E-NAV 22/11/X

November 2022

Original: ENGLISH

e-Navigation Information Services and Communications

22nd Session

Agenda item …..

**Revision of SOLAS chapters III and IV for Modernization of the GMDSS, including related and consequential amendments   
to other existing instruments**

**SMART GMDSS**

**Submitted by the Islamic Republic of Iran**

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| **SUMMARY**  **Executive summary:** This document highlights the need for developing measures to identify causes of false distress alerts and minimize their release.  **Strategic direction:** 4, 5, 6  **High-level action:** 8  **Planned output:** 7  **Action to be taken:** Paragraph 13  **Related documents:** |

**Introduction**

1 All through the global maritime community, false distress alerts still exert a sizeable and troublesome burden on rescue coordination services, while no integrated and approved operating procedure and method has been developed in initiating distress alerts to address it. For this purpose, a unified set of specifications for distress alert procedure and a safe test function need to be developed and implemented on the relevant radio communication equipment, in order to decrease the number of false distress alerts to a minimum and to avoid confusion among users.

2 At present, performance standards for VHF DSC, MF DSC, MF/HF DSC, EPIRB and Inmarsat ship-earth stations do not vividly include specifications of distress procedure, such as buttons and the method of initiating distress alerts as an example. As a result, different designs may be developed by manufacturers, which may lead to false distress alerts. In order to direct such efforts into a unitary channel and avoid such discrepancies, clear and unified specifications of distress procedure and a safe test function is proposed to be developed and followed.

**Discussion**

3 The Global Maritime Distress and Safety System (GMDSS) has been followed by a tangible transition of distress communication mode from radiotelephony to automatic transmission of distress alerts, using distress alert buttons. However, the number of false distress alerts increased significantly by such transition, possibly due to human-machine interface problems of the new technologies for distress alert systems. The issue has been under consideration in the past years, and extensive studies and research has been dedicated to diagnose and address the problem.

4 Studies have shown that such huge number of false distress alerts exert a sizeable burden on Rescue Coordination Centers (RCCs), while presenting a potential and serious impact on real distress situations. The false alerts not only waste the economic resources of such services, but also jeopardize the efficiency of assistance provision by unduly occupying the required elements.

5 A research conducted on this issue has identified the most important factor in releasing false distress signals to be human errors, accounting for 70 percent of the transmitted false signals. It was found that the principal cause of human errors was absence of skilled personnel knowing how to operate the GMDSS system, since the operation of this system is highly dependent on personal skills. In order to reduce this type of errors and to save unnecessary costs, training courses for operators working with these systems as well as inspecting (checking and analyzing the signals) and upgrading of equipment have been proposed. However, the excessive release of false distress alarms keeps entangling the maritime industry, mainly by reducing the availability of search and rescue units (which might have been deployed to respond to falsely transmitted distress situations), and exerting huge yet needless costs on the authorities providing SAR services. All this has unfortunately led to doubts and mistrusts about the efficiency of the GMDSS system in locating and rescuing people in distress at sea.

**Proposal**

6 In the face of this major obstacle to the efficient operation of SAR services, the IMO Assembly Resolution A.814(19) on the *Guidelines for the Avoidance of False Distress Alerts* was adopted on 23 November 1995. Moreover, the circular MSC/Circ.861 on the *Measures to Reduce the Number of False Distress Alerts*, and MSC/Circ.862 on the *Clarification of Certain Requirements in IMO Performance Standards for GMDSS Equipment* were approved and circulated at the sixty-ninth session of the MSC Committee in 1998.

7 In order to resolve this issue and minimize the release of false distress alerts, it is necessary to reduce the role of human element in sending distress signals and working with the systems. For this purpose, fundamental changes need to be applied to the hardware and software systems of GMDSS, such as using various sensors and employing advanced technologies in order to connect and integrate the systems into a larger platform. In GMDSS system, all the equipment function separately and independently, and further the large number of such equipment and their various models generate difficulties in the introduction of their performance and sending the data, which leads to the occurrence of false alerts.

8 Human error has been identified as the main cause of the release false alerts, which in turn resulted from their insufficient knowledge in how to report and cancel the false distress alerts that have been released automatically but falsely. Therefore, there is a need for an automatic distress alert method and system to reduce the role of human factors in sending the distress signals and operating the systems. That is what our new system for automatic distress alerting at sea does.

9 The procedure performed by this system, known as “GMDSS Enhancement Mechanism” (GEM) comprises of:

* Automatically detecting a distress situation by the sensors,
* Automatically sending a distress signal to a processing device,
* Initiating an alarm for a pre-defined time,
* Confirming the detected distress situation by a responsible officer,
* Sending automatically a distress alert package generated by the processor device through a main transmitter device to several satellites and to the terrestrial stations,
* Informing nearest maritime search and rescue coordination centers after receiving the distress alert package, and
* Sending one or more rescue teams to a location based on a data provided in the distress alert package.

If the alarm is detected to be false by the responsible officer then the distress alert is removed and alarm is activated if the responsible officer neither confirms nor denies the distress situation. In this manner, the responsible officer receives the opportunity of confirming the real cases of distress, and thus screening and eliminating the false ones.

**Benefits and Advantages**

10 Installing the proposed system on board vessels navigating around the globe will bring about the following benefits for the vessel, as well as the maritime community as a whole:

* **Higher SAR Efficiency and Rescuing More Lives:** Search and rescue is a humanitarian effort and respectable responsibility of maritime administrations and relevant authorities. Any method or system, including this system, that promotes the efficiency of SAR units in locating and rescuing people in distress at sea thus means saving more lives, which alone stands as the reason and driving force for any efforts and activities related to search and rescue.
* **Preserving the Golden Time in Rescue Operations:** Depending on the conditions surrounding each case of distress and emergency, there is a *golden time* for finding, rescuing and providing medical assistance to people involved in the incident. By minimizing the need for SAR units to respond to and be deployed for cases of distress that turn out to be false, this system promotes the availability of such units for real cases, where they can immediately arrive at the scene and save the lives in danger with higher success within the golden time.
* **Safeguarding SAR Personnel:** By nature, emergency response operations entail high degrees of risk for the individuals involved, whether en route to the scene or during the operation. By eliminating unnecessary deployment of SAR units and personnel to respond to false alerts, the *SMART GMDSS* helps safeguard the safety, health or even life of such personnel against unnecessary risks and hazards.
* **Saving Costs of SAR Operations:** Apart from the time and energy required for providing SAR services, deploying maritime and aerial units to locate and rescue people in distress entails huge costs on the responsible authorities. Dedicating and utilizing resources in this field is, nevertheless, justified and necessary, as SAR services are aimed at the priceless mission of saving human lives. However, the same is not true when such resources are spent (or rather “wasted”) on responding to false alerts (around 300 million USD per year, according to recent studies). Once this issue is resolved through the *SMART GMDSS* installed on vessels, SAR authorities can save their resources for promoting their fleet, personnel, capability, and thus efficiency as a result.
* **Enjoying Artificial Intelligence Capabilities:** The *SMART GMDSS* is designed in a manner that manages the interaction of different GMDSS systems operational on the vessel, with regard to their alarming and notification features. Through its smart algorithms and modules, it can independently consider and decide about the relevant activities, and thus minimize the human error factor by its dexterous AI processor, which can also welcome new technologies and parameters that may be relevant helpful for its performance.
* **Being Adaptable for Aerial Applications:** While the SMART GMDSS has been originally designed for the maritime industry, it can be easily modified and adapted for use on board aerial units, such as airplanes and helicopter, integrate their distress systems and sub-systems, and serve a purpose similar to that on board ships and vessels.
* **Restoring Confidence in GMDSS:** Once the GMDSS systems installed on board vessels are integrated through the *SMART GMDSS* and false alerts are lowered to a satisfactory minimum, the GMDSS can perform at the desired level of efficiency again, and hence win the trust of the maritime community in promoting safety of lives at sea once more.
* **Fulfilling IMO Missions:** One of the main objectives of the International Maritime Organization (IMO) is promoting safety of navigation and safety of lives at sea. Through its relevant committee, the Maritime Safety Committee (MSC), this organization considers and takes measures to fulfill this critical mission. Enhancing the efficiency of the GMDSS is among continuous efforts highlighted and pursued by this committee, and the *SMART GMDSS* can play a sizeable role in achieving this goal. This system has already been approved and acclaimed by the mentioned committee, and only awaits to be mass produced and installed on board vessels.

11 Once the *SMART GMDSS* is mass produced and integrated into the GMDSS systems installed and used on board vessels around the world, it can realize its potentials and achieve all the advantages and benefits mentioned above. By enhancing the efficiency of the GMDSS system and SAR services provided, this system will thus play its role in the humanitarian cause of saving people’s lives at sea, each single one of which is worth any amount of effort and strife.

12 Even with the circulation and implementation of these decisions, however, the number of false distress alerts has not been reduced, thereby undermining the efforts of the Organization for the last 10 years or more. As mentioned in NCSR 4/16, “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 to be recognized as transmitting false alerts under the current GMDSS. Measures should be taken to guide/educate people on how to handle such equipment (EPIRBs and MF/HF DSC) in order to avoid mis-activation, including seafarers, operators, shipyards (both for building and recycling), inspectors, surveyors and manufacturers."

**Action requested of the Committee**

13 The Committee is invited to consider the information provided in this document and take action as appropriate.

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