

SUB-COMMITTEE ON NAVIGATION,
COMMUNICATIONS AND SEARCH AND
RESCUE
1st session
Agenda item 13

NCSR 1/13
28 March 2014
Original: ENGLISH

**REVIEW AND MODERNIZATION OF THE GLOBAL MARITIME DISTRESS
AND SAFETY SYSTEM (GMDSS)**

Report of the Correspondence Group

Revision of the draft outline of the Detailed Review

Submitted by the United States

SUMMARY

Executive summary: This document contains a revised draft outline of the Detailed Review of the GMDSS

Strategic direction: 5.2

High-level action: 5.2.5

Planned output: 5.2.5.2

Action to be taken: Paragraph 3

Related documents: NCSR 1/17, including appendices 2 and 3 of the annex

Introduction

1 The Joint IMO/ITU Experts Group on Maritime Radiocommunication Matters at its ninth meeting from 14 to 18 October 2013, considered the preliminary draft reports of the correspondence group with respect to the outcome of the High-level review of the GMDSS and the outline of the Detailed Review. After the discussion of the Experts Group, certain revisions were made to these reports, which are presented in document NCSR 1/17, appendices 2 and 3 of the annex.

2 The outline of the Detailed Review (NCSR 1/17, appendix 3 of the annex) was prepared on the basis of the existing nine functional requirements of the GMDSS. However, the Experts Group noted that the existing functional requirement for ships to **transmit and receive** Maritime Safety Information (MSI) was incorrect in that MSI was prepared by authorities ashore and only **transmitted to** ships, in accordance with the definition of MSI in SOLAS, regulation IVI/2. Nevertheless, there is a responsibility for ships to transmit and receive safety information, some of which is used ashore to prepare MSI. Accordingly, the

Experts Group recommends in its draft outcome of the High-level Review (NCSR 1/17, appendix 2 of the annex), that the current functional requirement on MSI:

"transmitting and receiving maritime safety information"

should be divided into two:

"transmitting and receiving safety related information"; and

"receiving Maritime Safety Information (MSI)".

As a result, there would now be ten functional requirements. The correspondence group was invited by the Experts Group to further consider this and other items of discussion and submit a report to NCSR 1. The correspondence group has, therefore, prepared a draft outline of the Detailed Review which reflects the discussions of the Experts Group and includes the revised functional requirements. The revised draft outline of the Detailed Review is in the annex to this document.

Action requested of the Sub-Committee

3 The Sub-Committee is invited to consider and endorse the draft Outline of the Detailed Review as set out in the annex, and agree that this Outline will be used as the basic document to conduct further work.

ANNEX

REVIEW AND MODERNIZATION OF THE GMDSS

OUTLINE OF THE DETAILED REVIEW

1 Following completion of the High-level review of the GMDSS, a Detailed Review will follow. The Detailed Review is to consider the outcome of the High-level review, and the various proposals that were made and issues that were raised during the High-level review.

2 The functional requirements of the GMDSS are the framework on which the requirements for distress and safety communication systems are based. The High-level review resulted in some revisions to the functional requirements. In order to organise the Detailed Review in the context of the revised functional requirements, the various issues raised so far in the discussions on GMDSS Modernization have been listed under the various revised functional requirements in appendix 1. In addition, appendix 1 also lists solutions which are now available to meet the revised functional requirements. The information on solutions now available to meet the revised functional requirements is also presented in table format in appendix 2. This information may be useful in determining how new communication solutions could be used to fulfil the functional requirements.

3 The Detailed Review must also include the following as identified by the Correspondence Group and the Joint IMO/ITU Experts Group on Maritime radiocommunication matters:

- .1 the three options for definition of Sea Areas A3 and A4 together with port State control procedures, as discussed in NCSR 1/17, paragraphs 24 to 32 of appendix 2 of the annex;
- .2 issues to allow for differences for certain categories of ships as discussed in NCSR 1/17, paragraph 37 of appendix 2 of the annex:
 - .1 relating distress signals in COLREGs to SOLAS chapter IV and requiring SOLAS Convention vessels to relay a distress alert from non-Convention vessels to shore;
 - .2 the need for all equipment working in the GMDSS to be type approved, to ensure that it meets compatible standards;
 - .3 reduction in the applicable tonnage limits for SOLAS chapter IV, applicable functional requirements to non-Convention ships as currently defined, maintenance of equipment and qualification of personnel;
 - .4 use of personal devices, such as Man Overboard Devices (MOBs), etc. and protection of the integrity of the GMDSS;

- .3 routing of distress information in the GMDSS and addition of shore-to-shore communications as discussed in NCSR 1/17, paragraphs 19 to 21 of the annex;¹
- .4 the issue of dedicated equipment and integration of distress and safety functions into the radio equipment routinely used on the ship as discussed in NCSR 1/17, paragraph 39 of the annex;
- .5 a need for machine-readable MSI, that can readily be displayed on navigational systems (NCSR 1/17 paragraph 57 of the annex); and
- .6 alignment of terminology throughout documentation (NCSR 1/17, paragraph 57 of the annex).

¹ Routing of distress information is laid down in the 1979, SAR Convention. SAR 79 2.1.3 *adequate shore-based infrastructure*, 4.2 *information concerning emergencies*, in particular 4.2.3 *forward as soon as possible to the MRCC*.

But SAR 79 is not mandatory everywhere for all Member States have not ratified the convention. In addition, SAR 79 requires coordination and cooperation between States for operation, which is relevant for neighbouring States. The problem of long distance distress alerts is not resolved. State A may receive a distress call that must be forwarded to State B located far away.

In that respect Cospas-Sarsat has resolved the problem with the creation of SAR Point of Contact (SPOC). It should be considered SPOC globally for any GMDSS distress system (HF, Inmarsat and any new system).

Appendix 1

Revised Functional Requirements and Issues

- 1 **Transmit ship-to-shore distress alerts by at least two separate and independent means, each using a different radiocommunication service**
 - .1 Solutions now available
 - .1 VHF DSC (Sea Area A1)
 - .2 VHF Voice (Sea Area A1)
 - .3 MF DSC (Sea Areas A1 and A2)
 - .4 HF DSC (Sea Areas A1-A4)
 - .5 EPIRB (Sea Areas A1-A4)
 - .6 Inmarsat ship earth station(Sea Areas A1-A3)
 - .7 HF NBDP (Sea Areas A1-A4)
 - .2 Discussions for Modernization
 - .1 Reduce false alerts
 - .1 A method to reduce the effect of human error through a structure to control and monitor release of distress alerts (COMSAR 16/3/6)
 - .2 False alerts are random events which will be difficult to eliminate (COMSAR 16/9)
 - .3 Install device on bridge to indicate when EPIRB transmits (NCSR 1/19 (annex, 2.3.4))
 - .4 Note WRC-12 resolution 349 on cancelling false distress alerts
 - .5 Possible improvements for Cospas-Sarsat second generation beacons
 - .2 Improve access to and quality of information from ships in distress (COMSAR 16/11(annex 1, 310-Gop01/02))
 - .3 Role of AIS
 - .1 Next generation AIS (COMSAR 16/11 (26-32))

- .4 Role of the human element
 - .1 Standardized distress alarm buttons (COMSAR 16/9/1)
- .5 Eliminate VHF DSC EPIRB (COMSAR 15/3/11)
- .3 Related Work Plan Subjects
 - the role of MF/HF Digital Selective Calling (DSC) and the complexity of some of the signalling functions;
 - problems which might arise due to a lack of HF stations in future;
 - the usage of satellite equipment as an alternative in Sea Areas A2 currently based around MF/HF DSC;
 - the expected evolution of satellite EPIRB systems, such as the Medium Earth Orbit Search And Rescue system (MEOSAR); and
 - review existing systems considered for replacement, and existing and new systems for inclusion in the modernized GMDSS.

2 Receive shore-to-ship distress alert relays

- .1 Solutions now in use
 - .1 VHF DSC (Sea Area A1)
 - .2 VHF Voice (Sea Area A1)
 - .3 MF DSC (Sea Areas A1 and A2)
 - .4 HF DSC (Sea Areas A1-A4)
 - .5 Inmarsat ship earth station (Sea Areas A1-A3)
 - .6 HF NBDP (Sea Areas A1-A4)
- .2 Discussions for Modernization
 - .1 Ability to play back voice messages (COMSAR 15/INF.3 (table row 7))
- .3 Related Work Plan Subjects
 - the role of MF/HF Digital Selective Calling (DSC) and the complexity of some of the signalling functions;
 - problems which might arise due to a lack of HF stations in future; and
 - the usage of satellite equipment as an alternative in Sea Areas A2 currently based around MF/HF DSC.

3 Transmit and receiving ship-to-ship distress alerts

.1 Solutions now in use

- .1 VHF DSC (Sea Areas A1-A4)
- .2 VHF Voice (Sea Areas A1-A4)
- .3 MF DSC (Sea Areas A1-A4)
- .4 HF DSC (Sea Areas A1-A4)
- .5 Survival craft VHF (Sea Areas A1-A4)
- .6 HF NBDP (Sea Areas A1-A4)

.2 Discussions for Modernization

- .1 Role of AIS /VDES
 - .1 Next generation AIS (COMSAR 16/11 (26-32))
- .2 Relating distress signals in COLREGs to SOLAS chapter IV and requiring SOLAS Convention vessels to relay a distress alert from non-Convention vessels to shore (NCSR 1/17, appendix 2 (37))

.3 Related Work Plan Subjects

- the possible inclusion of Automatic Identification System (AIS) functions;
- the role of MF/HF Digital Selective Calling (DSC) and the complexity of some of the signalling functions;
- the usage of satellite equipment as an alternative in Sea Area A2
- currently based around MF/HF DSC; and
- voice communications as an integral part of the GMDSS, benefiting search and rescue operations.

4 Transmit and receive search and rescue coordinating communications

.1 Solutions now in use

- .1 VHF Voice (Sea Area A1)
- .2 MF Voice (Sea Areas A1 and A2)
- .3 HF Voice (Sea Areas A1-A4)
- .4 Inmarsat ship earth station(Sea Areas A1-A3)
- .5 Passenger ship aeronautical radios (Sea Areas A1-A4)
- .6 HF NBDP (Sea Areas A1-A4)

- .2 Discussions for Modernization
- .1 Aeronautical radios for all ships
- .2 Role of AIS / VDES
- .1 Use of AIS as a means for SAR communications
(COMSAR 16/7/1)
(COMSAR 16/7/3)
- .2 Use of AIS for SAR and locating
(COMSAR 15/INF.4 (13-15))
- .3 Next generation AIS
(COMSAR 16/11 (26-32))
- .3 Use text to supplement voice for traffic management and SAR
(COMSAR 15/INF.3 (6 and table row 7))
- .4 Ship reporting functions to support SAR
(COMSAR 15/11 (annex, 30.3))
- .5 Develop efficient way to communicate digital data between SAR
and ship
(COMSAR 16/11(annex 1, 310-Gte01-Ste02))
- .6 Voice communications essential – keep channel 16 for safety and
emergency
(COMSAR 15/INF.3 (table row 2))
- .7 Ability to play back voice messages
(COMSAR 15/INF.3 (table row 7))
- .8 Positioning/locating and communication equipment for lifeboats and
liferafts
COMSAR 15/INF.3 (table row 10)
COMSAR 15/INF.4 (15)
- .9 Distress Chat via Satellite
- .3 Related Work Plan Subjects
- the role of MF/HF Digital Selective Calling (DSC) and the complexity of some of the signalling functions;
 - problems which might arise due to a lack of HF stations in future;
 - the usage of satellite equipment as an alternative in Sea Areas A2 currently based around MF/HF DSC; and
 - voice communications as an integral part of the GMDSS, benefiting search and rescue operations.

5 Transmit and receive on-scene communications

.1 Solutions now in use

- .1 VHF Voice (Sea Areas A1-A4)
- .2 Survival craft VHF (Sea Areas A1-A4)
- .3 Passenger ship aeronautical radios (Sea Areas A1-A4)

.2 Discussions for Modernization

- .1 Aeronautical radios for all ships or better use of MF between ships and aircraft
- .2 Role of AIS / VDES
 - .1 Use of AIS as a means for SAR communications (COMSAR 16/7/1) (COMSAR 16/7/3) Use of AIS for SAR and locating (COMSAR 15/INF.4 (13-15))
 - .2 Next generation AIS (COMSAR 16/11 (26-32))
- .3 Use text to supplement voice for traffic management and SAR (COMSAR 15/INF.3 (6 and table row 7))
- .4 Develop efficient way to communicate digital data between SAR and ship (COMSAR 16/11(annex 1, 310-Gte01-Ste02))
- .5 Voice communications essential – keep channel 16 for safety and emergency (COMSAR 15/INF.3 (table row 2))
- .6 Positioning/locating and communication equipment for lifeboats and liferafts
COMSAR 15/INF.3 (table row 10) COMSAR 15/INF.4 (15)

.3 Related Work Plan Subjects

- the possible inclusion of Automatic Identification System (AIS) functions;
- voice communications as an integral part of the GMDSS, benefiting search and rescue operations; and
- possible new requirements for lifeboats and liferafts, for instance to provide long-range communications.

6 Transmit and receive signals for locating

.1 Solutions now in use

- .1 VHF DSC (Sea Areas A1-A4)
- .2 VHF Voice (Sea Areas A1-A4)
- .3 MF DSC (Sea Areas A1 and A2)
- .4 MF Voice (Sea Areas A1 and A2)
- .5 HF DSC (Sea Areas A1-A4)
- .6 HF Voice (Sea Areas A1-A4)
- .7 EPIRB (Tx only) (Sea Areas A1-A4)
- .8 SART (Tx only) (Sea Areas A1-A4)
- .9 Passenger ship aeronautical radios (Sea Areas A1-A4)

.2 Discussions for Modernization

- .1 Aeronautical radios for all ships
- .2 Role of AIS / VDES
 - .1 Use of AIS as a means for SAR communications
(COMSAR 16/7/1)
(COMSAR 16/7/3)
 - .2 Use of AIS for SAR and locating
(COMSAR 15/INF.4 (13-15))
 - .3 Next generation AIS
(COMSAR 16/11 (26-32))
- .3 Positioning/locating and communication equipment for lifeboats and liferafts
COMSAR 15/INF.3 (table row 10)
COMSAR 15/INF.4 (15)

.3 Related Work Plan Subjects

- the possible inclusion of Automatic Identification System (AIS) functions;
- possible new requirements for lifeboats and liferafts, for instance to provide long-range communications; and
- the expected evolution of satellite EPIRB systems, such as the Medium Earth Orbit Search And Rescue system (MEOSAR).

7 Transmit and receive safety related information

.1 Solutions now in use

- .1 VHF Voice (Sea Area A1)
- .2 MF Voice (Sea Areas A1 and A2)
- .3 HF Voice (Sea Areas A1-A4)
- .4 NAVTEX Receivers (Sea Areas A1-A4)
- .5 HF NBDP (Sea Areas A1-A4)
- .6 Inmarsat ship earth station(Sea Areas A1-A3)
- .7 Facsimile for weather and ice bulletins (not GMDSS, but recommended by WMO pending availability of new system)

.2 Discussions for Modernization

- .1 Role of AIS / VDES
 - .1 Next generation AIS
(COMSAR 16/11 (26-33))
(COMSAR 14/7/4)
 - .2 NBDP not needed
(COMSAR 15/INF.3 (table row 3))

.3 Related Work Plan Subjects

- the role of Narrow Band Direct Printing (NBDP);
- problems which might arise due to a lack of HF stations in future;
- the usage of satellite equipment as an alternative in Sea Areas A2 currently based around MF/HF DSC; and
- the further evolution of Maritime Safety Information broadcast systems, taking into account the ongoing work in IHO and WMO.

8 Receive Maritime Safety Information (MSI)

.1 Solutions now in use

- .1 VHF Voice (Sea Area A1)
- .2 MF Voice (Sea Areas A1 and A2)
- .3 HF Voice (Sea Areas A1-A4)
- .4 NAVTEX Receivers (Sea Areas A1-A4)

- .5 HF NBDP (Sea Areas A1-A4)
- .6 Inmarsat ship earth station(Sea Areas A1-A3)
- .7 Facsimile for weather and ice bulletins (not GMDSS, but recommended by WMO pending availability of new system)
- .2 Discussions for Modernization
 - .1 Role of AIS / VDES
 - .1 Next generation AIS
(COMSAR 16/11 (26-33))
(COMSAR 14/7/4)
 - .2 Digital system for MSI and security-related information at 500 kHz
(NAVDAT)
(COMSAR 16/4/3)
(COMSAR 16/11(34))
 - .3 NBDP not needed
(COMSAR 15/INF.3 (table row 3))
 - .4 Improve NAVTEX bandwidth. Provide MSI as a ship-"pull" service
(COMSAR 15/INF.4 (17))
 - .5 Ship "pull" service of MSI for EGC SafetyNET service
 - .6 Improved presentation of MSI / Machine readable MSI readily displayed on navigational systems
(COMSAR 16/3/5)
(COMSAR 16/INF.2)
(COMSAR 15/INF.3 (table rows 3 and 7))
(NCSR 1/17, annex (57))
 - .7 Improve storage, sharing and distribution of MSI
(COMSAR 15/11 (annex, 30.2))
- .3 Related Work Plan Subjects
 - the role of Narrow Band Direct Printing (NBDP);
 - problems which might arise due to a lack of HF stations in future;
 - the usage of satellite equipment as an alternative in Sea Areas A2 currently based around MF/HF DSC; and
 - the further evolution of Maritime Safety Information broadcast systems, taking into account the ongoing work in IHO and WMO.

9 Transmit and receive general communications

.1 Solutions now in use

- .1 VHF DSC (Sea Area A1)
- .2 VHF Voice (Sea Area A1)
- .3 MF DSC (Sea Area A2)
- .4 MF Voice (Sea Area A2)
- .5 HF DSC (Sea Areas A3-A4)
- .6 HF Voice (Sea Areas A3-A4)
- .7 Inmarsat ship earth station(Sea Areas A1-A3)
- .8 HF NBDP (Sea Areas A1-A4)

.2 Discussions for Modernization

- .1 HF DSC, HF mail, HF data and upgrading HF shore infrastructure in polar and remote regions
(16/11 (25))
(16/11/1)
- .2 New technology to provide automatic connection to the switched telephone network
- .3 Voice communications essential – keep channel 16 for safety and emergency
(COMSAR 15/INF.3 (table-row 2))
- .4 Consider satellite communication needs for e-navigation
(COMSAR 16/3/9 (25))
- .5 FAL Forms and Maritime Service Portfolios
(COMSAR 16/11(36-45))
- .6 Automatic ship reporting
(COMSAR 16/11(annex 1, 140-Gte01 to 05, 140-Gop01/02, 140-Gtr01))
- .7 Improve pilot-mariner communication
(COMSAR 16/11(annex 1, 135-Gte03))
- .8 Automatic on-air test features should be incorporated to the extent possible
(COMSAR 15/3/10 (4.4))
(COMSAR 15/INF.3 (table row 6))
- .9 Automatically detect free/open working channels
(COMSAR 15/INF.3 (7, table-row 2))

.10 Easier identification of addressees – link with AIS?
(COMSAR 15/INF.3 (table-row 1))

.11 Problems with simplex use of channels
(COMSAR 14/4 (34))

.3 Related Work Plan Subjects

- equipment carriage requirements for duplication, maintenance, equipment interfacing, back-up support systems and power supplies;
- the role of MF/HF Digital Selective Calling (DSC) and the complexity of some of the signalling functions;
- problems which might arise due to a lack of HF stations in future;
- the usage of satellite equipment as an alternative in Sea Areas A2 currently based around MF/HF DSC; and
- review existing systems considered for replacement, and existing and new systems for Inclusion in the modernized GMDSS.

10 Transmit and receive bridge-to-bridge communications

.1 Solutions now in use

.1 VHF Voice (Sea Areas A1-A4)

.2 Discussions for Modernization

.1 Ability to play back voice messages
(COMSAR 15/INF.3 (table row 7))

.3 Related Work Plan Subjects

- equipment carriage requirements for duplication, maintenance, equipment interfacing, back-up support systems and power supplies.

11 Modernization issues applying across multiple functional requirements s

.1 Reduction in the applicable tonnage limits for SOLAS chapter IV and/or applicable functional requirements to non-Convention ships as currently defined
(NCSR 1/17, appendix 2 (37))

.2 Support e-navigation communications – integrate navigation and communication systems
(COMSAR 15/3/10 (6.6))
(COMSAR 15/INF.3 (5 and table row 5))
(COMSAR 15/INF.4 (18))
(COMSAR 15/11 (annex. 30.1))

.3 Eliminate at-sea electronic maintenance option
(COMSAR 15/3/11)

- .4 System design
 - .1 Existing equipment is complex, outdated, and lacks integration (COMSAR 15/INF.3 (1 and table row 6))
 - .2 Integration of distress and safety functions into the radio equipment routinely used on the ship, instead of dedicated equipment (NCSR 1/17, annex (57))
 - .3 Consider existing requirements and equipment with a goal/objective to consolidate or reduce (COMSAR 15/3/10 (4.2))
- .5 Need for MF/HF
 - .1 VHF + satellite would reduce equipment and need for coast stations (COMSAR 15/INF.3 (table row 2))
 - .2 Improve HF communication option (COMSAR 15/INF.4 (20))
 - .3 Lack of shore stations and ability to test (COMSAR 15/INF.3 (3))
- .6 Upgrading of software dependent systems / Software Quality Assurance
(COMSAR 16/11(annex 1, 134-Gre02))
(COMSAR 14/9)
- .7 Introduction of new systems
 - .1 Use phased approach to introduce new systems (COMSAR 16/3/9 (24-26))
 - .2 Approved changes should be implemented carefully and gradually; however a sense of urgency should be applied for modernization work (COMSAR 15/3/10 (4.5))
 - .3 Modernization programme should not constrain approved incremental changes (COMSAR 15/3/10 (4.3))
 - .4 Need for flexibility and scalability through evolution of current system (COMSAR 15/16 (3.16.1.1))
 - .5 Need to keep system under continuous review (COMSAR 15/16 (3.16.1.2))
 - .6 Introduce short-term improvements plus long term strategic plan (COMSAR 15/3/10 (4.6))
 - .7 Need for all equipment working in the GMDSS to be type approved, to ensure that it meets compatible standards (NCSR 1/17, appendix 2 (37))

- .8 Additional satellite systems
 - .1 Definition of Sea Areas A3 and A4 together with port State control procedures (NCSR 1/17 (24-32))
 - .2 Additional satellite systems add cost and complexity for RCCs (COMSAR 16/3/9 (18-23))
 - .3 Remove barriers to additional satellite systems (COMSAR 15/INF.4 (10))
 - .4 Capacity-Building for Recognized Mobile Satellite Communication Systems (COMSAR 15/3/7 Rev.1)
- .9 Reliability of communications
(COMSAR 16/11(annex 1, 120-Gte01))
(COMSAR 15/11 (annex, 26-27))
- .10 Automatically limit PTT time to 2 minutes to prevent stuck key problem
(COMSAR 14/7/5)
- .11 Communications bandwidth
(COMSAR 16/11(annex 1, 120-Gte02))
- .12 Channel management and other data communication issues
(COMSAR 16/11(annex 1, 120-Gte03))
- .13 Modernization of GMDSS into digital communication – IP technology
(COMSAR 16/11(annex 1, 120-Gte04-Ste01))
(COMSAR 16/11(annex 1, 220-Gte01-Ste01))
- .14 Digitization should not interfere with global use of VHF channels 16 and 70. Elements operating satisfactorily should remain in place.
(COMSAR 15/4(annex, 116))
- .15 Transition to a (complete) new numbering scheme, (partly) replacing the current assignment and use of MMSI numbers
(COMSAR 15/16 (3.16.1.8))
- .16 Integrated mobile maritime service with one user interface
(COMSAR 16/11(annex 1, 120-Gte05-Sre01))
- .17 Common maritime data structure
(COMSAR 16/11(annex 1, 211-Gte01))
- .18 Spectrum
 - .1 Keep spectrum protection under continuous review (COMSAR 15/16 (3.16.1.6))
 - .2 Assess requirements for spectrum when evaluating new technologies (COMSAR 15/16 (3.16.1.7))

- .3 More spectrum available within range of appendix 18 – share with land mobile
(COMSAR 14/4 (33))
- .19 Alignment of terminology throughout documentation
(NCSR 1/17, annex (57))
- .20 Related Work Plan Subjects
 - equipment carriage requirements for duplication, maintenance, equipment interfacing, back-up support systems and power supplies;
 - the need to indicate the facilities required for capacity-building; and
 - review existing systems considered for replacement, and existing and new systems for inclusion in the modernized GMDSS.

12 Provision of radiocommunication services

- .1 Shore-shore communication
(COMSAR 16/11(annex 1, 120-Gte01))
(COMSAR 15/11 (annex, 26-27))
(NCSR 1/17 annex point 19 to 21)
- .2 CRS global distribution
(COMSAR 16/3)
(COMSAR 16/3/8)
(GMDSS master plan)
- .3 CRS minimum recommendations
(Res.A.801 (19) provision of radio services for the GMDSS)
(GMDSS manual)
(Res.A.616 (15) SAR homing capability)

13 Role of the human element relevant across multiple functional requirements

- .1 Training
 - .1 Onboard training for familiarization
(COMSAR 16/11(annex 1, 134-Gtr01))
 - .2 Improved training
(COMSAR 15/3/10 (6.3))
 - .3 Maintenance of equipment and qualification of personnel
(NCSR 1/17, appendix 2 (37))
- .2 Human-machine interface
 - .1 More advanced human-machine interface
(COMSAR 16/11(annex 1, 134-Gte01-Ste01/02))
 - .2 Ergonomic design and regulations
(COMSAR 16/11(annex 1, 134-Gte01-Sre01/05))
(COMSAR 16/11(annex 1, 134-Gre03))

- .3 Simplification/common look/standardized interface for all equipment for the operator
(COMSAR 15/3/10 (4.1, 6.3))
(COMSAR 15/INF.3 (2, 3 and table row 4))
(COMSAR 14/7)
 - .4 Standardized audio and visual indications and symbology
(COMSAR 16/9/2)
(COMSAR 16/11(annex 1, 134-Gte03))
 - .5 Standardized operational procedures
(COMSAR 16/11(annex 1, 134-Gop01))
 - .6 Clear/plain language operational guidance
(COMSAR 15/INF.3 (table row 8))
 - .7 Standards for usability assessment
(COMSAR 16/11(annex 1, 134-Gte01-Sre02/04))
(COMSAR 16/11(annex 1, 134-Gre04))
- .3 Related Work Plan Subjects
- the issue of training and performance of crews on board ships, considering the certification and renewal of qualifications and also noting the possible reduction of technical knowledge and skills by operators;
 - equipment carriage requirements for duplication, maintenance, equipment interfacing, back-up support systems and power supplies; and
 - review existing systems considered for replacement, and existing and new systems for Inclusion in the modernized GMDSS.

14 Optional systems which may use GMDSS facilities

- .1 Man overboard systems / personal devices
(COMSAR 16/7/2)
(NCSR 1/17, appendix 2 (37))
- .2 Protection of the integrity of the GMDSS
(NCSR 1/17, appendix 2 (37))

15 Matters raised previously which will not be considered further as a result of GMDSS functional requirements decisions

- .1 Include Long Range Identification and Tracking (LRIT)
(COMSAR 15/INF.4 (15))
- .2 HF data for LRIT
(COMSAR 14/7/6)
- .3 Include Ship Security and Alerting System (SSAS)
(COMSAR 15/INF.3 (table rows 2 & 9))
(COMSAR 15/INF.4 (15))

.4 Related Work Plan Subjects

- the possible inclusion of Long-range identification and tracking of ships (LRIT) functions; and
- the possible inclusion of Ship Security and Alerting System (SSAS) functions.

Appendix 2

Equipment used to meet Existing GMDSS Functional Requirements

	Ship-to-shore distress alerts	Shore-to-ship distress alert relays	Ship-to-ship distress alerts		Search and rescue coordinating comms		On-scene comms		Signals for locating		Safety related information		MSI	General comms		Bridge-to-bridge comms	
	Tx	Rx	Tx	Rx	Tx	Rx	Tx	Rx	Tx	Rx	Tx	Rx	Rx	Tx	Rx	Tx	Rx
VHF DSC	A1	A1	A1 A2 A3 A4	A1 A2 A3 A4					A1 A2 A3 A4	A1 A2 A3 A4				A1	A1		
VHF Voice	A1	A1	A1 A2 A3 A4	A1 A2 A3 A4	A1	A1	A1 A2 A3 A4	A1 A2 A3 A4	A1 A2 A3 A4	A1 A2 A3 A4	A1	A1	A1	A1	A1	A1 A2 A3 A4	A1 A2 A3 A4
MF DSC	A1 A2	A1 A2	A1 A2 A3 A4	A1 A2 A3 A4					A1 A2	A1 A2				A2	A2		
MF Voice					A1 A2	A1 A2			A1 A2	A1 A2	A1 A2	A1 A2	A1 A2	A2	A2		
HF DSC	A1 A2 A3 A4	A1 A2 A3 A4	A1 A2 A3 A4	A1 A2 A3 A4					A1 A2 A3 A4	A1 A2 A3 A4				A3 A4	A3 A4		
HF Voice					A1 A2 A3 A4	A1 A2 A3 A4			A1 A2 A3 A4	A1 A2 A3 A4	A1 A2 A3 A4	A1 A2 A3 A4	A1 A2 A3 A4	A3 A4	A3 A4		

	Ship-to-shore distress alerts	Shore-to-ship distress alert relays	Ship-to-ship distress alerts		Search and rescue coordinating comms		On-scene comms		Signals for locating		Safety related information		MSI	General comms		Bridge-to-bridge comms	
	Tx	Rx	Tx	Rx	Tx	Rx	Tx	Rx	Tx	Rx	Tx	Rx	Rx	Tx	Rx	Tx	Rx
Survival Craft VHF			A1 A2 A3 A4	A1 A2 A3 A4	A1	A1	A1 A2 A3 A4	A1 A2 A3 A4									
EPIRB	A1 A2 A3 A4								A1 A2 A3 A4								
SART									A1 A2 A3 A4								
NAVTEX Receiver												A1 A2 A3 A4	A1 A2 A3 A4				
HF NBDP	A1 A2 A3 A4	A1 A2 A3 A4	A1 A2 A3 A4	A1 A2 A3 A4	A1 A2 A3 A4	A1 A2 A3 A4						A1 A2 A3 A4	A1 A2 A3 A4	A1 A2 A3 A4	A1 A2 A3 A4		
Inmarsat terminal	A1 A2 A3	A1 A2 A3			A1 A2 A3	A1 A2 A3					A1 A2 A3	A1 A2 A3	A1 A2 A3	A1 A2 A3	A1 A2 A3		

	Ship-to-shore distress alerts	Shore-to-ship distress alert relays	Ship-to-ship distress alerts		Search and rescue coordinating comms		On-scene comms		Signals for locating		Safety related information		MSI	General comms		Bridge-to-bridge comms	
	Tx	Rx	Tx	Rx	Tx	Rx	Tx	Rx	Tx	Rx	Tx	Rx	Rx	Tx	Rx	Tx	Rx
Aeronautical frequency radios on passenger ships					A1 A2 A3 A4	A1 A2 A3 A4	A1 A2 A3 A4	A1 A2 A3 A4	A1 A2 A3 A4								
