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Some Aspects of the Modernization Plan for the GMDSS

K. Korcz
Gdynia Maritime University, Gdynia, Poland

ABSTRACT: Preliminary Modernization Plan for the Global Maritime Distress and Safety System (GMDSS) have been presented. On the base of a current status of the GMDSS and the discussion on a modernization topic some aspects of the Modernization Plan for the GMDSS, both regulatory and technical nature, have been described. Future work on the Modernization Plan for the GMDSS have been discussed as well.

1 INTRODUCTION

The Global Maritime Distress and Safety System (GMDSS) was adopted by International Maritime Organization (IMO) as part of the 1988 Amendments to the International Convention for the Safety of Life at Sea Convention, 1974 (SOLAS). It was fully implemented in 1999.

The GMDSS architecture [Korcz, TransNav 2011] ensures that a ship in distress anywhere should always be heard and responded to. It encompasses a unique combination of international technical and operational standards and recommendations, and further a globally coordinated use of frequencies, for both on board ships and on shore. It has served the mariner and the maritime industry well since its inception, but some of the GMDSS technologies used have not reached their full potential, and some GMDSS functions could be performed by more modern technologies.

Taking into account the above and the e-navigation Project, at 86 session the Maritime Safety Committee (MSC) agreed to include in the Sub-Committee on Radiocommunications and Search and Rescue (COMSAR) work programme, a sub-item on "Scoping exercise to establish the need for a review of the elements and procedures of the GMDSS".

As a result of this work, in 2012, the MSC approved a new unplanned output on the Review and Modernization of the GMDSS. The project includes a High Level Review (completed in 2014), a Detailed Review (completed in 2016), and then a Modernization Plan (started in 2016) based on the earlier work, assigning the COMSAR Sub-Committee as the coordinating organ. After the changes in the organization of the work of IMO subcommittees at the end of 2013, the issue is the competence of the new Sub-Committee on Safety of Navigation, Communication and Search and Rescue (NCSR).

2 PRELIMINARY MODERNIZATION PLAN

2.1 *Components of the Modernization Plan*

The preliminary GMDSS Modernization Plan consists of the following components [NCSR 4/12, 2016]:
- Overarching considerations,
- Functional requirements: alignment with the Radio Regulations and other ITU-R documents,

- Provision of GMDSS satellite services and redefinition of Sea Area 3,
- VHF Data Exchange System (VDES),
- NAVDAT,
- Routing of distress alerts and related information,
- Search and Rescue Technologies,
- HF Communications,
- GMDSS carriage requirements,
- False alerts,
- Training,
- Obsolete provisions, and
- Clarifications.

2.2 *Work Plan for the Modernization Plan*

Taking into account the above components of the GMDSS Modernization Plan, the Work Plan for the revision and development of legal instruments, performance standards and guidance material was adopted. The Table 1 reflects the required actions identified in the discussion [NCSR 4/12, 2016].

Table 1. Coordinated Plan of Work for the IMO Modernization Project

Year	Year Deliverable
2018	NCSR is finalizing Modernization Plan; First draft of the revision of SOLAS and related instruments; Draft revision of the Criteria for the provision of mobile-satellite communication services;
2019	Second draft of the revision of SOLAS and related instruments; Approved revision of the Criteria for the provision of mobile-satellite communication services in GMDSS;
2020	Final draft revision of SOLAS and related instruments; Draft performance standards for NAVDAT;
2021	Approved SOLAS amendments and related instruments; Approved performance standards for NAVDAT;
2022	Adopted SOLAS amendments (and related instruments, as appropriate);
2023	-
2024	SOLAS revisions in force.

2.3 *Overarching considerations*

In the process of modernization of the GMDSS, the following considerations should be taken into account [NCSR 3, 2016]:

- The GMDSS modernization process, including new and revised instruments, should not exclude non-SOLAS vessels from participating in the GMDSS for technical or economic reasons, and such instruments as affect non-SOLAS vessels should be compatible with the GMDSS,
- IMO liaison statements to the Radiocommunication Sector of International Telecommunication Union (ITU-R) must be guided by the principle that non-SOLAS vessels can make use of the GMDSS, and that the integrity of the GMDSS should be preserved, including if necessary, that ITU-R recommendations on GMDSS systems and frequency use are prescriptive,
- The GMDSS modernization project needs to continue to support the needs of the e-navigation strategy, and
- The Human Element will be embodied both on board and ashore in the process to ensure that both the implementation of GMDSS Modernization and technology are fit for purpose.

3 REGULATORY ASPECTS OF THE MODERNIZATION PLAN

3.1 *Functional requirements: alignment with the Radio Regulations and other ITU-R documents*

In order to align the functional requirements with Radio Regulations [RR, 2015] and other ITU-R documents the following issues should be considered [NCSR 4/12, 2016]:

- Definitions are needed for "Security communications" and "Other communications", as well as requirements for radio installations to perform these functions,
- References to the International Radio Consultative Committee (CCIR) should be changed to the International Telecommunications Union (ITU-R),
- Terms and definitions should be harmonized with the Radio Regulations and other ITU-R documents; MSC/Circ.1038 should be revised with respect to "general communications" too,
- "Security communications" and "Other communications" should be added to the functional requirements in addition to the GMDSS functions,
- The current functional requirements require ships to transmit and receive Maritime Safety Information (MSI), but by definition MSI is sent from shore stations and received by ships; ships transmit and receive safety related information.

Requirements for maritime security are given in SOLAS chapter XI-2. The Ship Security Alert System (SSAS) does not involve communication with other ships or with coast radio stations. Therefore, those communications are neither ship-to-ship nor ship-to-shore communications. Communications are addressed to a designated competent authority. Therefore, security-related communications should not be a functional requirement of the GMDSS but chapter IV should include a requirement for ships to be capable of security related communications, and a definition of "security-related communications" is also required. Therefore, a definition of "security-related communications" is proposed to be added to regulation IV/2, as follows [NCSR 4/12, 2016]:

"*Security-related communications* means communications associated with the update of security levels, security incidents or threat thereof and security-related information prior to the entry of a ship into a port".

Coast radio stations (Government owned) which provided public correspondence facilities when the GMDSS was first designed have now all largely closed down. However, facilities for public correspondence are still required. These

communications are now being achieved using commercial services which are not normally associated with coast radio stations and the term public correspondence is no longer widely used. For the Modernized GMDSS it is therefore proposed to change the term Public correspondence to "Other communications" and include a new capability for Other communications but not as part of the GMDSS functional requirements. It is proposed to redefine the term "General communications" by aligning it with the Radio Regulations. The new definition proposed is [NCSR 4/12, 2016]:

"*General communications* means operational communications, other than distress conducted by radio".

MSC/Circ.1038 on Guidelines for general communications will need to be revised or withdrawn to reflect this change as well.

So, the new text of functional requirements for the Modernized GMDSS is proposed as follows [NCSR 4/12, 2016]:

1 performing the GMDSS functions as follows:
   - transmitting ship-to-shore distress alerts by at least two separate and independent means, each using a different radiocommunication service;
   - receiving shore-to-ship distress alert relays;
   - transmitting and receiving ship-to-ship distress alerts;
   - transmitting and receiving search and rescue coordinating communications;
   - transmitting and receiving on-scene communications;
   - transmitting and receiving signals for locating;
   - transmitting and receiving safety-related information;
   - receiving Maritime Safety Information (MSI);
   - transmitting and receiving general communications; and
   - transmitting and receiving bridge-to-bridge communications,
2 transmitting and receiving security-related communications, in accordance with the requirements of the International Ship and Port Facility Security Code; and
3 transmitting and receiving other communications to and from shore-based systems or networks.

3.2 *Provision of GMDSS satellite services*

Amendments to SOLAS chapter IV are required to provide for additional mobile satellite systems recognized for use in the GMDSS. This work is underway (one of the issue for NCSR 4) including revision of certificates, so further action on this item under the Modernization Plan might not be required.

The definition of Sea Area A3 in SOLAS chapter IV should be revised to read [NCSR 4/12, 2016]:
"*Sea area A3* means an area, excluding sea areas A1 and A2, within the coverage of a recognized mobile-satellite communication service supported by the ship earth station carried on board in which continuous alerting is available".

There are consequential matters to be considered with regard to the new definition, and the effect on Sea Area A4. Sea Area A3 will be different for each different mobile-satellite communication service. Sea Area A4 is not redefined, but because it is the sea area not included in Sea Areas A1, A2, and A3, it will be different for ships using different mobile-satellite service providers, and would not exist in the case of a satellite service provider with global coverage.

Resolution A.1001(25) on *Criteria for the provision of mobile satellite communication systems in the GMDSS* and MSC.1/Circ.1414 on *Guidance to prospective GMDSS satellite service providers*, need to be revised to take into account recent experience in reviewing GMDSS satellite service provider applications. In this context a new generic performance standard for ship-borne GMDSS equipment to accommodate additional providers of GMDSS satellite services is needed.

Additional satellite providers raise concerns about Maritime Safety Information (MSI) messages via satellite. Formatting of Enhanced Group Calling (EGC) should be standardized for the MSI Provider and SAR authority message originator to be the same irrespective of the satellite provider if possible to minimize delays. If possible, a way should be found to transmit Enhanced Group Calling (EGC) simultaneously on all GMDSS satellite service providers. The GMDSS Master Plan needs to be revised and an MSI manual or manuals prepared to include additional satellite service providers.

3.3 *Routing of distress alerts*

The issue of the routeing of distress alerts and related information directly to the responsible Rescue Coordination Centre (RCC) needs to be considered, taking also into account the possible use of the Cospas-Sarsat system for distribution of GMDSS digital distress alerts in addition to the current 406 MHz beacon alerts.

3.4 *GMDSS carriage requirements*

Except for communications equipment installed or always carried in survival craft, the communications requirements for ships and life-saving appliances in chapter III, should be moved to chapter IV [SOLAS, 2014].

3.5 *False alerts*

No specific action has been identified to reduce false alerts and no determinations have been made at this stage as to which GMDSS equipment is most responsible for false alerts. However, EPIRBs and MF/HF DSC are recognized as transmitting a high number of false alerts under the current GMDSS. Measures should continue to be taken to guide/educate people on how to handle EPIRBs and MF/HF DSC equipment in order to avoid misactivation, including seafarers, operators, shipyards (both for building and recycling), inspectors and surveyors, emphasizing resolution A.814(19) on *Guidelines for the avoidance of false distress alerts*. Reduction of false alerts caused by human error should be addressed. For example, proper disposal of

EPIRBs should be emphasized, including removal of the battery.

3.6 *Training*

Training will be affected and amendments to STCW including Model Courses may be required. Model Courses will in general need to be revised to reflect the new Sea Area A3 definition and its effect on Sea Area A4, together with other amendments to chapter IV. Seafarer and shore personnel training will be affected and amendments to STCW may be required.

In addition to seafarer training, shore-based personnel training and operational requirements will be affected and amendments to the Radio Regulations, IAMSAR Manual, COMSAR/Circ.33 on the GMDSS Coast Station Operator's Certificate (CSOC) Model course might be required.

3.7 *Obsolete provisions and clarifications*

Narrow band direct printing (NBDP) telegraph equipment can be removed as a required system, although existing devices can be permitted to remain in use to receive MSI, if a ship is not equipped with other equipment suitable for the purpose. MSI can be displayed on other bridge systems, including integrated navigation systems (INS).

The VHF EPIRB should be removed from SOLAS chapter IV, and resolution A.805(19) revoked.

The regulation IV/18 exemption for communication equipment from automatically receiving the ship's position if the ship is not provided with a navigation receiver should be removed from SOLAS chapter IV.

Revise regulation IV/12.3 to reflect the decision to retain the VHF Channel 16 watch, as well as continuous listening watches is also in some areas for general communications including VTS, Maritime Assistance Service, coastal surveillance, ship reporting, port approaches etc. resolution MSC.131(75) and COMSAR/Circ.32 should be revised to reflect the correct Channel 16 listening watch requirement.

COM/Circ.117, COM/Circ.110, and COM/Circ. 105, providing clarifications of chapter IV should be revoked.

Regulation IV/6.2.5 should be revised to clarify the "other codes" required to be clearly marked on the radio installation.

Revise and simplify regulations, such as IV/9.1.2, to reflect that separate DSC watch receivers are no longer common and modern equipment practice integrates the radio functions into a single installation.

Finally, chapter IV should be reviewed for editorial improvements as well.

4 TECHNICAL ASPECTS OF THE MODERNIZATION PLAN

4.1 *VHF Data Exchange System*

The VHF Data Exchange System (VDES) was developed by International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA) to address emerging indications of overload of the AIS VHF Data Link (VDL) and simultaneously enabling a wider seamless data exchange for the maritime community. The initial concept of VDES includes the function of the Automatic Identification System (AIS), Applications Specific Messages (ASM), VDE terrestrial component and VDE satellite component. The VDES is one of the potential elements of e-navigation. VDES is capable of exchanging ASM, facilitating numerous applications for safety and security of navigation, protection of marine environment, efficiency of shipping and others. VDES will prospectively have a significant beneficial impact on the maritime information services including Aids to Navigation (AtN) and Vessel Traffic Service (VTS) in the future. It can potentially provide local MSI.

The VDES concept includes a satellite component. This system component might be suitable to be used for the transmission of MSI information in remote areas [Rec. ITU-R M.2092-0, 2015].

Insufficient study on sharing and compatibility between the VDE satellite component and incumbent services in the same and adjacent frequency bands was the cause that the spectrum issue could not be resolved at World Radiocommunication Conference in 2015 (WRC-15). As a consequence, VDES is still not a complete functional system as a whole. Consequential to WRC-15, the ITU standard for VDES, Recommendation ITU-R M.2092-0, was approved [RR, 2015]. A remaining outstanding issue is the approval of the satellite component for the VDE channels which is targeted for approval at WRC-19.

The study of the candidate frequency bands 156.0125-157.4375 MHz and 160.6125-162.0375 MHz would mainly concern the relationship with the existing services primarily allocated for the land mobile service and maritime mobile service, and with the services within lower adjacent frequency band from 154 MHz to 156 MHz and for the higher adjacent frequency band from 162 MHz to 164MHz.

The VDES concept is being developed under of Agenda Item 1.9.2 for WRC-19:

“modifications of the Radio Regulations, including new spectrum allocations to the maritime mobile-satellite service (Earth-to-space and space-to-Earth), preferably within the frequency bands 156.0125-157.4375 MHz and 160.6125-162.0375 MHz of Appendix 18, to enable a new VHF data exchange system (VDES) satellite component, while ensuring that this component will not degrade the current terrestrial VDES components, applications specific messages (ASM) and AIS operations and not impose any additional constraints on existing services in these and adjacent frequency bands as stated in recognizing d) and e) of Resolution 360 (Rev.WRC-15)”.

In addition to other uses, without a doubt the use of VHF Data Exchange System (VDES) needs to be considered in future possible mechanisms for the distribution of MSI.

4.2 *NAVDAT*

Navigational Data (NAVDAT) MF is the radio system, for use in the maritime mobile service, operating in the 500 kHz band for digital broadcasting of maritime safety and security related information from shore-to-ship for use in the maritime mobile service, operating in the 500 kHband for digital broadcasting of maritime safety and security related information from shore-to-ship.

The NAVDAT system uses a time-slot allocation similar to the NAVTEX system which could be coordinated by IMO in the same manner.

That system can also work on Single Frequency Network (SFN). In this case transmitters are frequency synchronized and the transmit data must be the same for all transmitter.

The NAVDAT 500 kHz digital system offers a broadcast transmission of any kind of message from shore-to-ships with possibility of encryption.

Any broadcasting message should be provided by a secure and controlled source.

Message types broadcast can include, but are not limited to, the following:
- safety of navigation;
- security;
- piracy;
- search and rescue;
- meteorological messages;
- piloting or harbour messages;
- vessel traffic system files transfer.

These messages are broadcasted for the attention of all ships, a group of ships or in a specific navigation area. These messages can be addressed to one ship, using the maritime mobile service identity (MMSI) as well.

The NAVDAT system is organized upon five vectors performing the following functions [Rec. ITU-R M.2010, 2012]:
1 System of information and management (SIM):
   - collects and controls all kinds of information;
   - creates message files to be transmitted;
   - creates transmitting programme according to message files priority and need of repetition.
2 Shore network:
   - assures the transportation of the message files from sources to the transmitters.
3 Shore transmitter:
   - receives the message files from SIM;
   - translates message files to orthogonal frequency division multiplexing (OFDM) signal;
   - transmits RF signal to the antenna for broadcast to ships.
4 Transmission channel:
   - transports the 500 kHz RF signal.
5 Ship receiver:
   - demodulates the RF OFDM signal;
   - reconstructs the message files;
   - sorts and makes the message files available for the dedicated equipment according to the message files applications.

Figure 1 shows the diagram of the NAVDAT broadcast chain.

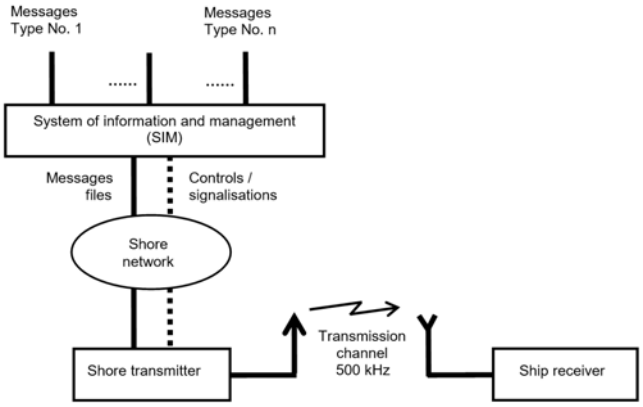

Figure 1. The diagram of the NAVDAT broadcast chain

The SIM term includes:
- all the sources that deliver file messages (e.g. meteorological office, safety and security organizations, etc.);
- the file multiplexer which is an application running on a server;
- the file multiplexer manager;
- the shore transmitter manager.

All the sources are connected to the file multiplexer through a network.

The shore network can use a broadband link, a low data rate link or a local file sharing.

A coastal transmitting station consists of this minimum configuration:
- one local server connected to a protected access;
- one OFDM modulator;
- one 500 kHz amplifier;
- one transmit antenna with matching unit;
- one GNSS receiver or atomic clock for synchronization;
- one monitoring receiver with its antenna.

A typical NAVDAT 500 kHz digital receiver is composed of several basic blocks:
- reception antenna and GNSS antenna;
- RF front end;
- demodulator;
- file demultiplexer;
- controller;
- power supply.

NAVDAT ship receiver performance specifications has been showed on Table 2 [Rec. ITU-R M.2010, 2012].

Table 2. Performance specifications of NAVDAT ship receiver

Frequency band	495 to 505 kHz
Adjacent channel protection	> 40 dB @ 5 kHz
Noise factor	< 20 dB
Usable sensitivity for BER = 10−4 after error correction	< −100 dBm
Dynamic	> 80 dB
Minimal usable RF field (with adapted receiving antenna)	25 dB(μV/m)

The system uses Orthogonal Frequency-Division Multiplexing (OFDM) which is a modulation technology for digital transmissions.

In the 10 kHz channel bandwidth with 500 kHz propagation, the raw data rate available for the data stream (DS) is typically around 25 kbit/s with 16-QAM signal.

With respect to the GMDSS Modernization Plan:

- SOLAS chapter IV should be revised to allow ships to use NAVDAT service in addition to or in place of NAVTEX in places where NAVDAT is available;
- when the NAVDAT concept is sufficiently developed, IMO and ITU should develop the necessary technical recommendations and performance standards for international NAVDAT service. This work should be closely followed by the development of IMO, IHO, ITU, WMO and IEC standards as appropriate, for shipborne NAVDAT and/or combined NAVTEX/NAVDAT equipment;
- the need for a NAVDAT coordination scheme needs to be considered taking account that it should retain the existing NAVTEX service areas, but other aspects may not be compatible with the existing NAVTEX coordination scheme (allocation of transmission times, duration etc.).

4.3 *Search and Rescue Technologies*

When considering amendments to the SOLAS Convention, a decision needs to be made as to whether all lifeboats, and whether some or all inflatable liferafts should be equipped with installed search and rescue locating devices: AIS Search and Rescue Transmitters (AIS-SART) or 9 GHz radar transponder (SART), and how that requirement should be introduced, taking into account the regulatory scheme of survey and certification and the environmental conditions inside of the survival craft.

Appropriate revisions need to be made to SOLAS chapter IV and the "Record of Equipment" list in the certificates.

Consideration on the development of a circular or other instrument to advise Member Governments to encourage shipowners of certain categories of ships to carry VHF direction finders to detect 121.5 MHz signals and VHF marine band transmissions (for instance off shore industry vessels) is needed.

Consideration should be given to the possible SAR benefits of the inclusion of text messaging, digital data, and chat messaging capabilities.

The possibility to allow for the addition of an AIS technology locating device to the EPIRB should also be considered.

MSC/Circ.1039 on *Guidelines for shore-based maintenance of satellite EPIRBs* needs to be revised to delete references to L-Band EPIRBs. MSC/Circ.1039 and MSC/Circ.1040/Rev.1 on *Guidelines on Annual Testing of 406 MHz Satellite EPIRBs* need to be revised, as appropriate, to include AIS locators, and reviewed for other needed changes in respect of Second Generation Beacons.

4.4 *HF Communications*

The list of HF stations in the GMDSS Master Plan needs to be updated, including information on coast stations capable of receiving and responding to test messages. The technical basis and the governance for determining the minimum number of HF GMDSS coast stations and their geographical distribution should be reviewed and, if necessary, consequential changes should be included in resolution A.801(19) on *Provision of radio services for the Global Maritime Distress and Safety System (GMDSS)*.

Consideration on the future role for HF data exchange under ITU-R Recommendation 1798-1 on Characteristics of HF radio equipment for the exchange of digital data and electronic mail in the maritime mobile service is needed.

Technological improvements can make HF easier to use. Consider revising resolutions A.806(19) on Performance Standards for Shipborne MF/HF Radio Installations Capable of Voice Communication, Narrow-Band Direct-Printing and Digital Selective Calling and MSC.68(68) on Adoption of amendments to Performance standards for shipborne radiocom munication equipment, annex 3 (Amendments to Resolution A.806(19) - Performance standards for MF/HF radio installations capable of voice communication narrow-band direct-printing and digital selective calling), to include a requirement for frequency scanning and/or Automatic Link Establishment (ALE).

MSC.1/Circ.1460 on Guidance on the validity of radiocommunications equipment installed and used on ships should be revised to delete the references to HF radiocommunication equipment capable of operating NBDP. Alternatively it may be revoked since it relates to the 2012 revisions to the Radio Regulations, and by 2022 should not be needed any longer.

Automatic link establishment (ALE) was developed to automatically select a frequency that will support automatic linking between stations in a network or point-to-point communication without operator assistance. This new technology has given HF radio a renewed sense of being. ALE offers a new approach in adaptive automated control via the HF medium. Once, skilled radio operators knowledgeable in HF propagation were the only answer to mastering long-haul HF communication. With ALE, significant training and cost is no longer required. ALE takes the guesswork out of the frequency selection process.

Under microprocessor control, ALE modes include automatic signaling, selective calling, and automatic handshaking. Other automatic functions related to ALE are channel scanning and selection, link quality analysis, polling, sounding, and message store-and-forward capabilities.

An adaptive system automates this process, dispenses with the need for a skilled operator and improves the quality of service and the efficiency of the link [Rec. ITU-R F.1110-3, 2003].

ALE may be used:

- for point-to-point links,

– for a network, with selective calling procedure, carried out by the control station, which may be:
– general (all stations),
– group (several stations),
– individual (a single station with which a point-to-point link is established).

All the user has to do is to operate the peripheral equipment corresponding to the type of service indicated in the call sequence (telephone, teleprinter, picture transmission equipment, data terminal), there being no need whatever for him to intervene in connection with the establishment, control and interruption of the radio connections.

Basically, an adaptive system has a triple function [Rec. ITU-R F.1110-3, 2003]:
– automatic selection of the frequency to be used;
– automatic operation as regards calling, establishing the communication (with possible switch-over to the peripheral equipment needed for the type of service to be provided), and disconnecting;
– adaptivity during the communication so as to optimize at all times the quality of service according to the ionospheric conditions and spectrum congestion.

5 CONCLUSIONS

Discussion on the modernization of the GMDSS (marine radiocommunication) is progressing.

The future of the GMDSS Modernization Plan is closely connected with the development of the e-navigation project and the detailed role of the radiocommunication in this process. Without a doubt a data communication network will be one of the most important parts of the e-navigation (Korcz, TransNav 2015].

In the Author's opinion the most important actions required at this stage of work on the GMDSS Modernization Plan are following:
– revise resolution A.1001(25) and MSC.1/Circ.1414 to take into account recent experience in reviewing GMDSS satellite service provider applications;
– revise resolution A.801(19) to include additional GMDSS satellite service providers, and to include the new definition for Sea Area A3;
– revise resolution A.707(17) to take into account additional satellite providers;
– prepare technical recommendations and performance standards for international NAVDAT service and ship equipment, including a coordination scheme;
– revise chapter IV to allow ships to use NAVDAT service in addition to or in place of NAVTEX in places where NAVDAT is available;
– revise appropriate instruments to ensure all distress alerts are routed directly to the responsible RCC that is capable of receiving them;
– consider requirements for search and rescue locating devices (AIS-Search and Rescue Transmitters (SART) or 9 GHz radar SART) in lifeboats and liferafts;
– revise SOLAS chapter IV and Records of Equipment for locating technology for survival craft;
– update MSC/Circ.1039 on Guidelines for shore-based maintenance of satellite EPIRBs;
– update MSC/Circ.1040/Rev.1 on Guidelines on Annual Testing of 406 MHz Satellite EPIRBs;
– determine the technical basis and the governance for determining the minimum global number of HF GMDSS stations;
– consider revising resolutions A.806(19) and MSC.68(68), annex 3, to include a requirement for frequency scanning and/or Automatic Link Establishment (ALE);
– revise or revoke MSC.1/Circ.1460;
– relocate requirements for GMDSS now in SOLAS chapter III to chapter IV;
– align definitions and functional requirements in SOLAS chapter IV with ITU-R and the Radio Regulations;
– correct the functional requirements in SOLAS chapter IV with respect to MSI and safety related information;
– Resolution A.814(19) on Guidelines for the avoidance of false distress alerts should continue to be implemented;
– Model courses need to be revised in accordance with GMDSS Modernization revisions under existing HTW work item on validated model training courses;
– revise Radio Operator's Certificate and operational requirements;
– make appropriate revisions to SOLAS chapter IV to eliminate obsolete provisions;
– revise resolution MSC.131(75) to reflect the correct Channel 16 listening watch requirement;
– other SOLAS chapter IV revisions as appropriate;
– make appropriate clarifications to SOLAS chapter IV.

The main issue in these work is prepare a good, appropriate changes in the SOLAS Convention.

During work on modernization of the GMDSS it is necessary first to identify real user needs and secondly to realize that the modernization of the maritime radiocommunication should not be driven only by technical requirements. In addition, it is necessary to ensure that man-machine-interface and the human element will be taken into account including the training of the personnel.

The lessons learnt from the original development and operation of GMDSS should be taken into account in the modification of GMDSS as well.

Furthermore, the continuous and open process is needed to ensure it remains modern and fully responsive to changes in requirements and evolutions of technology and it will meet the expected e-navigation requirements. To ensure it, a mechanism for continuous evolution of the GMDSS in a systematic way should be created as well.

In this approach to development of the GMDSS it is very important that the integrity of GMDSS must not be jeopardized.

It should be noted that in this context, for the process of the GMDSS modernization, very important will be regulatory decisions taken on the World

Radiocommunication Conference taking place in 2018 (WRC-18) and in 2021 (WRC-21).

And finally it should be noted that a key to the success of the modernization process of the GMDSS is not only that the work is completed on time, but also that it has the flexibility to implement changes ahead of schedule.

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