery.

3.5 Each message is queued at a server in the Iridium gateway and scheduled for delivery. When queued for delivery, the message is routed to the appropriate teleport(s) for delivery to the satellite(s). The message is then routed from the teleport to one, or more, satellite(s) depending on the geographic region for distribution. The satellite then utilizes an L-band channel to transmit the message to Iridium maritime mobile terminals. If specified by the registered information provider initiating the message, retransmission of the message is performed at specified time intervals for the geographic area. A flow diagram for shore-to-ship promulgation of EGC messages is provided in Figures 1 and 2 above.

3.6 Unique geographic areas are defined for each NAVAREA/METAREA, which will be identified by a unique group identification number (group ID). The delivery area for the messages is defined by a set of GPS coordinates which provides the boundary of the delivery area. The delivery area for each NAVAREA/METAREA will extend from the coastline of each of the regions to 300 nautical miles beyond the line of demarcation with an adjacent NAVAREA/METAREA. This will permit maritime mobile terminals outside of a NAVAREA/METAREA to receive a message in the adjacent region if it is within 300 nautical miles of that NAVAREA/METAREA boundary.

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3.7 Registered information providers have the ability to establish a dynamic delivery area for a message. In the event a registered information provider desires to communicate with maritime mobile terminals that are beyond the unique geographic delivery area defined for a specific NAVAREA/METAREA, they can specify an alternate delivery area for a message intended for the unique group ID.

3.8 Aboard the vessel, the Iridium maritime mobile terminal is interconnected to a message terminal, keyboard, printer and alarm panel which will perform the proper filtering, recording, alerting and display of messages. The maritime mobile terminal will receive the message, and then transfer the message content, along with the message priority to the other components of the GMDSS system on board the vessel.

4 Planning of new services

4.1 Authorities wishing to become officially registered information providers of MSI to ships at sea via Iridium terminals, should contact the IMO via the International Satellite EGC Coordinating Panel at an early stage for advice. The plans of any prospective registered information providers should be coordinated with the IMO, IHO and WMO and with other national authorities, before authorization to broadcast via Iridium may be granted by the International Satellite EGC Coordinating Panel, in accordance with the procedures set out in Annex 2.

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See also IMSO's recommendation toe NCSR 5

4.2 Once authorized and registered, information providers should contact Iridium and/or the service provider(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 Iridium system, charges and payment for services and any other matters with respect to providing MSI to mariners.

4.3 The International Satellite EGC Coordinating Panel, in cooperation with IHO and WMO, undertakes the coordination of times for scheduled transmissions.

4.4 Mariners should be informed of the establishment of a service by the inclusion of full details in Notices to Mariners and other national nautical publications and the IMO Master Plan of Shore-Based Facilities for the GMDSS, as amended. In addition, full details of the service should be sent to the International Satellite EGC Coordinating Panel at the address given in Annex 1.

4.5 Questions concerning promulgation of MSI through the Iridium mobile-satellite system can be addressed to the International Satellite EGC Coordinating Panel at the address given in Annex 1.

4.6 Questions concerning the operation of the Iridium system should be addressed to

Maritime Safety Services
Iridium Satellite LLC
1750 Tysons Boulevard, Suite 1400
McLean, VA
22102 USA

Email address: [maritime.safety(atmark)iridium.com]

5 Changes to existing services

5.1 Registered information providers wishing to change their existing service should follow the same coordination procedures as for a new service, in accordance with the procedures set out in Annex 2.

5.2 Mariners should be informed of the changes to an existing service by the inclusion of full details in Notices to Mariners and other national nautical publications and the IMO Master Plan of Shore-Based Facilities for the GMDSS, as amended. In addition, full details of the service should be sent to the International Satellite EGC Coordinating Panel at the address given in Annex 1.

6 Operation of the Iridium global satellite EGC system

6.1 Given the size of an ocean region, some form of selectivity in receiving and printing the various messages is required. All ships within the footprint of a selected satellite will receive area calls, however, they will only be displayed and printed by those receivers that recognize both:

.1 the fixed geographical area (NAVAREA/METAREA), user defined area as appropriate; and

.2 for coastal warnings, the coastal warning area and the subject indicator for the message.

6.2 The message format includes a preamble which enables the EGC receiver to display and print only those messages which relate to its present position, to the intended route, or to the aforementioned areas as programmed by the operator.

6.3 For coastal warning areas messages, the registered information provider must ensure that the preamble includes the B_1 code identifier allocated for the particular area, along with the appropriate B_2 code subject indicator (see section 13.4). The EGC receiver can be set to reject messages concerning certain optional subjects which may not be required by the ship (~~e.g. LORAN messages may be rejected in a ship which is not fitted with a LORAN receiver~~). Receivers also use the B_2 code subject indicator to identify coastal warnings which, because of their importance, may NOT be rejected.

6.4 Reception of certain types of messages, such as shore-to-ship distress alerts, SAR information, meteorological warnings and forecasts 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 the C_2 service codes: 00, 04, 14, 24, 31, 34 and 44 (see annex 4).~~

6.5 The Iridium EGC system allows several input parameters to support MSI and SAR information transmissions:

.1 Delivery Area (Predefined or Dynamic)

.2 User Group (Optional)

.3 Message Priority (Distress, Urgency, Safety and Routine)

.4 Delivery Method (Immediate or Scheduled)

.5 Echo (Up to 2)

.6 Repeat (Number of Instances)

.7 Scheduled transmissions may be cancelled by notifying the system

6.6 There are three methods of identifying the destination delivery area for an Iridium EGC transmission, including pre-defined areas such as NAVAREA/METAREAs, sub-areas and coastal areas, or specific ad hoc user-defined areas.

6.7 Messages can be addressed to user defined areas, which may be circular or rectangular in shape. A circular area is described by latitude and longitude of the centre in degrees and radius of the circle in nautical miles. A rectangular area is described by latitude and longitude of the south-west corner in degrees and extension in degrees to the north and east of the rectangle. Each satellite has a "footprint" of approximately 4 500 km diameter, and comprises 48 "spot beams" of approximately 400 km diameter. Each beam within a footprint overlaps, as do the beams from adjacent satellites. The Iridium system dynamically uses the most appropriate combination of beams and satellites for the delivery area required.

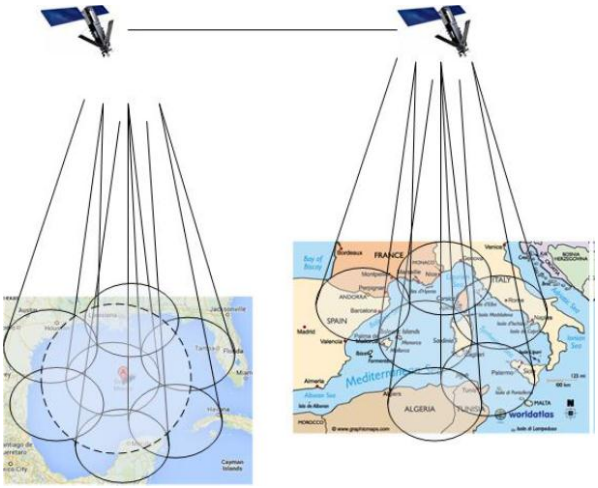

Figure 5 – Examples of message addressing

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6.8 In the case of a ship in distress, it is normal to create a circular user defined area ~~(C_2 service code 14~~), defined by the position of the casualty and a radius around the casualty to alert ships that may be able to render assistance. If no response is received from any ship at the first call, the area can be expanded in steps until an acknowledgement by one or more ships is received. In cases where the position of the distress is unknown, a shore-to-ship distress alert can be transmitted to all ships ~~(C_2 service code 00),~~ in a given ocean region. SAR coordination messages shall only be addressed to circular ~~(C_2 service code 14)~~ or to rectangular (~~C_2 service code 34)~~ user defined areas.

7 Promulgation of Maritime Safety Information (MSI) or Search and Rescue (SAR) information

7.1 MSI or SAR information is promulgated by officially registered information providers whose Certificates of Authorization to broadcast via Iridium are issued by the IMO in

accordance with the procedures in Annex 2. Registered information providers include for example:

.1 NAVAREA Coordinators: for NAVAREA warnings and other urgent safety-related information;

.2 National Coordinators: for coastal warnings and other urgent safety-related information;

.3 METAREA Coordinators: for meteorological warnings and forecasts; and

.4 Rescue Coordination Centres: for shore-to-ship distress alerts, SAR information and other urgent safety-related information.

Commented [A17]: Ice? Piracy?

Commented [A18R17]: 7.1.1-7.1.4 are from SafetyNET Manual. Adding ice, piracy etc here is simple. Text here would then differ from SafetyNET Manual, but does text in both need to be amended here to refer to "shore-to-ship distress alert relays" anyway?

7.2 All NAVAREA, Sub-area and coastal warnings and METAREA, Sub-area warnings and forecasts should be broadcast only in English in the international satellite EGC service in accordance with resolution A.706(17), as amended, and A.1051(27) as amended. In addition to the required broadcasts in English, METAREA/NAVAREA, Sub-area and coastal warnings may be broadcast in a national language using a national satellite EGC service.

7.3 Registered information providers shall take into account the need for contingency planning.

7.4 Scheduled transmissions are made at specified times, as allocated by the IMO International Satellite EGC Coordinating Panel. These schedules are published in national nautical publications and the IMO Master Plan of Shore-Based facilities for the GMDSS, as amended.

7.5 MSI providers shall adhere to their published scheduled broadcast times to facilitate reception of messages.

8 Message formatting and C codes

~~8.1 EGC messages include instructions to the LES for processing MSI in the form of a special address header that consists of five (or six) C codes as described below. In order for a message to be correctly processed, it shall always consist of data conforming to C codes "1" to "5". Additionally, C code "0" shall be used when required by the service provider.~~

~~C_0 Ocean Region code – 1 digit (when required)~~

~~0 – Atlantic Ocean Region – West~~

~~1 – Atlantic Ocean Region – East~~

~~2 – Pacific Ocean Region~~

~~3 – Indian Ocean Region~~

~~9 – all ocean regions served by the addressed LES (**Note:** availability of C_0 = 9 should be checked with the LES operator or service provider)~~

~~C_1 priority code – 1 digit code~~

~~C_2 service code – 2 digit code~~

~~C_3 address code – 2, 4, 10 or 12 alphanumeric code~~

~~C_4 repetition code – 2 digit code~~

~~C_5 presentation code – 1 or 2 digit code~~

C Codes					
~~C_0 Ocean Region code (when required)~~	~~C_1 Priority code~~	~~C_2 Service code~~	~~C_3 Address code~~	~~C_4 Repetition code (see Annex 4, part E)~~	~~C_5 Presentation Code~~
~~1 digit code~~	~~1 digit code~~	~~2 digit code~~	~~2, 4, 10 or 12 alphanumeric code~~	~~2 digit code~~	~~1 or 2 digit code~~
~~0 – AOR W~~ ~~1 – AOR E~~ ~~2 - POR~~ ~~3 – IOR~~ ~~9 – All Ocean Regions*~~	~~1 – Safety~~ ~~2 – Urgency~~ ~~3 - Distress~~	~~00 – All ships (general call)~~	~~2 digit – 00 (All ships)~~	~~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 MSI provider~~	~~Always 0** or 00~~
		~~04 – Navigational, meteorological or piracy warning or meteorological forecast to a rectangular area~~	~~12 alphanumeric rectangular area address $D_1D_2N(S)D_3D_4D_5E(W)D_6D_7D_8D_9D_{10}$~~		
		~~13 – Navigational, meteorological, coastal or piracy warning or meteorological forecast to a coastal warning area~~	~~4 alphanumeric coastal warning area address $X_1X_2B_1B_2$~~		
		~~14 – Shore-to-ship distress alert to a circular area~~	~~10 alphanumeric circular area address $D_1D_2N(S)D_3D_4E(W)M_1M_2M$~~		
		~~24 – Navigational, meteorological or piracy warning or meteorological forecast to a circular area~~	~~10 alphanumeric circular area address $D_1D_2N(S)D_3D_4E(W)M_1M_2M_3$~~		
		~~31 – NAVAREA/ METAREA, or piracy warning, or meteorological forecast to a NAVAREA/METAREA~~	~~2 digit – NAVAREA/METAREA number~~		
		~~34 – SAR coordination to a rectangular area~~	~~12 alphanumeric rectangular area address $D_1D_2N(S)D_3D_4D_5E(W)D_6D_7D_8D_9D_{10}$~~		
		~~44 – SAR coordination to a circular area~~	~~10 alphanumeric circular area address $D_1D_2N(S)D_3D_4E(W)M_1M_2M_3$~~		
~~* Subject to availability through LES or service provider~~ ~~** Value of the presentation code is given by the LES operator or service provider after registration.~~					

~~8.2 The syntax of the special address header in relation to the exact number of digits and/or alphanumeric characters, and to the spaces between each C code, is critical and must conform to the format required by the LES or service provider used.~~

~~8.3 Messages are stored at the addressed LES until transmitted the appropriate number of times, as specified by the C_4 code, although the MSI provider may also cancel a message at any time by sending an appropriate cancellation message to the LES.~~

~~8.4 Cancellation procedure may vary between different LESs or service providers. Detailed operational procedure is contained in the instructions on sending EGC broadcast given to the MSI providers after registration with the LES operator or service providers.~~

~~8.5 Scheduled broadcasts are made to specified ocean regions at specified times, as allocated by the IMO International Satellite MSI Coordinating Panel. These schedules are published in national nautical publications and the IMO Master Plan of Shore-Based Facilities for the GMDSS, as amended.~~

~~8.6 MSI providers shall adhere to their published scheduled broadcast times to facilitate reception of messages.~~

9 Monitoring of MSI broadcasts

9.1 In order to ensure the integrity of the MSI being broadcast, MSI providers must monitor the broadcasts which they originate in accordance to resolution A.706(17), as amended. Monitoring is especially important in a highly automated system, which is dependent on careful adherence to procedure and format. This shall be accomplished by the installation of a receiver to enable each MSI provider to:

.1 confirm that the message is transmitted and received correctly;

.2 ensure that cancellation messages are properly executed; and

.3 observe any unexplained delay in the message being broadcast.

9.2 EGC receivers only display or print messages on the first occasion they are received. Therefore, in order for MSI providers to confirm that all messages in force are still being transmitted by the LES, and that cancelled messages are no longer being transmitted, the EGC receiver used by the MSI provider to monitor their broadcasts should be powered down (including the transceiver), and re-booted at regular intervals, wherever this is possible.

Alternatively, MSI providers should consult their equipment supplier for specialist EGC monitoring software which would not require the MES to be re-booted.

9.3 Log

All Iridium maritime mobile terminals capable of receiving MSI have a Log, which contains information on all messages received by the terminal.

This information includes:

Message number	Generated by the terminal
LES	ID of the LES which transmits the message
Service	The MES software translates the C_2 service code used in the message address and displays a short title for the particular type message service
Priority	The MES software translates the C_1 priority code used in the message address and displays the appropriate Priority. This could be either: Safety, Urgency or Distress.
Received date and time	The date time group YY-MM-DD HH:mm of when the message was received. A format of the date is

	configurable by the MES operator.
Size	Usually in number of bytes or characters.
Sequence number	The unique message sequence or reference number allocated to the message by the addressed LES.
Routeing	Message routeing (memory or memory and printer) – set up by the MES operator or a mandatory routeing for Urgency and Distress priority messages.

Message number	LES	Service	Priority	Received date and time	Size	Sequence number	Routeing
17022405.egc	321	MET/NAV warning/forecast	Safety	17-02-24 03:31	2263	1605	Mem
17022402.egc	321	SAR coordination	Urgency	17-02-24 03:02	1506	1604	Prn+Mem
17022401.egc	322	Coastal warning/forecast	Safety	17-02-23 02:56	269	9154	Mem
17022302.egc	304	Distress alert relay	Distress	17-02-23 20:44	769	691	Prn+Mem
17022305.egc	317	NAV warning	Safety	17-02-23 19:41	819	8318	Mem
17022302.egc	322	MET warning	Safety	17-02-23 19:35	2358	9150	Mem

Figure 6 – Example of an EGC SafetyNET Log

10 Quality control of MSI broadcasts

~~**10.1 Misuse of C codes**~~

~~Monitoring of MSI broadcasts is a vital tool to show instances of misuse of C_1 (priority), C_2 (service) and C_4 (repetition) codes and other technical or operational problems in connection with preparing and broadcasting EGC messages. Misuse of C codes results in incorrect understanding of MSI services and types of message, multiple reception of unwanted messages received on ships and delay in receiving vital information.~~

~~**10.2 Improper use of C_1 priority codes**~~

~~This refers mainly to the use of service code C_2 = 14 "Ship-to-Shore distress alerts" which require using C_1 = 3 Distress priority code only. Problems are caused when the service code C_1 = 2 is used by mistake, as in the following example. When C_1 = 2 is erroneously used in conjunction with C_2 = 14, the header of the message received on a ship is displayed and printed as:~~

~~LES xxx – MSG 1210 – Distress Urgent Call to Area:~~
~~14N 66W 300 – PosOK~~

~~where:~~

~~LES xxx – ID of the LES;~~

~~MSG 1210 – message number;~~

Distress Call to Area – decoding of service C_2 = 14;

Urgent – decoding of priority C_1 = 2;

14N 66W 300 – circular area the message was sent to, where 14N 66W is centre of the circle and 300 is radius of the circle in nautical miles; and

PosOK – indicator that the MES's position status is valid or the position was updated within the last 12 hours.

The message header contains reference to two different priorities at the same time – Distress and Urgent (the same problem may be evident in the EGC log or message list), which misleads mariners about the message importance and its content. This is an important issue, particularly for non-SOLAS users, where an EGC message received with conflicting Urgency and Distress priorities may NOT be printed out automatically, which could cause a delay in reacting to the vital information.

If an EGC message is submitted with Urgency priority, service code C_1 = 2 and another message is sent with Distress priority afterwards, priority code C_1 = 3, the message with Urgency priority will be aborted and the message with Distress priority will be handled first.

10.3 Improper use of C_2 service codes

There are cases when MSI providers submit an EGC SafetyNET message using improper C_2 service codes and a sample is given below:

LES xxx – MSG 5213 – Met/NavWarn Urgent Call to Area:
35N 23E 300 – PosOK
FROM: Maritime Rescue Coordination Centre xxx
TO: ALL SHIPS IN xxx

SAR SITREP NO: 02
FISHING BOAT 'xxx' WITH THREE PERSONS ON BOARD DEPARTED FROM xxx ISLAND ON xxx AT NOONTIME AND SINCE THEN NO INFORMATION ABOUT HER. PARTICULARS .... SHIPS SAILING IN VICINITY ARE KINDLY REQUESTED TO KEEP A SHARP LOOK OUT INFORMING MRCC REGARDS DUTY OFFICER

The message was sent using service code C_2 = 24 "Met/Nav warning to circular area", as shown in the message header, but the text of the message content is concerned with SAR coordination. The correct C_2 code for this type of message should have been C_2 = 44 "SAR Coordination to a circular area". Use of the incorrect C_2 codes may delay delivery of the vital SAR information.

Another example is the improper use of rectangular addressing, e.g. service code C_2 = 04, for coastal warnings whereby the addressed rectangular area covers areas far beyond coastal areas. In this case, ships receive unwanted information for areas other than those in which they are navigating.

Reception of coastal warnings is an option and to receive these messages, MESs should be programmed or set up accordingly; otherwise coastal warnings will not be received, regardless of the ship's position. If a coastal warning type message is addressed to a rectangular area, **ALL** ships, whose position is inside the addressed rectangle, will receive the message. The main problem here is not only misusing service codes, which are specified by the International Satellite MSI Manual, but reception (and printing) of multiple unwanted messages which ships may never require.

~~10.4 Improper use of C_4 repetition codes~~

~~Repetition codes detailed in Annex 4, part E, are used by MSI providers to "instruct" the system to repeat a message a finite number of times or at specific intervals until cancelled by the information provider.~~

~~MSI is submitted for broadcast with repetitions, either six minutes after initial broadcast (with six minute "echo") or every 1, 2, 3, 4,… 48,… or 120 hours until cancelled by the MSI provider. Each message, when submitted for broadcast, is given a unique reference number. When the message is received by the MES, the reference number is "recorded" by the mobile terminal and stored in the memory. When the same message is re-broadcast later, using any C_4 repetition codes, MESs receive it and "recognize" the reference number by cross-checking the list of numbers of messages already received. Messages received with the same unique reference number will not be displayed or printed out for a second time.~~

~~Note: An EGC message, which requires a multiple broadcast, should be addressed with the proper repetition code and requires only a single submission to the LES. The process of repeated broadcast will be controlled by the repetition code.~~

~~When the same message is submitted for broadcast for a second (or third or more) time, the addressed LES will give the message **another** reference or sequence number and mobile terminals will not be able to "recognize" it as the same message. In this case each subsequent message submitted to the LES for repetition will be received by MESs and may be automatically printed out.~~

~~SafetyNET monitoring shows that some MSI providers do not use the recommended repetition code and in this case MESs receive and print unwanted messages, which will fill up the MES's memory rather quickly and waste printing paper.~~

Notes:

1. ~~Some MSI is broadcast only once on receipt using repetition code C_4 = 01.~~

~~2.~~ Mariners are advised not to engage in routine communications during the periods designated for scheduled MSI broadcasts. The six minute repeat or echo should be used for non-scheduled broadcasts.

Below is an example of the same weather forecast submitted for broadcast twice and having two different reference numbers:

LES xxx – MSG 1032 – MetWarn/Fore Safety Call to Area:
xxx – PosOK
xxx CSAT 23423440010402 xx-NOV-2016 09:55:41 103000
SECURITE
HIGH SEAS BULLETIN FOR METAREA xxx ISSUED AT 0800 ON xx NOV 2017 BY THE MET OFFICE …

LES xxx – MSG 1033 – MetWarn/Fore Safety Call to Area:
xxx – PosOK
xxx CSAT 23423440010402 xx-NOV-2017 10:10:13 103453
SECURITE
HIGH SEAS BULLETIN FOR METAREA xx ISSUED AT 0800 ON xx NOV 2017 BY THE MET OFFICE

The message (size about 4,800 characters) was received and printed twice since it was submitted to the LES for broadcast twice and was given two separate reference numbers – 103000 and 103453.

If the message had been submitted once ~~with, for example $C_4 = 11$~~ (transmit on receipt followed by repeat six minutes later), it would have been given one reference number and received and printed only once.

11 Accessing the Iridium global satellite EGC system

11.1 MSI or SAR information is promulgated by officially registered information providers whose Certificates of Authorization to promulgate via Iridium are issued by the IMO in accordance with the procedures in Annex 2.

11.2 Messages are initiated via a secure, web-based portal that Iridium will make available to officially registered users (see an illustrative example in Annex 3 of this Manual), or by such other means of access as may be agreed. Using the portal, users will input the text of the message and specify the delivery characteristics for each message. The delivery characteristics that the users specify include message priority, geographic region for distribution, frequency of distribution, and termination of distribution.

11.3 Users may elect to have a direct connection to the Iridium gateway using a VPN or dedicated circuit(s). Utilizing this interface, the message priority, delivery area, frequency of distribution and termination of distribution are specified by the message originator when the message is sent to an Iridium gateway for delivery.

12 Land Earth Station functions

Each message is queued at a server in the Iridium gateway and scheduled for delivery. When queued for delivery, the message is routed to the appropriate teleport(s) for delivery to the satellite(s). The message is then routed from the teleport to one, or more satellite(s) depending on the geographic region for distribution.

13 Receiving transmission

13.1 When a message has been received, a record is made of the message identification associated with that message. The unique sequence number is used to suppress the printing of repeated transmissions of the same message.

13.2 A maritime mobile terminal is capable of storing at least 255 message identifications. These message identifications are stored with an indication of the number of hours that have elapsed since the last receipt of the message. Subsequent reception of the same message identification will 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 will be erased.

13.3 The maritime mobile terminal also suppresses the printing of messages previously received. 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.

13.4 The following B_2 code subject indicators for coastal warnings are in use[1]:

[1] Cannot be rejected by the receiver

A = Navigational warnings

B = Meteorological warnings

C = Ice reports

D = Search and rescue information, and acts of piracy warnings

E = Meteorological forecasts

F = Pilot service messages

G = AIS

H = LORAN messages

I = Not used

J = SATNAV messages

K = Other navaid messages

L = Other navigational warnings – additional to B_2 code A

V = Special services allocation by the International Satellite EGC Coordinating Panel

W = Special services allocation by the International Satellite EGC Coordinating Panel

X = Special services allocation by the International Satellite EGC Coordinating Panel

Y = Special services allocation by the International Satellite EGC Coordinating Panel

Z = No messages on hand

13.5 It is recommended that, in order to ensure that all necessary MSI is available before sailing, the maritime mobile terminal should remain in operation while the ship is in port.

13.6 Although reception of MSI and SAR information is automatic, the shipboard operator must set up the receiver properly before the start of the voyage.

Commented [A19]: Etc…

Commented [A20R19]: Although context says "MSI" is appropriate for 13.5, in 13.6 would generic term "messages" be better, as elsewhere in section 13?

13.7 The position information in maritime mobile terminals is up-dated automatically from integrated navigational receivers and they are fitted on most Iridium maritime mobile terminals, or may be up-dated from a separate electronic position-fixing system. If there is no automatic position up-date system installed, e.g. on older MES terminals, it is recommended that the position in the maritime mobile terminal is up-dated at least every 4 hours

14 Charges for MSI services

14.1 Resolution A.707(17): *Charges for Distress, Urgency and Safety Messages Through the Inmarsat System*, establishes the arrangements in place for the treatment of charges. IMO resolution A.1001(25). *Criteria for the provision of mobile satellite communication systems in the Global Maritime Distress and Safety System (GMDSS),* requires that prospective satellite systems operating in the GMDSS undertake to apply the principles of resolution A.707(17), and Iridium has given such an undertaking.

14.2 There are no charges to the mariner for reception of these messages.

14.3 Message transmission charges apply to MSI providers and are set at a special tariff.

Annex 1

International Satellite EGC Coordinating Panel

1 Terms of reference

To coordinate the development and use of the International Satellite EGC Service, and in particular to:

.1 develop operating methods for the effective use of the service, including consideration of the need for scheduled broadcasts;

.2 develop documentation in support of the service, in particular the International Satellite EGC System Manuals;

.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 coordinate the registration of potential information providers; and

.6 promote a proper understanding of the benefits and use of the International Satellite EGC Service among the wider maritime community.

2 Contact address

The International Satellite EGC Coordinating Panel can be contacted at the following address:

The Chairman
International Satellite EGC Coordinating Panel
International Maritime Organization
4 Albert Embankment
London SE1 7SR
United Kingdom
Telephone: +44 (0)20 7735 7611, Fax: +44 (0)20 7587 3210
Email: ncsr@imo.org (In subject line add: for Chairman IMO International Satellite EGC Coordinating Panel)

3 Panel membership

3.1 The International Satellite EGC Coordinating Panel is open to membership by all Member Governments and also includes one member nominated by each of the following international organizations:

.1 International Maritime Organization (IMO)

.2 World Meteorological Organization (WMO)

.3 International Hydrographic Organization (IHO)

.4 International Mobile Satellite Organization (IMSO)

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

.1 IHO World-Wide Navigational Warning Service Sub-Committee

.2 IMO NAVTEX Coordinating Panel

.3 Expert Team on Maritime Safety Services (ETMSS) of the Joint WMO/IOC Technical Commission for Oceanography and Marine Meteorology (JCOMM)

.4 Inmarsat plc

.5 Iridium Satellite LLC

Annex 2

Authorization, certification and registration of registered information providers

Two distinct and separate processes, Authorization and Certification, must be completed before an information provider will be granted Registration to access the Iridium global satellite EGC system. They have been established to protect the integrity of the information service and clearly establish a qualification to the special tariff.

1 Authorization

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

1.2 In order to obtain authorization to broadcast maritime safety information through the Iridium satellite EGC service, an information provider must apply to the relevant international organization for approval to participate in the internationally coordinated service:

Meteorological authorities – to WMO;
Hydrographic authorities – to IHO;
Search and rescue authorities – to IMO;
The International Ice Patrol – to IMO;
Others – to IMO.

1.3 In considering such applications, the relevant international organizations will take into account:

.1 the established and expected availability of other information sources for the area concerned; and

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

1.4 The relevant international organization will inform IMO of endorsed applications.

2 Certification

2.1 On receipt of IMO authorization, the International Satellite EGC Coordinating Panel will issue a Certificate of Authorization to Participate in the International Satellite EGC Service directly to the information provider with a copy to IHO or WMO or IMO, as well as to Iridium. A specimen Certificate of Authorization is shown at the end of this Annex.

2.2 International Satellite EGC Coordinating Panel will maintain the master list of all registered information providers and circulate it to IMO, IHO, WMO and Iridium.

3 Registration

3.1 After receiving a Certificate of Authorization, an information provider may conclude an agreement with Iridium, to obtain access to the system.

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

3.3 Iridium will only register information providers who have received a Certificate of Authorization.

4 Contact addresses

International Maritime Organization

The Chairman
International Satellite EGC Coordinating Panel
4 Albert Embankment
London SE1 7SR
United Kingdom
Telephone: +44 (0)20 7735 7611
Fax: +44 (0)20 7587 3210
Email: ncsr@imo.org (In subject line add: for Chairman IMO International Satellite EGC Coordinating Panel)

International Hydrographic Organization
4b quai Antoine 1er
BP445
MC98011 Monaco Cedex
Principauté de MONACO
Telephone: +377 93 10 81 00
Fax: +377 93 10 81 40
Email: info@iho.int

World Meteorological Organization
7bis, avenue de la Paix
Case postale 2300
CH-1211 Geneva 2
Switzerland
Telephone: + 41(0) 22 730 81 11
Fax: + 41(0) 22 730 81 81
Email: mmo@wmo.int

5 Sample Certificate of Authorization

4 Albert Embankment London SE1 7SR United Kingdom	99 City Road London EC1Y 1AX United Kingdom

[Name of authority/country]

Date: 01 Jan 2020

Certificate of Authorization to Participate as an Information Provider in the Iridium Global Satellite EGC System

This is to certify that the [*Name of authority/country*] is authorized by the international Maritime Organization to provide navigational warning services for transmission in accordance with Annex 2 of the Iridium Global Satellite EGC System Manual.

[PETER M. DOHERTY]

Chair[man]
International Satellite EGC Coordinating Panel

Certificate No: "XX"

International Maritime Organization (IMO)	International Mobile Satellite Organization (IMSO)
Telephone: National (207) 735-7611 International +44 (207) 735-7611 Facsimile +44 (207) 587-3210	Telephone: National (207) 728-1249 International +44 (207) 728-1249 Facsimile +44 (207) 728-1172

Annex 3

The Iridium Global Mobile-Satellite System

1 Introduction

1.1 Iridium Satellite LLC owns and operates a Global Mobile Personal Communications by Satellite (GMPCS) system providing fully global digital communications. The major components of the Iridium mobile-satellite system are:

1.1.1 The space segment, consisting of 66 operational satellites and additional in-orbit spare satellites;

1.1.2 The ground segment, consisting of satellite teleports ("teleports") for the transfer of voice and data communications between the gateways and the satellite constellation, and gateways which provide connection to terrestrial voice and data networks; and

Commented [A21]: Consider including in definitions

Commented [A22R21]: The "Definitions" section 2.2 of the Manual is copied from the 2018 SafetyNET Manual, and the additional definitions are suggested in the "Notes" text underneath that.

1.1.3 Mobile earth stations, which consist of a satellite modem, which is incorporated into a commercial product, and an externally installed antenna.

1.2 The satellite constellation provides the communication links between the user terminals and the teleport(s), which are interconnected to the gateways. The gateways serve as the switching center, routing all communications into and from terrestrial networks, such as the PSTN. The gateway also locates, identifies and tracks subscribers for mobility management, and records user activity for billing purposes.

1.3 These components are illustrated in Figure 7 below:

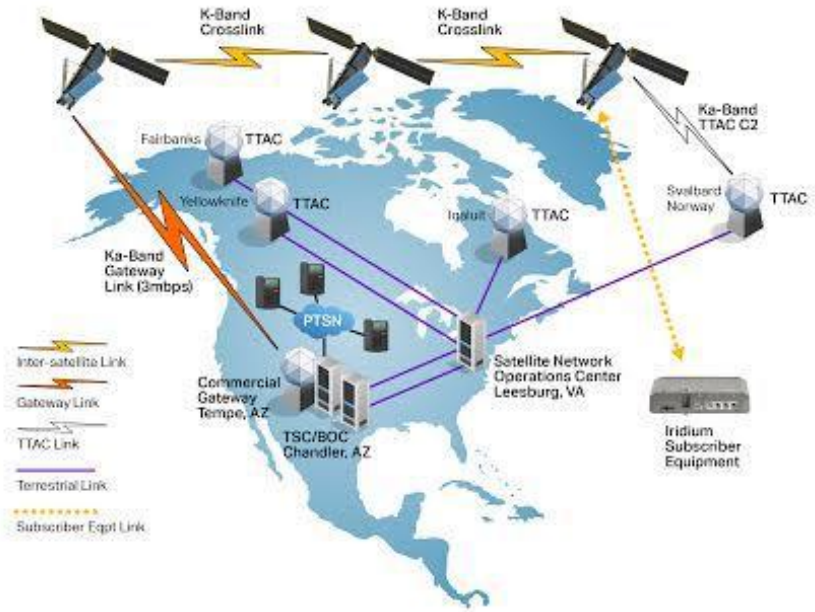

Figure 7 – The Iridium global satellite system, network overview (North and Central America)

Commented [A23]: Needs further work?

Commented [A24R23]: Will be updated to show new spacecraft.

2 The space segment

2.1 The constellation of 66 operational Low Earth Orbit (LEO) satellites enables user terminal-to-user terminal, user terminal-to-gateway, and gateway-to-user terminal communications. The 66 satellites are evenly distributed in six orbital planes with a polar (86.4 degree) inclination, with on-orbit spare satellites. The satellites orbit the Earth at an altitude of 780 km and take approximately 100 minutes to complete one orbit.

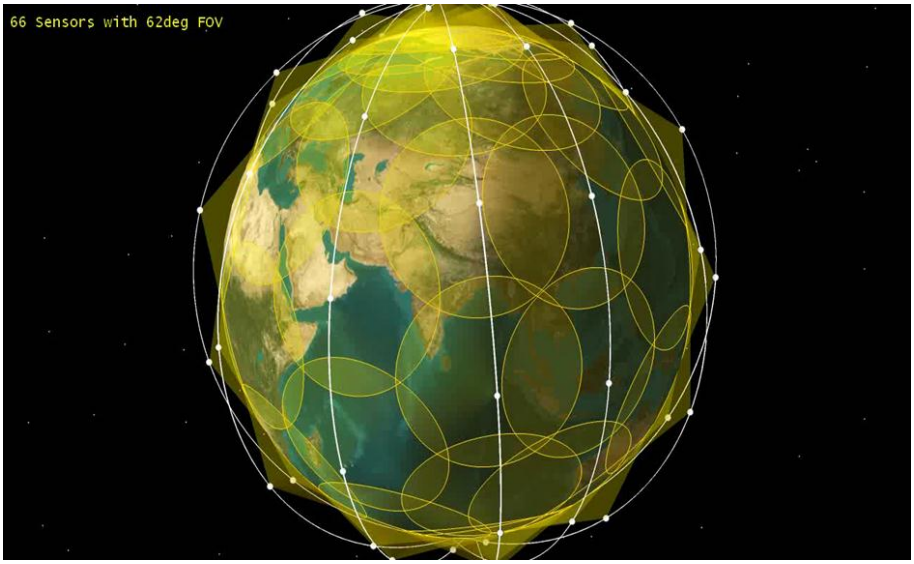

Figure 8 - Iridium constellation,

[Iridium constellation animation embedded here]

2.2 The satellites support three types of communication links – satellite-to-satellite, satellite-to-teleport, and satellite-to-user terminal. Each satellite communicates with the satellite immediately ahead and behind in its orbital plane (north/south) and to the nearest satellite in each of the two adjacent orbital planes (east/west). The Iridium system is the only mobile-satellite system employing this cross-linked satellite architecture. As a result, a user terminal is not required to be within the same satellite footprint as a gateway in order to gain access to the network.

2.3 The satellite-to-user terminal link uses an L-band antenna system. This projects 48 spot beams, or cells, on the Earth, with each beam being approximately 400km (250 miles) in diameter. Each L-band antenna has a “footprint” with a diameter of approximately 4 500 km (2 800 miles). Adjacent satellite footprints overlap on the Earth’s surface, enabling seamless global coverage from pole to pole. The overlapping coverage provided by the crosslinked satellites operates as a fully meshed network.

2.4 About once every minute, the cell for a user terminal is provided by a different beam on the same satellite. About once every six minutes, the cell transitions to a beam on an adjacent satellite. Special processing called a “handoff” ensures that communication sessions are maintained.

3 The ground segment

3.1 The Satellite Network Operations Center (SNOC) manages the satellite constellation and provides network management over the entire Iridium system. The SNOC communicates with the satellites through Telemetry, Tracking and Control (TTAC) facilities. In addition to controlling communications between the SNOC and the satellites, the TTAC sites track the Iridium satellites and receive telemetry data from them.

3.2 Iridium currently operates teleports at geographically diverse locations around the globe, as part of the commercial network. The teleports interconnect the satellite constellation with the Iridium gateways for the transfer of communications to and from Iridium user terminals.

3.3 Operating as a switching center, the primary gateway provides the connection between the Iridium network and terrestrial-based networks. Additional gateways are being added around the globe, where appropriate, which can serve to enhance overall system reliability and capacity. Each gateway controls system access, call setup, mobility management, billing, tracking and maintaining all information pertaining to user terminals, such as user identity and geo-location.

4 Coverage Area

The Iridium network provides fully global service coverage. All communication services are provided for user terminals independent of geographic location. Communications are provided by a constellation of LEO satellites with overlapping coverage areas, providing ubiquitous coverage. The Iridium network and the services that are intended to be used for GMDSS communications are fully operational for the entire globe.

5 Iridium Network Functional Capabilities

5.1 The Iridium network permits ship-to-shore, shore-to-ship and ship-to-ship calls for maritime safety communications. It provides for four levels of prioritization of all calls and performs pre-emption of lower priority communications, if necessary.

5.2 Only registered information providers will be allowed to input messages for transmission. Approval and registration of these entities is performed by the International Satellite EGC Coordinating Panel by the procedure described in Annex 2 of this Manual. During the approval and registration process, the means of access, and the credentials needed by the authorised entity, will be agreed between the entity, the Panel and Iridium. For example, access can be protected by requiring a two-stage access procedure using a password and PIN, and authorised users can input messages using email, a web interface or other means of transmitting data over the Internet, a leased line or VPN. An example of a user interface for submitting messages to the Iridium system is shown in Figures 9 and 10 below:

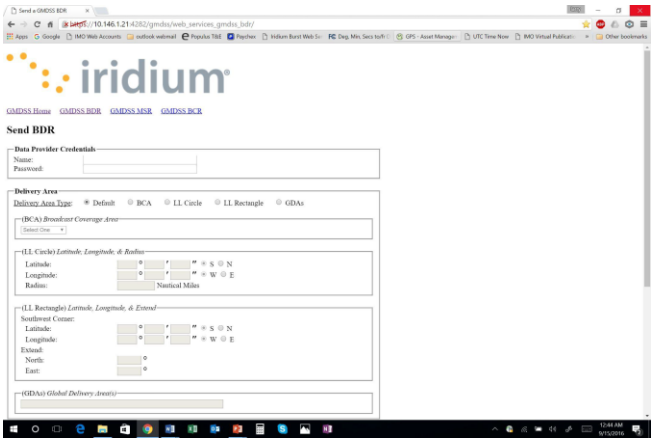

Figure 9a - Top half of input screen (illustrative example)

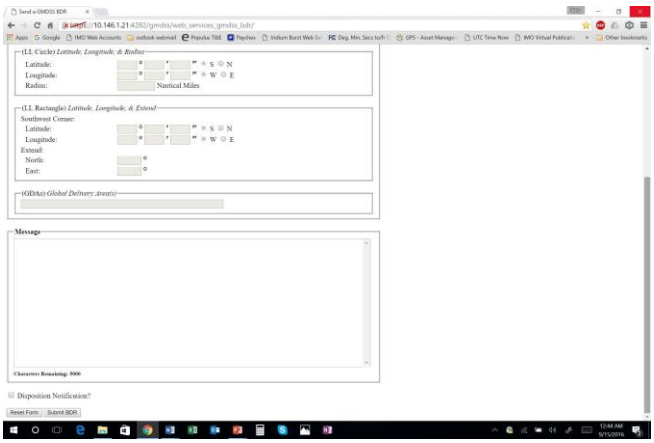

Figure 9b - Bottom half of input screen (illustrative example)

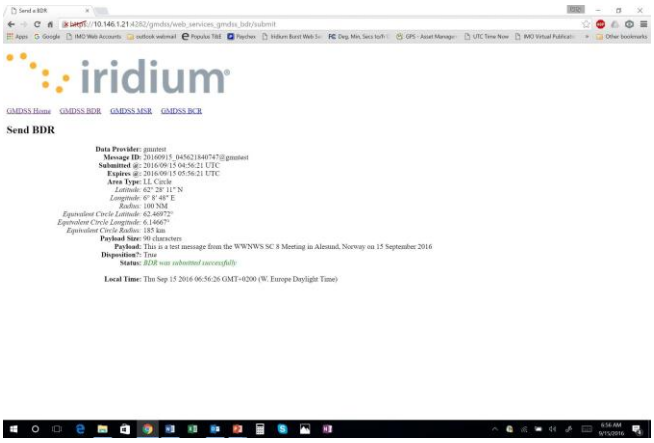

Figure 10 - System receipt screen (illustrative example)

5.3 Transmission of safety-related information by ships to shore authorities is accomplished using the general communication capabilities of the Iridium system. Messages can be addressed to relevant shore authorities (hydrographic offices, meteorological offices or other shore authorities) using the contact details published in Lists of Radio Signals and elsewhere.

6 Network Availability and Service Restoration

6.1 The Iridium network provides all services globally and is in continuous operation. System performance for each of the services is continuously monitored worldwide through numerous mechanisms. If there is a service impairment, Iridium will issue an advisory notice within ten minutes of the impairment being identified by operations staff, and provide regular updates until the impairment is corrected. In the event of a partial or total satellite failure, services to affected users will be fully restored within minutes. The constellation architecture and operation does not permit a single satellite to cause an extended service interruption from the user's perspective. The nature of the satellite footprints as they orbit, combined with "echo" transmissions, ensures that ships will still be able to transmit distress alerts and to receive MSI or SAR communications even in the event of a satellite failure.

6.2 The International Mobile Satellite Organization (IMSO) provides annual reports to the IMO on Iridium's performance of its GMDSS functions, including availability during the reporting period.

Annex 4

Operational guidance

1 This annex contains operational guidance for the benefit of registered MSI providers who are responsible for preparing messages for broadcast via the International Satellite 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-parts of this annex.

Part A – Navigational warning service

Part B – Meteorological service

Part C – Search and rescue (SAR) services and SAR coordination traffic

Part D – Piracy countermeasures broadcast messages

Allocation of priority and services codes for services		
Service	**Message priority**	**Service code (type)**
Navigational warning services	C_1 = 1 (Safety) – normally C_1 = 2 (Urgency) – exceptionally at discretion of MSI provider	C_2 = 04 – Navigational warning to a rectangular area C_2 = 13 – Coastal warning to a coastal warning area C_2 = 24 – Navigational warning to a circular area C_2 = 31 – NAVAREA warning to a NAVAREA
Meteorological services	C_1 = 1 (Safety) – always for forecasts and warnings C_1 = 2 (Urgency) – always for urgent tropical cyclone warnings only	C_2 = 04 – Meteorological warning or forecast to a rectangular area C_2 = 13 – Meteorological warning or forecast to a coastal warning area C_2 = 24 – Meteorological warning or forecast to a circular area C_2 = 31 – METAREA warning or meteorological forecast to a METAREA
SAR services: 1) Shore-to-ship	C_1 = 3 (Distress) – always	C_2 = 14 – Shore-to-ship distress alert to a circular

distress alert		area
2) SAR coordination traffic	C_1 = 1 (Safety) – determined by the phase of emergency C_1 = 2 (Urgency) – determined by the phase of emergency C_1 = 3 (Distress) – determined by the phase of emergency	C_2 = 34 – SAR coordination to a rectangular area C_2 = 44 – SAR coordination to a circular area
3) Shore-to-ship urgency and safety traffic	C_1 = 1 (Safety) C_1 = 2 (Urgency)	C_2 = 31 – Urgency and safety traffic
4) General (all ships call within the Inmarsat ocean region)	C_1 = 2 (Urgency) C_1 = 3 (Distress)	C_2 = 00
Piracy countermeasures broadcast messages	C_1 = 1 (Safety) C_1 = 2 (Urgency) – for piracy attack warnings	C_2 = 04 – Piracy warning to a rectangular area C_2 = 13 – Piracy warning to a coastal warning area C_2 = 24 – Piracy warning to a circular area C_2 = 31 – Piracy warning to a NAVAREA

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

C_0:C_1:C_2:C_3:C_4:C_5

(*Spaces, colons or other delimiters between these codes will be required, depending on the communication protocol of the addressed LES.*)

C_0 – Ocean region

C_1 – Message priority

C_2 – Service code

C_3 – Address code

C_4 – Repetition code

C_5 – Presentation code

Each C code controls a different broadcast parameter and is assigned a numerical value according to the options specified in the following parts.

The additional C_0 code will only be required to identify the satellite ocean region when sending a broadcast message to a LES which operates to more than one satellite ocean region, as follows:

C_0 = 0 – AOR-W

C_0 = 1 – AOR-E

C_0 = 2 – POR

C_0 = 3 – IOR

C_0 = 9 – All Ocean Regions[2]

4 (a) All EGC messages should comprise of three elements:

Address header instruction (EGC C codes)
TEXT OF MESSAGE
NNNN

Mandatory message element table	
Message element	**Remarks**
Address header instruction	The syntax of the special address header in relation to the exact number of digits and/or alphanumeric characters, and to the spaces between each C code is critical, and must conform to the format required by the LES or service provider as supplied in their specific instruction manual.
TEXT OF MESSAGE	The content of the message should be presented in UPPER case. For maritime safety information messages, the format of navigational warnings is defined in the *Joint IMO/IHO/WMO Maritime Safety Information Manual*, as amended.
NNNN	The letters NNNN should be inserted at the end of the text to indicate "end of message".

(b) EGC messages submitted for transmission (or broadcast) via a two stage access system must also include an end of transmission instruction code for the LES. This should be inserted on the final line, after NNNN. This code may vary, and must conform to the format required by the LES or service provider as supplied in their specific instruction manual.

[2] Subject to availability through LES or service provider

5 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 Satellite Service are made at scheduled times. Broadcast schedules must be coordinated through the International Satellite Coordinating Panel, which can also offer advice on ways of scheduling information within the system.

6 Because errors in the header format of a message may prevent it being released, MSI providers must monitor broadcasts of messages which they originate.

7 For all the services described below, a cancellation or deleting facility is provided for messages transmitted to a LES with category (b) repetition codes (see part E). Cancellation (or deletion) procedures may vary between different LESs or service providers. Detailed operational procedure is contained in the instructions on sending EGC broadcasts given to the MSI providers after registration with the LES operator or service provider.

8 The term "echo" used in all of the services described below in parts A, B, C and D, is associated with using the respective C_4 repetition codes which will initiate an automatic repeated broadcast six minutes after the initial scheduled or unscheduled broadcast. The six minute repeat or echo is used to ensure that the warning is received by the maximum number of ships.

Part A – Navigational warning services

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

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

3 Navigational warnings that require an immediate broadcast should be transmitted as soon as possible after receipt. If still in force, they should be repeated in subsequent scheduled broadcasts, twice a day for six weeks or until cancelled.

4 Navigational warnings shall remain in force until cancelled by the originating Coordinator. Navigational warnings should be broadcast for as long as the information is valid; however, if they are readily available to mariners by other official means, for example in Notices to Mariners, then after a period of six weeks they may no longer be broadcast. If the navigational warning is still valid and not available by other means after six weeks, it should be re-issued as a new navigational warning.

5 The following C codes shall be used for warnings issued under the auspices of the WWNWS.

5.1 C_1 – Message priority

C_1 = 1 (safety)

C_1 = 2 (urgency)(at discretion of the registered MSI provider)

5.2 C_2 – Service code[3]

C_2 = 04 Navigational warning to a rectangular area*

[3] C_2 = 04 may be used for NAVAREA warnings to a rectangular area by NAVAREAs XVII, XVIII, XIX, XX and XXI.

~~C_2 = 13 Coastal warning to a coastal warning area~~

~~C_2 = 24 Navigational warning to a circular area~~

~~C_2 = 31 NAVAREA warning to a NAVAREA~~

~~5.3 C_3 – Address code~~

~~C_3 = two digits X_1X_2~~	~~When C_2 = 31, then:~~ ~~X_1X_2 are the two digits of the NAVAREA number (with a leading zero where necessary in the range 01 – 21).~~
~~C_3 = four alphanumeric characters $X_1X_2B_1B_2$~~	~~When C_2 = 13 for Coastal warnings, then:~~ ~~X_1X_2 are the two digits of the NAVAREA number (with a leading zero where necessary in the range 01 – 21)~~ ~~B_1 is the coastal warning area A to Z~~ ~~B_2 is the subject indicator and must always be A or L, where:~~ ~~A = Navigational warnings~~ ~~L = Other navigational warnings~~
~~C_3 = twelve alphanumeric characters $D_1D_2LaD_3D_4D_5LoD_6D_7D_8D_9D_{10}$~~	~~When C_2 = 04 for NAVAREA warnings within a rectangular area:~~ ~~D_1D_2 is latitude of south-west corner of the rectangle in degrees~~ ~~La is hemisphere which will always be N for Arctic NAVAREAs XVII to XXI~~ ~~$D_3D_4D_5$ is longitude of south-west corner of rectangle in degrees, with leading zeros if required~~ ~~Lo is longitude E or W~~ ~~D_6D_7 is extent of rectangle in latitude (degrees)~~ ~~$D_8D_9D_{10}$ is extent of rectangle in longitude (degrees)~~
~~Example: a rectangle whose south-west corner is 60°N and 010°W, extending 30° north and 25° east, is coded as: 60N010W30025~~ ~~Note: Latitude and longitude are limited by values from 00° to 90° latitude and 000° to 180° longitude.~~	

~~5.4 C_4 – Repetition code~~

C_4 = 01	May be used for initial unscheduled broadcast of NAVAREA warnings, and coastal warnings with no echo (transmit once on receipt)
C_4 = 11	Recommended for use with initial unscheduled broadcast of NAVAREA warnings, and coastal warnings (transmit on receipt, echo six minutes later)
C_4 = 16	Use for NAVAREA or coastal warnings scheduled for broadcast twice per day at 12 hour intervals with safety priority
Note: For NAVAREA or coastal warnings scheduled for broadcast more than twice per day, the appropriate C_4 repetition code detailed in part E of this Manual must be used.	

5.5 C_5 – Presentation code

C_5 = 00 The code 00 for International Alphabet Number 5 is normally used

Part B – Meteorological services

1 The following guidelines set out the arrangements to be used for promulgating meteorological forecasts and warnings for the GMDSS. **They are mandatory for broadcasts in the International Satellite Service.**

2 These guidelines are to be read in conjunction with the WMO Manual on Marine Meteorological Services (WMO No. 558), as revised for the GMDSS.

3 In order to ensure uniformity of meteorological forecasts and warnings globally, the following C codes should be used for meteorological services via Iridium.

3.1 C_1 – Message priority

C_1 = 2 (urgency)	Only use for tropical cyclone warnings or urgent meteorological warnings with force 12 Beaufort or above
C_1 = 1 (safety)	For forecasts and other meteorological warnings

3.2 C_2 – Service code[4]

C_2 = 04	Meteorological warning or forecast to a rectangular area*
C_2 = 13	Meteorological warning or forecast to a coastal warning area
C_2 = 24	Meteorological warning or forecast to a circular area
C_2 = 31	METAREA warning or meteorological forecast to a METAREA

C_2 = 04 may be used for METAREA warnings or meteorological forecasts to a rectangular area by METAREAs XVII, XVIII, XIX, XX and XXI.

~~3.3 C3 – Address code~~

~~C_3 = ten alphanumeric characters $D_1D_2LaD_3D_4D_5LoR_1R_2R_3$~~	~~When C_2 = 24 for meteorological warnings to user defined circular area, then:~~ ~~D_1D_2La (three characters) is latitude of centre in degrees, and La whether north (N) or south (S). A leading zero should be used for latitudes less than 10°~~ ~~$D_3D_4D_5$Lo (four characters) is longitude of centre in degrees, and Lo whether east (E) or west (W) of the prime meridian. One or two leading zeros should be used for longitudes less than 100°~~ ~~$R_1R_2R_3$ (three characters) is radius of circle in nautical miles, up to 999. One or two leading zeros should be used for radius less than 100 nm~~
~~Example: A circle centred at latitude 56°N longitude 34°W with radius of 35 nautical miles is coded as: 56N034W035~~	
~~C_3 = two digits XX~~	~~When C_2 = 31, then:~~ ~~C_3 = the two digits of the METAREA number (with a leading zero where necessary in the range 01 – 21)~~
~~C_3 = four alphanumeric characters $X_1X_2B_1B_2$~~	~~When C_2 = 13 for coastal warnings, then:~~ ~~X_1X_2 are the two digits of the METAREA number (with a leading zero where necessary in the range 01 – 21).~~ ~~B_1 is the coastal warning area A to Z~~ ~~B_2 is the subject indicator and must always be B or E, where:~~ ~~B = Meteorological warnings~~ ~~E = Meteorological forecasts~~
~~C_3 = twelve alphanumeric characters $D_1D_2LaD_3D_4D_5LoD_6D_7D_8D_9D_{10}$~~	~~When C_2 = 04 for meteorological warnings or forecasts within a rectangular area~~ ~~Note: The definition of 12 characters for a rectangular address is given in part A, paragraph 5.3~~

~~3.4 C4 – Repetition code~~

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

~~C_4 = 01~~	~~Use for meteorological forecast (transmit once on receipt)~~
~~C_4 = 11~~	~~Use for meteorological warning (transmit on receipt followed by repeat six minutes later)~~

~~3.5 C_5 – Presentation code~~

~~C_5 = 00 The code 00 for International Alphabet Number 5 is normally used~~

~~Part C – Search and rescue services~~

~~1 The following guidelines set out the arrangements to be used by Rescue Coordination 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.~~

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

~~3 Shore-to-ship distress alert relays~~

~~3.1~~ ~~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 Satellite Service should contain the identification of the unit in distress, its approximate position and other information which might facilitate rescue. Codes should be as follows:~~

~~3.2 C_1 – Message priority~~

~~C_1 = 3 (distress)~~

~~3.3 C_2 – Service code~~

~~C_2 = 14 (shore-to-ship distress alert to circular areas)~~	~~Messages addressed to circular areas will only be received and printed out by EGC receivers that are located inside the circle~~

~~3.4 C_3 – Address code~~

~~C_3 = ten alphanumeric characters $D_1D_2LaD_3D_4D_5LoR_1R_2R_3$~~	~~When C_2 = 14 for distress alert to user defined circular area, then:~~ ~~D_1D_2La (three characters) is latitude of vessel in distress in degrees (two digits) and whether north (N) or south (S): e.g. 39N (three characters total). A leading zero should be included for latitudes less than 10°~~

	~~$D_3D_4D_5$Lo (four characters) is longitude of vessel in distress in degrees (three digits) and whether east (E) or west (W) of the prime meridian: e.g. 059W. A leading zero or zeros should be included for longitudes less than 100° or 10° as appropriate: e.g. use 099 for 99° and 008 for 8°~~ ~~$R_1R_2R_3$ (three characters) is alert radius 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.~~

~~3.5 C_4 – Repetition code~~

~~C_4 = 11~~	~~Use for distress alerts (transmit on receipt followed by repeat six minutes later)~~

~~3.6 C_5 – Presentation code~~

~~C_5 = 00 The code 00 for International Alphabet Number 5 is normally used~~

~~4 General (all ships) call~~

~~4.1 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 ocean region.~~

~~Note:~~ ~~This method of alert should rarely be used.~~

~~The C_0:C_1:C_2:C_3:C_4:C_5 codes for general calls are always as follows:~~

~~C_0 = 0 (1, 2 or 3) (if required)~~

~~C_1 = 3 (distress) or 2 (urgency)~~

~~C_2 = 00~~

~~C_3 = 00~~

~~C_4 = 11~~

~~C_5 = 00~~

~~5 Search and rescue coordination traffic~~

~~5.1 Search and rescue coordination messages should be addressed to user defined circular or rectangular areas for the intent of coordinating the search and rescue of a vessel in distress. Priority of the message will be determined by the phase of the emergency.~~

~~5.2 C_1 – Message priority~~

~~C_1 = 3 (distress), 2 (urgency) or 1 (safety)~~

~~5.3 C_2 – Service code~~

C_2 = 34	Search and rescue coordination to a rectangular area
C_2 = 44	Search and rescue coordination to a circular area

5.4 C_3 – Address code

C_3 = twelve alphanumeric characters $D_1D_2LaD_3D_4D_5LoD_6D_7D_8D_9D_{10}$	When C_2 = 34 Search and rescue coordination to a rectangular area Note: The definition of 12 characters for a rectangular address is given in part A, paragraph 5.3
C_3 = ten alphanumeric characters $D_1D_2LaD_3D_4D_5LoR_1R_2R_3$	When C_2 = 44 search and rescue coordination to a circular area Note: The definition of 10 characters for a circular address is given in part B, paragraph 3.3

5.5 C_4 – Repetition code

C_4 = 11 Use for distress alerts (transmit on receipt followed by repeat six minutes later)

5.6 C_5 – Presentation code

C_5 = 00 The code 00 for International Alphabet Number 5 is normally used

6 Shore-to-ship urgency and safety traffic

6.1 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 alerts should be broadcast to a NAVAREA using C codes as follows:

6.2 C_1 – Message priority

C_1 = 2 (urgency) or 1 (safety)

6.3 C_2 – Service code

C_2 = 31

6.4 C_3 – Address code

C_3 = two digits X_1X_2	When C_2 = 31, then: X_1X_2 are the two digits of the NAVAREA number (with a leading zero where necessary in the range 01–21)

6.5 C_4 – Repetition code

C_4 = 11	Use for unscheduled broadcasts of urgency and safety traffic (transmit on receipt followed by repeat six minutes

	later)

6.6 C_5 – Presentation code

C_5 = 00 The code 00 for International Alphabet Number 5 is normally used

7 SAR broadcast for overlapping satellite ocean regions

7.1 Search and rescue distress and urgency broadcasts should be promulgated through all satellites serving the area surrounding the vessel in distress. This is to ensure that vessels will receive the message.

Part D – Piracy countermeasures broadcast messages

1 On receiving a message of alert or any other information concerning a threat of attack (from the Security Forces Authority responsible for the operational application of the urgency plans (countermeasures) in the region or another MRCC, for example), the MRCC should ask the NAVAREA coordinator (or any other competent authority in accordance with local arrangements), to send out a warning through the appropriate MSI network (NAVTEX or satellite) and other broadcasting networks for warnings to shipping, if these exist.

2 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.

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

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

5 The following C codes illustrate those to be used for broadcasts of the daily SITREP:

5.1 C_1 – Message priority

C_1 = 1 (safety)

5.2 C_2 – Service code

C_2 = 04	SITREP to a rectangular area
C_2 = 24	SITREP to a circular area

5.3 C_3 – Address code

C_3 = twelve alphanumeric characters $D_1D_2LaD_3D_4D_5LoD_6D_7D_8D_9D_{10}$	When C_2 = 04 SITREP to a rectangular area Note: The definition of 12 characters for a rectangular address is given in part A, paragraph 5.3
C_3 = ten alphanumeric characters $D_1D_2LaD_3D_4D_5LoR_1R_2R_3$	When C_2 = 24 SITREP to a circular area Note: The definition of 10 characters for a circular address

	~~is given in part B, paragraph 3.3~~

~~5.4 C_4 – Repetition code~~

~~C_4 = 18~~	~~Broadcast every 24 hours (no echo) until cancelled~~

~~5.5 C_5 – Presentation code~~

~~C_5 = 00 The code 00 for International Alphabet Number 5 is normally used~~

~~6 A piracy attack warning shall be broadcast as an "URGENT" NAVAREA or coastal warning immediately on receipt of the source information and at least at the next scheduled broadcast or for as long as the information remains valid. Urgent warnings will be broadcast over all satellites which cover the affected region. Subject indicator character B_2 = L should be used in coastal warning areas. The specific area in which the attack has taken place is to be quoted in the first line of the text, using no more detail than is necessary to indicate the probable location of further attacks, e.g. WESTERN PHILIP 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 other attacks.~~

~~7 The following C codes illustrate those to be used for broadcast of piracy attack warnings:~~

~~7.1 C_1 – Message priority~~

~~C_1 = 2 (urgency)~~

~~7.2 C_2 – Service code~~

~~C_2 = 13~~	~~Coastal warning~~
~~C_2 = 31~~	~~NAVAREA warning~~

~~7.3 C_3 – Address code~~

~~C_3 = two digits X_1X_2~~	~~When C_2 = 31 then:~~ ~~X_1X_2 are the two digits of the NAVAREA number (with a leading zero where necessary in the range 01 to 21)~~
~~C_3 = four alphanumeric characters $X_1X_2B_1B_2$~~	~~When C_2 = 13 for coastal warnings then:~~ ~~X_1X_2 are the two digits of the NAVAREA number (with a leading zero where necessary in the range 01 to 21)~~ ~~B_1 is the coastal warning area A to Z~~ ~~B_2 is the subject indicator and must always be A or L, where:~~

	A = Navigational warnings L = Other navigational warnings

7.4 C_4 – Repetition code

C_4 = 16	Broadcast every 12hours with no echo until cancelled

7.5 C_5 – Presentation code

C_5 = 00 The code 00 for International Alphabet Number 5 is normally used

8 Date/time should always be quoted in the form:

DDHHMM UTC MoMoMo YY

as in the example: 251256 UTC JUN 17

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

9 Geographical positions should be quoted in the standard format:

$D_1D_2M_1M_2LaD_3D_4D_5M_3M_4Lo$

where:

D_1D_2 = degrees latitude (with leading zero if required)

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. Examples of format and drafting guidance for piracy warnings is contained in the *Joint IMO/IHO/WMO Manual on Maritime Safety Information* (MSC.1/Circ.1310, as amended, and IHO Publication No. S-53).

2. Decimals of minutes will seldom be necessary or appropriate for reports of this kind.

3. 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.

Part E – Repetition codes (C_4)

1 The C_4 repetition codes are divided into two categories:

Category (a) for messages that are required to be repeated an finite number of times; and

Category (b) for messages that are required to be repeated at specified intervals until cancelled by the MSI provider.

1.1 Category (a) repetition codes:

Code	Instruction
01	transmit once on receipt
11	transmit on receipt followed by repeat six min later
61	transmit on receipt and 1 hour after initial broadcast (twice)
62	transmit on receipt and 2 hours after initial broadcast (twice)
63	transmit on receipt and 3 hours after initial broadcast (twice)
64	transmit on receipt and 4 hours after initial broadcast (twice)
66	transmit on receipt and 12 hours after initial broadcast (twice)
67	transmit on receipt and 24 hours after initial broadcast (twice)
70	transmit on receipt, 12 hours after initial broadcast and then 12 hours after the second broadcast (three times)
71	transmit on receipt, 24 hours after initial broadcast and then 24 hours after the second broadcast (three times)

1.2 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 six minutes. Repetition codes are made up by stating the multiplier first, followed by the delay period:

Multiplier x Delay

where the multiplier specifies the amount 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 hours delay; no echo

5 = 6 hours delay; with echo

6 = 12 hours delay; no echo

7 = 12 hours delay; with echo

8 = 24 hours delay; no echo

9 = 24 hours delay; with echo

The various combinations (Multiplier x Delay) available, are shown in the table below:

Code	Instruction
12	repeat broadcast every 1 hour with no echo
13	repeat broadcast every 1 hour with an echo six minutes after each broadcast
22	repeat broadcast every 2 hours with no echo
23	repeat broadcast every 2 hours with an echo six minutes after each broadcast
32	repeat broadcast every 3 hours with no echo
33	repeat broadcast every 3 hours with an echo six minutes after each broadcast
42	repeat broadcast every 4 hours with no echo
43	repeat broadcast every 4 hours with an echo six minutes after each broadcast
52	repeat broadcast every 5 hours with no echo
53	repeat broadcast every 5 hours with an echo six minutes after each broadcast
14	repeat broadcast every 6 hours with no echo
15	repeat broadcast every 6 hours with an echo six minutes after each broadcast
16 (or 24)	repeat broadcast every 12 hours with no echo
17 (or 25)	repeat broadcast every 12 hours with an echo six minutes after each broadcast
34	repeat broadcast every 18 hours with no echo
35	repeat broadcast every 18 hours with an echo six minutes after each broadcast
18 (or 26; or 44)	repeat broadcast every 24 hours with no echo
19 (or 27; or 45)	repeat broadcast every 24 hours with an echo six minutes after each broadcast
54	repeat broadcast every 30 hours with no echo
55	repeat broadcast every 30 hours with an echo six minutes after each broadcast
36	repeat broadcast every 36 hours with no echo
37	repeat broadcast every 36 hours with an echo six minutes after each broadcast
28 (or 46)	repeat broadcast every 48 hours with no echo
29 (or 47)	repeat broadcast every 48 hours with an echo six minutes after each broadcast
56	repeat broadcast every 60 hours with no echo
57	repeat broadcast every 60 hours with an echo six minutes after each broadcast
38	repeat broadcast every 72 hours with no echo
39	repeat broadcast every 72 hours with an echo six minutes

	~~after each broadcast~~
~~48~~	~~repeat broadcast every 96 hours with no echo~~
~~49~~	~~repeat broadcast every 96 hours with an echo six minutes after each broadcast~~
~~58~~	~~repeat broadcast every 120 hours with no echo~~
~~59~~	~~repeat broadcast every 120 hours with an echo six minutes after each broadcast~~

~~**Note:** Not all codes may be provided by all service providers.~~

Annex 5

Ship earth station specifications

RESOLUTION MSC.434(98)
(Adopted on16 June 2017)

PERFORMANCE STANDARDS FOR A SHIP EARTH STATION FOR USE IN THE GMDSS

THE MARITIME SAFETY COMMITTEE,

RECALLING Article 28(b) of the Convention on the International Maritime Organization concerning the functions of the Committee,

RECALLING ALSO resolution A.886(21), by which the Assembly resolved that the functions of adopting performance standards for radio and navigational equipment, as well as amendments thereto, should be performed by the Maritime Safety Committee on behalf of the Organization,

RECALLING FURTHER regulations IV/10.1 and 14.1 of the International Convention for the Safety of Life at Sea (SOLAS), 1974, as amended, concerning radiocommunications for the Global Maritime Distress and Safety System (GMDSS), which require, respectively, that ships remaining in sea area A3 be provided with a ship earth station and that such ship earth stations shall conform to appropriate performance standards not inferior to those adopted by the Organization,

FURTHER RECALLING resolution A.1001(25) by which the Assembly adopted the criteria and requirements for mobile-satellite communication services being designed for use in the GMDSS,

NOTING that the International Mobile Satellite Organization (IMSO) oversees certain public interests in satellites' operations, including the continued provision of satellite services for the GMDSS,

RECOGNIZING the need to prepare performance standards for satellite communication equipment designed in accordance with resolution A.1001(25) in order to ensure the operational reliability of such equipment and to avoid, as far as practicable, adverse interaction between satellite communication equipment and other communication and navigation equipment aboard the ship,

HAVING CONSIDERED, at its [ninety-eighth] session, the recommendation made by the Sub-Committee on Navigation, Communications and Search and Rescue at its fourth session,

1 ADOPTS the Recommendation on performance standards for a ship earth station for use in the GMDSS, set out in the annex to the present resolution;

2 RECOMMENDS Governments to ensure that every ship earth station which forms part of the GMDSS:

.1 if designed to operate on a mobile satellite service recognized on or after 1 January 2021, comply with the relevant requirements of resolution A.1001(25) and conform to performance standards not inferior to those specified in the annex to the present resolution; and

.2 if designed to operate on a mobile satellite service recognized before 1 January 2021:

.1 conforms to the relevant requirements of resolution A.1001(25) and to the performance standards not inferior to those specified in the annex to the present resolution; or

.2 conforms to performance standards not inferior to those specified in the annex to:

.1 resolution MSC.130(75) on Performance standards for Inmarsat ship earth stations capable of two-way communications, if installed after 1 February 1999;

.2 resolution A.808(19) on Performance Standards for Ship Earth Stations Capable of Two-Way Communications, if installed on or after 23 November 1996 and before 1 February 1999;

.3 resolution A.698(17) on Performance Standards for Ship Earth Stations Capable of Two-Way Communications, if installed before 23 November 1996

3 INVITES IMSO to coordinate with the recognized GMDSS service providers with a view to ensuring consistency between their ship earth station design and installation guidelines and the performance standards specified in the annex to the present resolution.

ANNEX

PERFORMANCE STANDARDS FOR A SHIP EARTH STATION FOR USE IN THE GMDSS

1 INTRODUCTION

1.1 The ship earth station installation capable of two-way radiocommunications should comply with the general requirements set out in resolutions A.694(17), A.813(19), MSC.191(79), and with the following minimum requirements.

2 TECHNICAL REQUIREMENTS

2.1 General

.1 The ship earth station should operate using a recognized mobile-satellite service and meet the functional requirements of resolution A.1001(25). The ship earth station should comply with the technical standard provided by the recognized mobile-satellite service provider and be certified by this provider for operation in the GMDSS, in order to ensure operational reliability.

.2 The ship earth station should comply with ITU Radio Regulations.

2.2 Functional requirements

.1 The ship earth station should be capable of automatically recognizing the priority of ship-to-ship, ship-to-shore and shore-to-ship communications and should process them in accordance with the message priority defined by the ITU Radio Regulations. The order of processing these communications should be:

.1 distress;

.2 urgency;

.3 safety; and

.4 other communications.

.2 The ship earth station should provide a specific visual indication when unable to detect or otherwise make contact with the satellites of the mobile-satellite system for a period of one minute or more, as referred to in the appendix.

2.3 Integrated systems and equipment interfaces

.1 The equipment should meet the requirements for Bridge Alert Management (BAM) system[1]. Equipment interfaces should comply with recognized international standards. Where the ship earth station is part of an Integrated Communication System (ICS), Integrated Navigation System (INS), Integrated Bridge System (IBS) or connected to a navigation system, this should not impair any of the GMDSS functions of these systems or the ship earth station itself.

[1] Resolutions A.811(19), MSC.252(83) and MSC.302(87); guideline SN.1/Circ.288; international standards IEC 62940, IEC 61924-2 and IEC 62923.

.2 The ship earth station should provide an interface from which data from Enhanced Group Call (EGC) communications, including Maritime Safety Information (MSI), can be provided to navigation display systems, in accordance with recognized international standards.

.3 The ship earth station should provide either an integral electronic position fixing equipment or have an interface for position updating conforming to the recognized international standards.

.4 The ship earth station should provide an interface in accordance with recognized international standards to report a ship's identifier and location data from a received distress alert relay to navigation display systems in order to enable graphical display and possible linking to available target information.

3 OPERATION

3.1 Primary human-machine interface (HMI)

.1 The primary HMI should provide all functions necessary to carry out all communication procedures including those required by the GMDSS.

3.2 Ship earth station identity

.1 No control external to the equipment should be available for alteration of the ship station identity.

3.3 Transmission of distress alerts/calls

.1 It should be possible to initiate transmission of distress alerts/calls at any time. It should be possible to initiate transmission of distress alerts/calls whilst the ship earth station is transmitting lower priority communications, and whilst it is receiving communications of any priority, if necessary by pre-emption of those communications.

.2 It should be possible to initiate and make distress alerts/calls from the position at which the ship is normally navigated. The equipment should include an option making it possible to initiate transmission of distress alerts/calls at a position remote from the primary HMI of the equipment.

.3 The HMI should include a dedicated distress button that has no other function than activating distress transmissions.

.4 A distress alert/call should be activated only by means of a dedicated distress button (a physical button, not a touchscreen button). The dedicated distress button[2] should not be any key of a digital input panel or a keyboard provided on the equipment. The distress button should be clearly identified and protected against inadvertent activation, requiring at least two independent actions. Lifting of the protective lid or cover is considered as the first action. Pressing the distress button as specified above is considered as the second independent action.

[2] MSC/Circ.862.

.5 The distress button should be red in colour and marked "DISTRESS". Where a non-transparent protective lid or cover is used, it should be also be red in colour and marked "DISTRESS".

.6 The required protection of the distress button should consist of a spring-loaded lid or cover permanently attached to the equipment by, e.g. hinges. It should not be necessary for the user to remove additional seals or to break the lid or cover in order to operate the distress button.

.7 The equipment should indicate the status of the distress alert/call. The operation of the distress button should generate a visible and audible indication. The distress button should be kept pressed for at least 3 seconds. A flashing light and an intermittent audible signal should start immediately. After the transmission of the distress alert/call is initiated, the visual indication should become steady and the audible signal should cease.

.8 The equipment should automatically initiate repetitive initial distress alerts/calls, which are repeated until cancelled on the ship or until appropriately acknowledged. It should be possible to interrupt repetitive initial distress alerts/calls. Such operation should not interrupt the transmission of a distress alert/call in progress but should prevent repetitive transmissions of a distress alert/call.

.9 The distress alert should contain identification of the station in distress, its position and the time of the position fix.

.10 The equipment should be capable of transmitting and receiving subsequent distress communication.

.11 After initiating a false distress alert/call, it should be possible to send a cancellation of the alert/call. This cancellation should not be initiated by cutting the power supply to the ship earth station nor by the operator switching the ship earth station off.

3.4 Test facilities

.1 It should be possible to test the distress capability of the ship earth station without initiating a distress alert/call.

3.5 Reception of distress, urgency and safety alerts/calls

.1 It should be possible for the ship earth station to receive distress, urgency and safety priority alerts/calls whilst it is being used for communications of a lower priority than that being received.

.2 Provision should be made for an audible signal and visual indication at the position from which the ship is normally navigated, to indicate receipt of a distress or urgency enhanced group call message. It should not be possible to disable this indication and it should only be possible to reset it manually and only from the position where the message is displayed or printed. The audible signals for distress, urgency and their acknowledgements should be continuously repeated until manually terminated.

.3 For the presentation of received distress and urgency alerts/calls intended as text to be read, the equipment should include or interface to either:

.1 an integrated printing device; or

.2 a dedicated display device[3], printer output port and a non-volatile message memory; or

.3 a connection to a navigation system and a non-volatile message memory.

3.6 Audible signals and visual indications:

.1 The audible signals should be activated in relation to:

.1 distress alert/calls or distress relay alert/calls; and

.2 urgency calls and messages.

.2 For visual indication the ship earth station should conform to MSC 191(79).

.3 BAM classification of priorities and categories is attached as appendix.

3.7 Enhanced Group Call (EGC) messages, including Maritime Safety Information (MSI)

.1 Facilities should be provided for the ship earth station to receive maritime safety information (MSI) for the NAVAREA/METAREA and the coastal warning areas and different classes of messages:

.1 where the ship is sailing and 300 NM beyond the limits of the NAVAREA/METAREA;

.2 for the planned voyage; and

.3 for a fixed position.

Additional means should be provided to filter received MSI based on NAVAREA/METAREA and the coastal warning area codes and different classes of messages.

.2 The station should be able to receive and filter distress relay and urgency messages in accordance with area defined within the EGC message and the ship's position.

.3 For the presentation of received EGC communications intended as text to be read, the equipment should include or interface to either:

.1 an integrated printing device; or

[3] Where there is no printer, the display device should be located in the position from which the ship is normally navigated.

.2 a dedicated display device[4], printer output port and a non-volatile message memory; or

.3 a connection to a navigation system and a non-volatile message memory.

.4 If a dedicated display device or a connection to a navigation system is used, it should meet the general requirements of the Organization for such devices[5] and the following additional requirements:

.1 the capability of showing at least 16 lines by 40 characters, with a non-volatile memory of at least 255 messages of 1,023 characters;

.2 an indication of newly received unsuppressed messages should be immediately displayed until acknowledged, as referred to in the appendix; and

.3 the design and size of the display device should be such that displayed information is easily read under all conditions, by observers at normal working distances and viewing angles.

.5 If a printing device is used, it should meet the general requirements of the Organization for such devices and the following additional requirements:

.1 the printing device should be capable of printing at least the standard International Reference Alphabet (IRA) character set. Other character sets can be optionally used according to ISO 2022[6] standards and ITU-T Recommendations T.50;

.2 the printing device should be able to print at least 40 characters per line;

.3 means should be provided to prevent the re-printing of a message once it has been received without error;

.4 any messages should be displayed or printed regardless of the character error rate of its reception. The equipment should use an asterisk (the "*" character) or a low line (the "_" character) if a corrupted character is received; and

.5 a "paper low" condition should generate a caution, as referred to in the appendix.

.6 For the presentation of received group call messages intended as text to be read, or intended as imagery to be viewed, on another connected device or an integrated system, paragraph 2.3.1 also applies.

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[4] Where there is no printer, the dedicated display device should be located in the position from which the ship is normally navigated.

[5] Resolution MSC.191(79).

[6] ISO/IEC 2022:1994, Information technology – Character code structure and extension techniques.

3.8 Position updating

.1 Facilities should be provided to automatically update the ship's position and the time at which the position was determined from a suitable electronic position fixing equipment which may be an integral part of the equipment.

.2 To enable updating of the position:

.1 the status of the position update should be visible to the operator (e.g. offline, manual or automatic);

.2 if position data is being updated automatically, a caution should be raised if no update has been performed for a period of 10 minutes, as referred to in the appendix. The caution should be removed by receiving new position data;

.3 the equipment should have facilities for manually entering the ship's position and the time of the position fix;

.4 if the ship's manually-set position is older than 4 hours, a caution should be raised, as referred to in the appendix. The caution should be removed by inputting or receiving new position data; and

.5 if the ship's position is older than 24 hours, the position is clearly identified with date and time of the fix in UTC for distress alerting purposes.

4 POWER SUPPLY AND SOURCES OF ENERGY

4.1 The ship earth station should normally be powered from the ship's main source of electrical energy. In addition, it should be possible to operate the ship earth station and all equipment necessary for its normal functioning, from an alternative source of electrical 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, should not result in loss of received communications stored in the memory and should not render the equipment inoperative when power is restored.

5 ANTENNA SITING

5.1 Where an omni-directional antenna is used, it is desirable that the antenna be sited in such a position that no obstacle is likely to degrade significantly the performance of the equipment. The manufacturer should provide information, in the installation manual, on the required free line of sight and the angles in the fore and aft directions and in the port and starboard directions that are required for reliable operation, taking into account ship movements in heavy seas.

5.2 Where a stabilized directional antenna is used, it is desirable that the antenna be sited in such a position that no obstacle is likely to degrade significantly the performance of the equipment. The manufacturer should provide information in the

installation manual, on the required free line of sight and the angles of elevation required for reliable operation, taking into account ship movement in heavy seas.

5.3 For omni-directional antennas, the manufacturer should specify sizes and critical distances of objects related to the antenna which cause a shadow sector, likely to degrade significantly the performance of the equipment, taking into account ship movement in heavy seas. This information should be documented in the installation manual.

5.4 For directional antennas, the manufacturer should specify sizes and critical distances of objects to the antenna, which cause shadow sectors, likely to degrade significantly the performance of the equipment, taking into account ship movement in heavy seas. This information should be documented in the installation manual.

5.5 To ensure reliable and continuous operation of the satellite communication system the manufacturer should specify the necessary distances required between the satellite antenna and marine radar in the installation manual.

5.6 In case of multiple ship earth stations operating on adjacent frequency bands, the antenna should be installed such as to ensure electromagnetic compatibility.

6 RADIO FREQUENCY RADIATION HAZARDS

6.1 A warning of potential radiation hazards should be displayed in appropriate locations. A label should be attached external to a radome or antenna indicating the distances at which radiation levels of 100 W/m², 25 W/m² and 10 W/m² exist. These distances should be noted in the user manual.

APPENDIX

CLASSIFICATION OF SHIP EARTH STATION INDICATIONS

BAM classification[7] of ship earth station warnings or cautions, as specified in these performance standards.

Cause	Alarm	Warning	Caution	Category A	Category B
No contact with satellites (referred to in paragraph 2.2.2)			X		X
Received distress communications (referred to in paragraph 3.6)		X		X	
Received urgency message (referred to in paragraph 3.6)		X		X	
Received safety message (referred to in paragraph 3.7.4.2)			X		X
Paper low (referred to in paragraph 3.7.5.5)			X		X
Loss of position (referred to in paragraph 3.8.2.2)			X		X
Manual position older than 4h (referred to in paragraph 3.8.2.4)			X		X

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[7] As referred to in resolution MSC.302(87)

Annex 6

Procedure for amending the Iridium Global Satellite System Manual

1 Proposals for amendment or enhancement of the Iridium Global Satellite System Manual should be submitted to the IMO Maritime Safety Committee through the Sub-Committee on Navigation, Communications and Search and Rescue (NCSR).

2 Amendments to this Manual should normally be approved at intervals of approximately two years or at such longer periods as determined by the Maritime Safety Committee at the time of adoption. Amendments approved by the Maritime Safety Committee will be notified to all concerned and will come into force on 1 January of the following year, or at a date….

3 The agreement of the International Hydrographic Organization, International Mobile Satellite Organization, the World Meteorological Organization and the active participation of other bodies should be sought, according to the nature of the proposed amendments.

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Commented [A25]: Copy from A705/A706.

Commented [A26R25]: MSC97/22 (Report): "7.5 Having considered a proposal by the IHO observer on behalf of the Chair of the World-Wide Navigational Warning Service Sub-Committee for an earlier entry-into-force date of these manuals and, consequently, to delete the requirement of providing at least 12 months notification, the Committee decided that this should be considered by the NCSR Sub-Committee before agreeing to the proposed modifications relating to the entry-into-force dates."