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CRITERIA FOR THE PROVISION OF MOBILE-SATELLITE COMMUNICATION SYSTEMS IN THE GLOBAL MARITIME DISTRESS AND SAFETY SYSTEM (GMDSS)

THE ASSEMBLY,

RECALLING Article 15(j) of the Convention of the International Maritime Organization concerning the functions of the Assembly in relation to regulations and guidelines concerning maritime safety,

RECALLING ALSO that regulation IV/5 of the International Convention for the Safety of Life at Sea (SOLAS), 1974, as amended in 1988, requires each Contracting Government to undertake to make available, either individually or in co-operation with other Contracting Governments, as they may deem practical and necessary, appropriate shore-based facilities for space and terrestrial radiocommunication services having due regard to the recommendations of the Organization,

TAKING INTO ACCOUNT resolution 322(Rev.Mob-87) of the World Administrative Radio Conference, 1987, relating to coast stations and coast earth stations assuming watchkeeping responsibilities on certain frequencies in connection with the implementation of distress and safety communications for the GMDSS,

TAKING INTO ACCOUNT ALSO resolution 3, Recommendation on the Early Introduction of the Global Maritime Distress and Safety System (GMDSS) Elements, adopted by the 1988 SOLAS Conference introducing the GMDSS,

NOTING resolution A.801(19) on the Provision of radio services for the GMDSS,

NOTING ALSO developments within the field of mobile-satellite communications,

NOTING FURTHER that future mobile-satellite communication systems might have the potential to offer maritime distress and safety communications,

CONSIDERING that mobile-satellite communication systems for use in the GMDSS should fulfil performance criteria adopted by the Organization,

RECOGNIZING that the Inmarsat system at present is the only mobile-satellite communication system recognized by SOLAS Contracting Governments for use in the GMDSS,

RECOGNIZING ALSO the need for the Organization to have in place criteria against which to evaluate the capabilities and performance of mobile-satellite communication systems, as may be notified to the Organization by Governments for possible recognition for use in the GMDSS,

1. ADOPTS the Criteria for the Provision of Mobile-Satellite Communication Systems in the GMDSS set out in the Annex to the present resolution;

2. INVITES Governments, when permitting ships flying their countries' flag to carry equipment which can utilize recognized regional satellite systems on a national or regional basis, to apply the criteria set out in sections 2 to 5 of the Annex;

3. REQUESTS the Maritime Safety Committee to:

(a) apply the criteria set out in the Annex to the present resolution, in particular the procedure set out in section 1 of the Annex, when evaluating mobile-satellite communication systems notified by Governments for possible recognition for use in the GMDSS, and to consider, in connection with decisions thereon, the provisions of relevant regulations of SOLAS chapter IV;

(b) ensure that, for mobile-satellite communication systems to be recognized by the Organization for use in the GMDSS, they should be compatible with appropriate SOLAS requirements, and also that any such recognition should not result in substantial changes having to be made to existing procedures and equipment performance standards; and

(c) keep this resolution under review and take appropriate action as necessary to secure the long-term integrity of the GMDSS.

ANNEX

CRITERIA FOR THE PROVISION OF MOBILE-SATELLITE COMMUNICATION SYSTEMS IN THE GLOBAL MARITIME DISTRESS AND SAFETY SYSTEM (GMDSS)

1 GENERAL

1.1 Mobile-satellite communication systems presented to the Organization for evaluation and possible recognition as a radio system providing the maritime distress and safety satellite communication capabilities necessary for use in the GMDSS should be notified to the Organization by Governments, either individually or in co-operation with other Governments. The Governments concerned should make available to the Organization all necessary information relevant to the criteria indicated below, including proof of availability obtained in the mobile-satellite system concerned.

1.2 Governments desiring, individually or in co-operation with other Governments within a specific SAR area, to provide coast earth station facilities for serving the GMDSS in particular areas as part of a recognized system, should notify the Organization as to the extent of continuous coverage and the extent of coverage from shore. This information should be determined by Governments in accordance with the criteria indicated below.

1.3 Governments proposing such mobile-satellite communication systems for possible recognition and use in the GMDSS should ensure that:

.1 these mobile-satellite communication systems conform with the criteria specified in this Annex;

.2 only those systems are notified to the Organization for evaluation and possible recognition for use in the GMDSS; and

.3 the provisions of resolution A.707(17) on Charges for distress, urgency and safety messages through the Inmarsat system are complied with.

1.4 Notifications of mobile-satellite communication systems proposed for evaluation and possible recognition for use in the GMDSS should be evaluated by the Maritime Safety Committee relative to the criteria specified in this Annex. Based on the results of the detailed evaluation, the Maritime Safety Committee will decide as appropriate, taking into account the provisions of the relevant regulations of chapter IV of the 1974 SOLAS Convention, as amended.

1.5 Governments providing mobile-satellite communication systems recognized by the Organization for use in the GMDSS should, either individually or in co-operation with other Governments, ensure that these systems continue to conform to the criteria specified in this Annex and should, at least once a year, make available to the Organization for evaluation a report on the availability and performance obtained during the period since the preceding report in accordance with section 3.5.2 of the criteria indicated below. The Maritime Safety Committee should evaluate such reports relative to the criteria specified in this Annex and take action as appropriate.

1.6 The Organization should include and maintain in the GMDSS Master Plan details of all areas covered by mobile-satellite communication systems recognized for use in the GMDSS and of all areas covered by individual coast earth stations operating in those systems recognized as serving the GMDSS. The Organization should periodically circulate an updated copy of the description of these systems and areas to Governments.

2 DEFINITIONS

2.1 Satellite System

The satellite system means the space segment, the arrangements for controlling the space segment and the network control facilities controlling the access to the space segment.

2.2 Coverage area

The coverage area of the satellite system is the geographical area within which the satellite system provides an availability in accordance with the criteria stated in section 3.5 in the ship-to-shore and shore-to-ship directions, and within which continuous alerting is available. This should be described in relation to any of the sea areas as defined in the SOLAS Convention, i.e. Sea Area A4 is an area outside sea areas A1, A2 and A3; Sea Area A3 is within the coverage of an Inmarsat geostationary satellite in which continuous alerting is available, excluding Sea Areas A1 and A2; Sea Area A2 is within the radiotelephone coverage of at least one MF coast station in which continuous DSC alerting is available; and Sea Area A1 is within the radiotelephone coverage of at least one VHF coast station in which continuous DSC alerting is available.

2.3 Availability

2.3.1 The availability of a communication system is defined as the percentage of time in which the system is available for access to and communications through the system, *i.e.*:

$$A = \frac{\text{(scheduled operating time) - (downtime)}}{\text{(scheduled operating time)}} \times 100\%$$

2.3.2 Definitions and calculations of availabilities of communications circuits in the Maritime Mobile-Satellite Service are given in ITU-R *M.828-1*.

3 CRITERIA AND REQUIREMENTS FOR THE MOBILE-SATELLITE COMMUNICATION SYSTEM

3.1 Functional requirements*

3.1.1 Mobile-satellite communication systems for maritime distress and safety communication services and forming part of the GMDSS radio systems specified in chapter IV, regulation 5 of the 1974 SOLAS Convention, as amended, should be capable of processing at least the following maritime distress and safety communications:

.1 ship-to-shore distress alerts/calls;

.2 shore-to-ship distress relay alerts/calls;

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* - Resolution A.801(19) "Provision of Radio Services for the Global Maritime Distress and Safety System (GMDSS)", Annex 5 "Criteria for use when providing Inmarsat shore-based facilities for use in the GMDSS";
- Resolution A.887(21) "Establishment, Updating and Retrieval of the Information Contained in the Registration Databases for the Global Maritime Distress and Safety System (GMDSS)";
- Resolution A.694(17) "General requirements for shipborne radio equipment forming part of the Global Maritime Distress and Safety System (GMDSS) and for electronic navigational aids";
- IMO International SafetyNET Manual;
- Resolution A.664(16) "Performance Standards for Enhanced Group Call Equipment"; and
- Appropriate IEC Standards and ITU Recommendations.

.3 ship-to-shore, shore-to-ship and ship-to-ship search and rescue co-ordinating communications;

.4 ship-to-shore transmissions of Maritime Safety Information; and shore-to-ship broadcast of Maritime Safety Information; and

.5 ship-to-shore, shore-to-ship, and ship-to-ship general communications.

3.2 Capacity

The satellite system should be designed for and should provide adequate channel and power capacity for processing effectively, and with an availability as stated in section 3.5, the maritime distress, urgency, safety and general communication traffic estimated to be required by the ships using the system.

3.3 Priority access

3.3.1 Although current systems can recognize more levels, the capability is not implemented in all coast earth stations. In any case, distress alerts and distress calls should be given priority treatment by providing immediate access to satellite channels and, for store and forward systems, should be placed ahead of all routine traffic. Any system currently being designed for use in the GMDSS after 1 February 1999 should be able to recognize the four levels of priority as described below:

.1 Mobile-satellite communication systems and coast earth stations used for providing other mobile-satellite communications in addition to maritime communications should be capable of automatically recognizing requests for maritime communications from:

- ship earth stations; and

- recognized entities of importance for safety at sea, such as MRCCs, hydrographic and meteorological offices, medical centres, etc., registered with the coast earth station.

The system should process such maritime communications in the ship-to-shore and shore-to-ship directions for levels 1 to 3 with priority over other communications.

.2 The satellite system and the coast earth stations should be capable of processing maritime distress, urgency, safety and routine communications in accordance with the message priority as defined by the ITU Radio Regulations. The order of processing these communications should be:

.1 distress;

.2 urgency;

.3 safety; and

.4 other communications.

.3 In processing maritime distress, urgency, safety and routine communications, the satellite system and the coast earth stations should be capable of:

.1 automatically recognizing the message or access priority for ship-to-shore communications;

.2 automatically recognizing the message or access priority for shore-to-ship communications from, as a minimum, recognized entities of importance for safety at sea, registered by the coast earth station;

.3 preserving and transferring the priority;

.4 giving distress alerts and distress messages immediate access, if necessary by pre-emption of ongoing communications of level 4;

.5 automatically recognizing maritime distress communications, and of routeing automatically maritime distress alerts/messages directly to the associated MRCC or responsible RCC, if this capability exists; and

.6 processing maritime urgency and safety communications in the ship-to-shore and shore-to-ship directions with adequate priority, for example by allocating the first vacant channel, if no channel is immediately available.

.4 Selection and use of message or access priority for urgency and safety transmissions by ship earth stations should preferably be automatic and should be restricted to calls to special, recognized entities such as medical centres, maritime assistance, hydrographic and meteorological offices, etc., as defined for the coast earth station. The coast earth station should automatically route such calls directly to the relevant entity.

3.4 Coverage area

3.4.1 Documentation on the coverage area of the satellite system, as defined in section 2.2, should be forwarded to the Organization.

3.4.2 Information on coverage areas for satellite systems accepted by the Organization, as forming part of the GMDSS, should be published by the Organization in the GMDSS Master Plan.

3.5 Availability

3.5.1 The satellite system should provide continuous availability for maritime distress and safety communications in the ship-to-shore and shore-to-ship directions.

3.5.2 The availability of the space segment, provision of spare satellite capacity and the network control function (i.e. the network availability), as defined in section 2.3 above, should be continuously monitored, and reports on the recorded availability of the system should be given to the Organization at least once every year. Service providers should be obligated to advise the Organization and RCCs of planned outages and advise ships of scheduled downtime and known interruptions in service and any other relevant network information.

3.6 Network availability

The following minimum values of availability are recommended for the complete mobile-satellite communication network, including coast earth stations:

.1 for ship-to-shore distress priority alerts calls: 99.9%; and

.2 for other maritime communications in ship-to-shore and shore-to-ship directions: 99%.

3.7 Restoration and spare satellites

3.7.1 Spare satellite capacity and arrangements prepared in advance should be provided for ensuring, in the event of a partial or total satellite failure, restoration of the maritime distress and safety communication services in the area concerned to their normal availability, within no more than one hour after the event of a satellite failure.

3.7.2 Adequate information on the means and arrangements prepared for restoration of the maritime distress and safety communication services in the event of a satellite failure should be notified to the Organization.

3.8 Identification

The satellite system should be capable of automatically recognizing and preserving the identification of maritime mobile earth stations.

3.9 Information to be made available to SAR authorities

For all distress urgency and safety communications, the Mobile Earth Station Identification Number or Maritime Mobile Service Identity should be an integral part of the distress alert and provided to the RCC with the alert. When available, all additional registration, commissioning or other data relevant to the search and rescue or prosecution of false alert should be referenced to this number and made available to the proper SAR authority or RCC upon request.

3.10 Reception of distress alerts

The satellite system should allow for addressing a maritime distress alert to a specific coast earth station chosen by the ship's operator and covering the area concerned, but should also provide for automatic routeing of manually initiated response to maritime distress alerts even if no specific CES is selected.

3.11 Control of ship earth stations

Access control arrangements for controlling and giving, or temporarily rejecting, access for ship earth stations to the system should at any time allow ship earth stations access for transmission of maritime distress alerts/calls and distress messages.

3.12 Test facilities

The system should provide facilities making it possible for ship earth stations to test the distress capability of their stations without initiating a distress alert/call.

4 CRITERIA AND REQUIREMENTS FOR COAST EARTH STATIONS

4.1 Functional requirements

4.1.1 Coast earth stations serving the GMDSS should:

.1 be in continuous operation;

.2 be connected to an associated RCC;

.3 keep continuous watch on appropriate satellite communication channels; and

.4 be capable of transmission and reception of at least the following maritime distress and safety communications:

.4.1 ship-to-shore distress alerts/calls;

.4.2 shore-to-ship distress relay alerts/calls;

.4.3 ship-to-shore, ship-to-ship and shore-to-ship search and rescue co-ordinating communications;

.4.4 ship-to-shore and shore-to-ship transmissions of Maritime Safety Information; and

.4.5 ship-to-shore, ship-to-ship and shore-to-ship general communications.

Note: Coast earth stations operating in the Inmarsat-C system should be capable of transmission of Maritime Safety Information in the shore-to-ship direction via the Inmarsat SafetyNET service.

4.2 Priority

4.2.1 The coast earth station should be capable of automatically recognizing the priority of ship-to-shore and shore-to-ship communications, and should preserve the priority and process maritime mobile communications for the following four levels of priority:

.1 distress;

.2 urgency;

.3 safety; and

.4 other communications.

4.2.2 Priority access should be given for distress alerts and calls in real time. Although the current system can recognize more than two levels of priority, the capability is not implemented in all coast earth stations. In any case, distress alerts and calls should be given priority treatment by providing immediate access to satellite channels, and distress alerts and calls for store and forward systems should be placed ahead of all routine traffic. Any system currently being designed for use in the GMDSS after 1 February 1999 should be able to recognize the four levels of priority and give appropriate access for communications in the ship-to-shore direction and in the shore-to-ship direction for distress, urgency and safety traffic originated by RCCs or other Search and Rescue Authorities.

4.2.3 Limitations in existing public switched networks on facilities for indication and use of priority access codes might necessitate special arrangements such as use of leased lines between, for example, MSI providers and the coast earth station, until such facilities become available in the public switched network.

4.3 Routeing of maritime distress alerts

4.3.1 The coast earth station should have reliable communication links to an associated MRCC.

4.3.2 The coast earth station should be capable of automatically recognizing maritime distress and safety communications and of routeing, as far as possible automatically, the maritime distress alerts/calls directly to the associated MRCC, via a highly reliable communication link. In cases where capability exists, CESs may route alerts directly to the responsible RCC as defined in the IAMSAR Manual.

4.3.3 The coast earth station should be provided with an aural/visual alarm to alert a designated responsible person in the event that appropriate connection to the MRCC cannot be achieved within 60 s. In this case, all necessary action should be taken to inform the MRCC of the details of the distress alert or call.

4.3.4 The coast earth station should be provided with reliable communication links to the MRCC for shore-to-ship distress relay alerts and distress traffic, preferably via dedicated communication links.

4.4 Identification

The coast earth station should be capable of automatically identifying ship earth stations. If another identification than the Maritime Mobile Service Identity (MMSI) is used in the system, a means should be provided 24 h a day to easily identify the ship by cross referencing to the ship's MMSI number, and to provide all the appropriate additional information to the MRCC necessary for effecting the rescue.

4.5 Voice communication systems

4.5.1 The communication links for mobile-satellite voice communication systems should be connectable to the public switched network in accordance with relevant ITU-T Recommendations.

4.5.2 Coast earth stations using the public switched network for routeing maritime distress alerts/calls and distress traffic to and from its associated MRCC should, upon receipt of ship-to-shore or shore-to-ship distress alerts/calls or distress traffic, immediately attempt to establish the connection necessary for transfer of the distress alert or distress message.

4.6 Data communication systems

4.6.1 The communication links for mobile-satellite data communication systems should be connectable to the public data communication network in accordance with relevant ITU-T Recommendations. The system should provide capability for transfer of the identity of the called subscriber to the calling subscriber. Maritime distress alerts/calls and distress messages should include the ship identity and the coast earth station identity.

4.6.2 Coast earth stations using the public switched network for routeing distress alerts/calls and distress traffic to and from its associated MRCC should, on receipt of ship-to-shore or shore-to-ship distress alerts/calls or distress traffic, immediately attempt to establish the connection necessary for transfer of the distress alert or distress message.

4.7 Store and forward systems

Coast earth stations for store and forward communication systems should:

.1 make an initial attempt to deliver a ship-to-shore or shore-to-ship message within 60 s for any maritime distress alert or distress traffic, and 10 min for all other maritime messages, from the time the receiving station receives the message. The message should include the ship identity and the coast earth station identity; and

.2 generate notification of non-delivery immediately once the message is considered non-deliverable, for maritime distress alerts and distress messages not later than 4 min after the reception of the alert or message.

4.8 Facilities for broadcast of Maritime Safety Information

4.8.1 Maritime mobile-satellite communication systems forming part of the GMDSS should technically be capable of offering facilities for broadcast of Maritime Safety Information (MSI) by direct-printing from MRCC's and authorized providers of MSI, such as Hydrographic Offices and Meteorological Offices, to ships at sea.

4.8.2 Such facilities for broadcast of MSI should provide for automatic, continuous and reliable reception on board ships and should, as a minimum, fulfil the requirements specified in sections 4.8.3 to 4.8.7 below.

4.8.3 The facilities should provide for recognition of and processing the following four levels of priority:

.1 distress;

.2 urgency;

.3 safety; and

.4 other communications.

4.8.4 It should be possible to address the broadcast of MSI to all properly equipped ships within a specified area for at least the following types of areas:

.1 the entire region covered by the satellite over which the transmission is made;

.2 the NAVAREAs/METAREAs as established by the International Maritime Organization (IMO), the International Hydrographic Organization (IHO) and the World Meteorological Organization (WMO) respectively; and

.3 a temporary area chosen and specified by the originator of the MSI message, including area specifications appropriate for broadcast of distress relay alerts and search and rescue co-ordinating communications.

4.8.5 The facilities should provide for transmission of at least the following types of Maritime Safety Information:

.1 search and rescue co-ordination information, including distress relay alerts;

.2 navigational warnings; and

.3 meteorological warnings and forecasts.

4.8.6 The facilities for broadcast of navigational and meteorological warnings should include possibilities for:

.1 scheduling the broadcast at fixed times or as unscheduled broadcast transmissions; and

.2 automatic repetition of the broadcast with time intervals and number of broadcast transmissions as specified by the MSI provider, or until cancelled by the MSI provider.

4.8.7 The facilities should provide for marking MSI messages with a unique identity, making it possible for the shipborne equipment for reception of these broadcasts to automatically ignore messages already received.

4.8.8 The broadcast facilities may in addition provide facilities for broadcasts similar to NAVTEX to coastal areas not covered by the International NAVTEX Service, in accordance with the identification system (*i.e.,* the identification characters B1, B2, B3, B4) used in the International NAVTEX Service.

5 ADDITIONAL RECOMMENDED CAPABILITIES

Mobile-satellite service providers should be encouraged to:

5.1 route Automatic Location Identification (ALI) and Automatic Number Identification (ANI) in accordance with appropriate ITU-T Recommendations with distress calls originating from MSS terminals directly to responsible RCCs for voice and data calls;

5.2 automatically route information contained in registration databases in accordance with resolution A.887(21) in a recognizable format with the distress call to the responsible RCC, once means are established for doing so;

5.3 be capable of retrieving maritime safety information in a timely manner from NAVAREA, METAREA, other relevant co-ordinators, and the International Ice Patrol Service, in a standard format and process established by those co-ordinators; and

5.4 broadcast maritime safety information (MSI) in accordance with the relevant provisions of the IMO International SafetyNET Manual.

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