

## ANNEX 2

### DRAFT WORK PLAN

#### Review and Modernization of the Global Maritime Distress and Safety System (GMDSS)

##### Introduction

1 This draft Work Plan contains the final outcome of the consideration of the planned output on a Scoping exercise to establish the need for a review of the elements and procedures of the GMDSS undertaken by the COMSAR Sub-Committee, and has been developed in accordance with the Guidelines on the organization and method of work of the Committees (MSC-MEPC.1/Circ.4), taking into account the High-level Action Plan for the Organization and priorities for the 2010-2011 biennium (resolution A.1038(27)). The objective of the draft Work Plan is to justify the request for a new unplanned output on "Review and modernization of the Global Maritime Distress and Safety System" with a target completion year of 2017 and to include the proposed unplanned output in the biennial agenda of the COMSAR, NAV and STW Sub-Committees and in the provisional agenda for COMSAR 17.

2 The agenda item is to review the Global Maritime Distress and Safety System (GMDSS), and then to develop a modernization programme. The modernization programme would implement findings of the review, include more modern and efficient communications technologies in the GMDSS, and support the communications needs of the e-navigation strategy.

3 The review, with particular reference to the Human Element, will include:

a high-level review, containing as a minimum:

- .1 review of the existing nine functional requirements, including:
  - .1 the possible need for inclusion of security-related communications in the GMDSS; and
  - .2 the consideration of the possible need to develop a clearer definition of "General Communications", which is continuing to cause confusion and consider if this category should be included within the requirements of the GMDSS;
- .2 the need for the current order of priorities in use for radiocommunications;
- .3 the future need for the four different areas of carriage requirements (Sea Areas A1 to A4), and port State control procedures if sea areas are changed;
- .4 the future need to allow for differences for certain categories of ships, including non-SOLAS ships;
- .5 whether distress communications should be separated from other types of communications and in consequence whether the arrangements in chapters in SOLAS could be revised (Note: chapter II, (part D – Electrical installations), chapter III (part B in several instances), chapter V in various instances including e-navigation applications);

a detailed review, containing as a minimum:

- .6 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;
- .7 equipment carriage requirements for duplication, maintenance, equipment interfacing, back-up support systems and power supplies;
- .8 the possible inclusion of Automatic Identification System (AIS) functions;
- .9 the possible inclusion of Long-range identification and tracking of ships (LRIT) functions;
- .10 the possible inclusion of Ship Security and Alerting System (SSAS) functions;
- .11 the role of Narrow Band Direct Printing (NBDP);
- .12 the role of MF/HF Digital Selective Calling (DSC) and the complexity of some of the signaling functions;
- .13 problems which might arise due to a lack of HF stations in future;
- .14 the usage of satellite equipment as an alternative in Sea Areas A2 currently based around MF/HF DSC;
- .15 voice communications as an integral part of the GMDSS, benefiting search and rescue operations;
- .16 possible new requirements for lifeboats and liferafts, for instance to provide long-range communications;
- .17 the expected evolution of satellite EPIRB systems, such as the Medium Earth Orbit Search And Rescue system (MEOSAR);
- .18 the further evolution of Maritime Safety Information broadcast systems, taking into account the ongoing work in IHO and WMO;
- .19 possible alignment between chapters III, IV, V and XI-2 of SOLAS, in particular with regard to type approval, secondary equipment and maintenance arrangements and their regulatory status (i.e. mandatory or discretionary);
- .20 the need to indicate the facilities required for capacity-building; and
- .21 assess whether to increase the use of goal-based methodologies when reviewing the regulations and regulatory framework for GMDSS in SOLAS chapters IV and V and the STCW Convention, to provide flexibility to allow the GMDSS to adapt to new and evolving technologies without major revision of the SOLAS and STCW Conventions in future.

The review should take place over a three-year period (2013-2015). The inclusion of timelines and an appreciation of workload would allow all to plan and participate. The review process is illustrated in a flow diagram in appendix A.

4 A further two-year period is envisaged (2015-2017) for the GMDSS modernization plan. This will be followed by development of legal instruments, revision/development of relevant performance standards and an implementation period.

### **Relationship to IMO's objectives**

5 IMO's objectives are generally summarized as safe, secure and efficient shipping on clean oceans. The maritime communications system is essential to achieving all of these objectives. Information passed between ships and between ships and shore facilities ensures safe passages on the waterways of the world. In order to achieve safe, secure and efficient shipping on clean oceans, modernization of the GMDSS system is essential.

### **Compelling need**

6 As the world continues to move into the "information age", there is a need for an ever-increasing exchange of information, but there is a finite supply of radio spectrum for wireless communications. Consequently, new services seek to use spectrum allocated to others. Existing services must use the spectrum they have been allocated in the most efficient manner. The current GMDSS is not optimized for efficient spectrum use and there is a growing demand for maritime communication resources, such as those that will result from the e-navigation initiative.

7 The GMDSS was designed over 25 years ago. There has not been a full review since its implementation in 1999 and technology has developed significantly in that time. There are GMDSS elements where improvement could be brought about, e.g. the acceptance, procedures and lack of usability and consequential usage of DSC, managing the cessation of international telex, and to examine the continued use of narrow-band direct-printing in certain sea areas. The elements that will be identified may need to be examined and reviewed as a matter of some urgency.

8 Consideration should be given to any compatibility that there may be between the GMDSS, current technologies like AIS, and new or emerging technologies that are over the horizon. The emerging e-navigation facets should also be considered, to ascertain what parts may or may not, be beneficial to this mature distress alerting and communications system.

9 It is also important that any review of the GMDSS takes into account the *raison d'être* for each of the system's elements. It is important to consider the information that is conveyed by each element of the overall system in terms of importance or criticality, which aspect of a ship's mission is it supporting, timeliness/latency, volume of data involved, and so on. The time has come for maritime communications to be redefined and thus add more value by delivering increases in safety, efficiency and quality of life for those serving at sea.

10 The use of GMDSS-compliant and GMDSS-compatible equipment on board ships is widely implemented and there is a persistent need for compatibility between SOLAS and other ships, including recreational vessels. In this regard it is noted that SOLAS chapter V has been applied generally to all ships on all voyages and that a similar approach could be taken in reviewing chapter IV. IMO has adopted a similar stance in the development of e-navigation.

## Analysis of the issue

11 The GMDSS already provides for exchange of information vital for maritime safety and for certain general communications. E-navigation initiatives will create the need for additional communications capabilities. The project is intended to allow the evolution of maritime communications to meet these needs and improve service through the introduction of modern technologies. Elements to be considered include the following:

- .1 Which basic communication capabilities are properly part of the GMDSS and which could become a part of the developing e-navigation concept?
- .2 VHF and HF equipment might employ more modern digital technology.
- .3 New developments may be employed, for instance by non-GMDSS communication providers, as well as the use of mobile phones, satellite systems, including regional satellite systems, and the possible introduction of new technologies in future.
- .4 Survival craft communications, homing and locating equipment.
- .5 Examination of how maritime safety information is provided to ships.
- .6 Benefits of including additional satellite service providers to enter the GMDSS.
- .7 Identify elements that may be phased out from current carriage requirements.

12 The following goals should be achieved without a complete redesign of the communications regime:

- .1 continue to be effective for both SOLAS and non-SOLAS ships in the face of changing ship traffic patterns, patterns of use, skills, knowledge and resources;
- .2 within the definition of "effective" to consider fitness for purpose, need, benefit and cost and recognize the existing investment in the GMDSS;
- .3 readily able to evolve without undue burdens on administrations or industry;
- .4 to take advantage, where appropriate, of changes and advances in technology;
- .5 to recognize the importance of human factors in the proper use of the GMDSS;
- .6 to recognize the development of e-navigation; and
- .7 ensure capacity-building.

## Analysis of the implications

13 Revisions to chapter IV of SOLAS may be expected, along with revised resolutions and circulars that support chapter IV. Chapter IV may become strictly goal-based, with more detailed solutions contained in one or more resolutions, or perhaps a Code as has been done with SOLAS chapters II-2 and III.

14 Impact analysis and evaluation of cost implications resulting from amendments to legislation, administration changes, and modernization of the facilities and technologies within the GMDSS need to be undertaken, taking into account the facilities required for capacity-building.

15 The e-navigation initiative will need to focus on the challenge of keeping shipboard systems up to date, error-free and securely implemented. The GMDSS will also need to examine this issue. Convergence of technologies may require a similar approach to some GMDSS elements. The existing system of standards setting may not be suitable in all cases to all elements of a modernized GMDSS, due to the rapid change and increasing use of software-based systems.

## Benefits

16 Do the benefits vis-à-vis enhanced maritime safety, maritime security or protection of the marine environment expected to be derived from the inclusion of the new item proposed justify such action?

- .1 Evolving technology and e-navigation applications will continue to drive change in the maritime communications system. With or without a GMDSS modernization plan, shore facilities and ship operators will have more economical and efficient choices for exchanging the information they need for the safe operation of ships. Unless the GMDSS can evolve to include these technologies, ship operators may find themselves carrying obsolete equipment for the sole purpose of meeting a SOLAS requirement. In addition, if future advances are not well controlled there is a risk that increasing complexity will cause incompatibility between equipment, in turn resulting in decreased availability and adverse safety outcomes.
- .2 It may be that the review will confirm that enhanced safety, response to alerts and follow-up communications, especially in the Polar Regions, could be attained by the integration of newer technologies and existing systems.
- .3 The examination of the technology used for the provision of maritime safety information may result in alternative proposals to allow for more rapid dissemination of maritime safety information.
- .4 The e-navigation strategy and the pulling together of some of the salient strands within this visionary introduction of technology and systems, together with the GMDSS and its mature existing technologies, can only lead to overall improvement in safety and efficiency. Enhanced use of allocated spectrum can only be of benefit where the provision in some areas is congested and in others underutilized and where, internationally, the assignment becomes more competitive. Current and emerging technologies could also be investigated so that more efficient use of spectrum would be provided.

- .5 The key benefits of the proposed actions would be to all seafarers, shore communications providers, rescue coordination centres, shipowners and managers, surveyors, training establishments, those involved in the provision of maritime communications equipment, classification societies and regulators. The proposed actions aim to ensure that the GMDSS continues to be fit for purpose for the 21st century, to allow modern technologies to be incorporated into the GMDSS, thus enhancing and improving safety of life at sea.
- .6 The benefits that are expected to emerge, include enhancement of safety in general, and navigation safety in particular, security, environmental protection and general communications for the industry, while mariners would benefit from a GMDSS that is fully modern and responsive to user needs.

### **Industry standards**

17 IMO has a close relationship with the United Nations Specialized Agency, the International Telecommunications Union (ITU), and has formed a Joint Experts Group with ITU to ensure close coordination on revisions required to the Radio Regulations and associated ITU Recommendations.

18 IMO has the benefit of a close relationship with the International Electrotechnical Commission (IEC), and IEC Technical Committee 80 (TC 80), Maritime navigation and radiocommunication equipment and systems. TC 80 has continued to develop standards as required, throughout the existence of the GMDSS. Standards, during review, are improved to reflect technological advancement and improvement. It is unlikely that new standards will be needed for existing technologies, however, some existing technology standards will require to be revised into the future (examples could include AIS, DSC, VHF radio, EPIRBs and LRIT equipment), but the continued support of TC 80 may be expected for new technologies, as required.

19 IMO also has a close relationship with the International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA). IALA has actively contributed to the development of e-navigation strategy and development and maintenance of ITU-R Recommendations, and also publishes IALA Recommendations, guidelines and other useful documents for ship and shore facilities including GMDSS.

### **Output**

20 The intended output is described in SMART terms (specific, measurable, achievable, realistic, time-bound):

- .1 Specific – A review will be completed first, followed by a GMDSS Modernization Plan leading to development of new and/or revised instruments.
- .2 Measurable – The project is measurable in terms of meeting its time goals.
- .3 Achievable – The involved subsidiary bodies of the Committee have the expertise to complete the project, and have appropriate liaisons with outside bodies such as ITU, IEC and IALA to complete the work.
- .4 Realistic – There are no technological reasons why the project cannot be completed.

- .5 Time-bound – COMSAR 19 is to complete the review at its (expected) March 2015 meeting. The Modernization Plan is to be completed at the (expected) COMSAR 21 meeting in 2017, but possibly earlier depending upon the amount of intersessional work that can be completed.

### Human element

21 See the MSC-MEPC.7/Circ.1 checklist in appendix B. The Human Element will be embodied in the process from the beginning to ensure the technology is fit for purpose. The checklist is designed to review projects at their completion, so the marks on the checklist indicate the anticipated outcome. The checklist should be reviewed at the completion of the project.

### Priority/Urgency

22 How is the proposed item related to the scope of the Strategic Plan for the Organization and how does it fit into the High-level Action Plan? With reference to resolution A.1038(27), the following elements of the High-level Action Plan are related to the GMDSS Modernization project:

- 5.1 Ensuring that all systems related to enhancing the safety of human life at sea are adequate, including those concerned with large concentrations of people:
- 5.1.2 Development and review of safe evacuation, survival, recovery and treatment of people following maritime casualties or in case of distress.  
*GMDSS communications play a vital role in distress response.*
  - 5.1.3 Enhance the safety of navigation in vital shipping lanes  
*GMDSS communications are essential to safe navigation and will play a key role in the implementation of the e-navigation strategy.*
- 5.2 Enhancing technical, operational and safety management standards:
- 5.2.1 Keep under review the technical and operational safety aspects of all types of ships, including fishing vessels.  
*The GMDSS Modernization project will be the first comprehensive review of the GMDSS since its development 25 years ago. Fishing vessels must have communication systems compatible with the GMDSS.*
  - 5.2.4 Keep under review measures to improve navigational safety, including ships' routing, ship reporting systems, vessel traffic services, requirements and standards for shipborne navigational aids and systems and Long-range identification and tracking of ships (LRIT).  
*GMDSS communications are essential to safe navigation and will play a key role in the implementation of the e-navigation strategy.*
  - 5.2.5 Monitor and evaluate the operation of the Global Maritime Distress and Safety System (GMDSS).  
*The GMDSS Modernization project will be the first comprehensive review of the GMDSS since its development 25 years ago.*

- 5.2.6 Development and implementation of the e-navigation strategy  
*GMDSS communications are essential to safe navigation and will play a key role in the implementation of the e-navigation strategy.*
- 10 IMO will apply goal-based standards for maritime safety:
- 10.1 Further develop measures to apply goal-based standards for maritime safety and environmental protection.  
*GMDSS regulations already employ goal-based standards (see SOLAS regulation IV/4). The Modernization project will consider further application of the concept.*
- 23 Target completion date: 2017 (2016 with extensive intersessional work).
- 24 Timescale needed for the IMO organ to complete the work:
- A project schedule is in appendix 3.

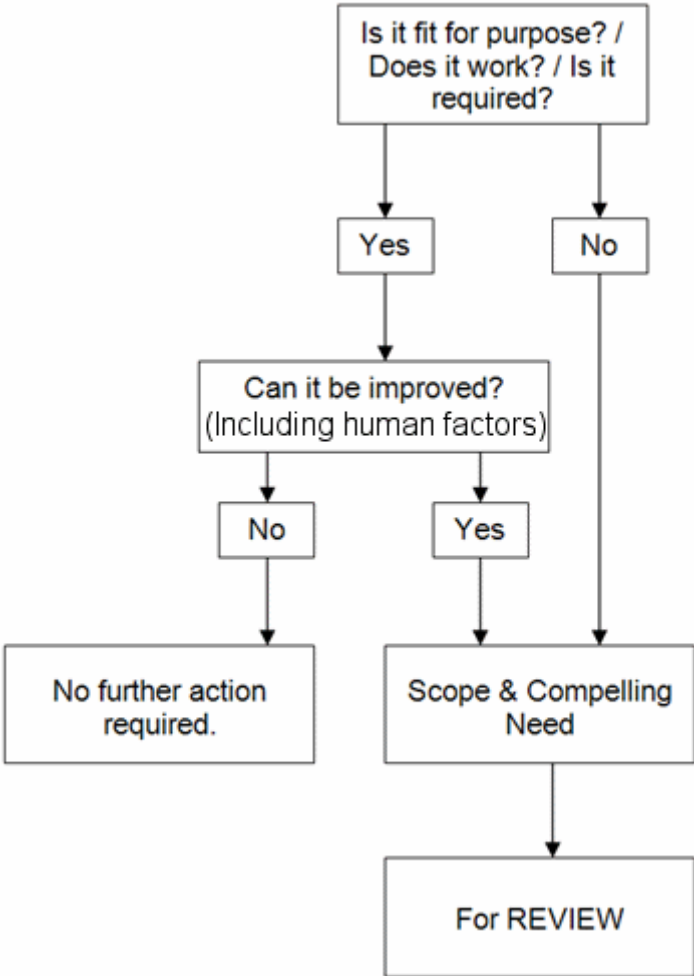
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**APPENDIX 1**

**REVIEW PROCESS**

A simple process for the review is offered in the following flow diagram. The intent is to develop a simple statement of compelling need and implications for each of the review subjects.



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**APPENDIX 2**

**CHECKLIST FOR CONSIDERING HUMAN ELEMENT ISSUES BY IMO BODIES**

<p><b>Instructions:</b> If the answer to any of the questions below is:</p> <p>(A) <b>YES</b>, the preparing body should provide supporting details and/or recommendation for further work.          (B) <b>NO</b>, the preparing body should make proper justification as to why human element issues were not considered.          (C) <b>NA</b> (Not Applicable), the preparing body should make proper justification as to why human element issues were not considered applicable.</p>	
<p><b>Subject Being Assessed:</b> (e.g. Resolution, Instrument, Circular being considered) Review and modernization of the GMDSS</p>	
<p><b>Responsible Body:</b> (e.g. Committee, Sub-committee, Working Group, Correspondence Group, Member State) Sub-Committee on Radiocommunications and Search and Rescue (COMSAR), and Sub-Committee on Standards of Training and Watchkeeping (STW) (Human element aspect)</p>	
1. Was the human element considered during development or amendment process related to this subject?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA
2. Has input from seafarers or their proxies been solicited?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA
3. Are the solutions proposed for the subject in agreement with existing instruments? (Identify instruments considered in comments section)	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> NA
4. Have human element solutions been made as an alternative and/or in conjunction with technical solutions?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA
5. Has human element guidance on the application and/or implementation of the proposed solution been provided for the following:	
• Administrations?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA
• Shipowners/managers?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA
• Seafarers?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA
• Surveyors?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA
6. At some point, before final adoption, has the solution been reviewed or considered by a relevant IMO body with relevant human element expertise?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA
7. Does the solution address safeguards to avoid single person errors?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA
8. Does the solution address safeguards to avoid organizational errors?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA
9. If the proposal is to be directed at seafarers, is the information in a form that can be presented to and is easily understood by the seafarer?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA
10. Have human element experts been consulted in development of the solution?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA
<b>11. HUMAN ELEMENT: Has the proposal been assessed against each of the factors below?</b>	
<input type="checkbox"/> CREWING. The number of qualified personnel required and available to safely operate, maintain, support, and provide training for system.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA
<input type="checkbox"/> PERSONNEL. The necessary knowledge, skills, abilities, and experience levels that are needed to properly perform job tasks.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA
<input type="checkbox"/> TRAINING. The process and tools by which personnel acquire or improve the necessary knowledge, skills, and abilities to achieve desired job/task performance.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA
<input type="checkbox"/> OCCUPATIONAL HEALTH AND SAFETY. The management systems, programmes, procedures, policies, training, documentation, equipment, etc., to properly manage risks.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA
<input type="checkbox"/> WORKING ENVIRONMENT. Conditions that are necessary to sustain the safety, health, and comfort of those on working on board, such as noise, vibration, lighting, climate, and other factors that affect crew endurance, fatigue, alertness and morale.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA

<input type="checkbox"/> HUMAN SURVIVABILITY. System features that reduce the risk of illness, injury, or death in a catastrophic event such as fire, explosion, spill, collision, flooding, or intentional attack. The assessment should consider desired human performance in emergency situations for detection, response, evacuation, survival and rescue and the interface with emergency procedures, systems, facilities and equipment.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA
<input type="checkbox"/> HUMAN FACTORS ENGINEERING. Human-system interface to be consistent with the physical, cognitive, and sensory abilities of the user population.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA
<p><b>Comments:</b> (1) Justification if answers are NO or Not Applicable. (2) Recommendations for additional human element assessment needed. (3) Key risk management strategies employed. (4) Other comments. (5) Supporting documentation.</p> <p>It is anticipated that certain existing instruments will need to be revised.</p>	

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