

ANNEX 24

**RESOLUTION MSC.517(105)
(adopted on 28 April 2022)**

**PERFORMANCE STANDARDS FOR A SHIPBORNE
INTEGRATED COMMUNICATION SYSTEM (ICS) WHEN USED IN THE GLOBAL
MARITIME DISTRESS AND SAFETY SYSTEM (GMDSS)**

THE MARITIME SAFETY COMMITTEE,

RECALLING Article 28(b) of the Convention on the International Maritime Organization concerning the functions of the Committee,

RECALLING ALSO resolution A.811(19), by which the Assembly, at its nineteenth session, adopted the *Recommendation on Performance standards for a shipborne integrated radiocommunication system (IRCS) when used in the GMDSS*,

RECALLING FURTHER resolution A.886(21), by which the Assembly resolved that the functions of adopting performance standards for radio and navigational equipment, as well as amendments thereto, shall be performed by the Maritime Safety Committee on behalf of the Organization,

TAKING INTO ACCOUNT the amendments to the International Convention for the Safety of Life at Sea, 1974 ("the Convention") adopted by resolution MSC.496(105),

NOTING, in particular, regulations IV/6 and 14 of the Convention concerning radiocommunications for the Global Maritime Distress and Safety System (GMDSS), which require, respectively, that every ship shall be provided with radio installations and that all the equipment in these installations shall conform to appropriate performance standards not inferior to those adopted by the Organization,

RECOGNIZING the need to take into account the human element in identifying measures to increase the effectiveness and efficiency of the human performance by designing equipment that is more suited to the operators who use it,

RECOGNIZING ALSO that increased effectiveness and efficiency in the use of GMDSS equipment would be achieved by integrating the radiocommunication equipment into a shipborne integrated communication system, thereby providing simpler procedures for operators,

RECOGNIZING FURTHER the need to prepare performance standards for such a shipborne integrated communication system to ensure that the functional requirements of regulation IV/4 of the Convention are met,

HAVING CONSIDERED, at its 105th session, the recommendation made by the Sub-Committee on Navigation, Communications and Search and Rescue at its eighth session,

1 ADOPTS the *Performance standards for a shipborne integrated communication system (ICS) when used in the Global Maritime Distress and Safety System (GMDSS)* set out in the annex to the present resolution;

2 RECOMMENDS Governments to ensure that a shipborne integrated communication system (ICS) when used in the GMDSS:

- .1 if installed on or after 1 January 2024, conforms to performance standards not inferior to those specified in the annex to the present resolution; and
- .2 if installed before 1 January 2024, conforms to performance standards not inferior to those specified in the annex to resolution A.811(19) or conforms to performance standards not inferior to those specified in the annex to the present resolution.

ANNEX

PERFORMANCE STANDARDS FOR A SHIPBORNE INTEGRATED COMMUNICATION SYSTEM (ICS) WHEN USED IN THE GLOBAL MARITIME DISTRESS AND SAFETY SYSTEM (GMDSS)

1 INTRODUCTION

1.1 An integrated communication system (ICS) combines, processes and evaluates data and signals from connected radiocommunication equipment and installations used as sensors and sources, providing outputs to and accepting inputs from the operator's position.

1.2 A "COM-HMI" (communications processing with human-machine interface) provides functions to an ICS with the capability to initiate distress alerts.

1.3 A "remote COM-HMI" (remote communications processing with human-machine interface) provides limited functions to an ICS. If this "remote COM-HMI" is only intended for general communication, then it is not required to provide the capability to initiate distress alerts.

1.4 The ICS should provide the necessary communication capability for permanently installed equipment¹ for the sea areas documented in the ship safety certificate as required by SOLAS chapter IV. Two independent COM-HMIs should be included in the ICS. Such COM-HMIs should include control and monitoring of the equipment and installations provided by the ICS for the GMDSS which are also suitable for general radiocommunications and may optionally be part of an integrated navigation system (INS).

1.5 The ICS should provide at least two independent physical items of radio equipment as sensors and sources, each providing at least one GMDSS function.

1.6 The ICS, in addition to meeting the general requirements set out in resolution A.694(17), should comply with the requirements for the presentation of information on shipborne displays set out in resolution MSC.191(79), as amended, and with the following performance standards.

SENSOR/SOURCE MODULE

2 Position-updating for the ICS

2.1 The ICS should provide facilities to automatically update the ship's position and the time at which the position was determined from a suitable electronic position-fixing aid. This may be an integral part of the equipment. For an ICS which does not have an integral position-fixing aid, such facilities should include a suitable interface conforming to the appropriate international standard.² In this case, the position from an INS consistent common reference point (CCRP) should be preferred if provided.

2.2 The COM-HMI should include:

- .1 means for manual entry of position information and time at which the position was determined; and

¹ EPIRB, locating devices and handheld devices are not part of the ICS.

² Refer to IEC 61162.

- .2 means to activate a caution, when:
 - .1 no position data is received from electronic position-fixing aid; or
 - .2 in case of manual input, the position information is over four hours old.

2.3 Any position information not updated for more than 23.5 hours should be erased.

OPERATIONAL/FUNCTIONAL MODULE

3 GENERAL

3.1 The ICS should provide the necessary communication capability for permanently installed equipment³ for the sea areas documented in the ship safety certificate as required by SOLAS chapter IV. No radiocommunication equipment or installation integrated in the ICS should impair the availability or use of any required function integrated into the ICS. Administrations may accept the ICS as substitute for stand-alone communication equipment as required in SOLAS chapter IV.

3.2 All required functions of the equipment integrated into the ICS should conform to the appropriate provisions of the performance standards for the equipment concerned. COM-HMIs can be implemented as dedicated devices or as applications on separate and independent screens beside other applications.

3.3 The ICS should:

- .1 comprise at least two dedicated workstations each including a COM-HMI connected to all GMDSS radiocommunication sensors and sources included in the ICS over a network or connecting system;
- .2 provide a full backup functionality for all COM-HMIs integrated in the ICS;
- .3 include detecting facilities such that failure of any part of the ICS activates a BAM alert;
- .4 if part of an INS is providing the capability to engage in communication presented in combination with graphical presentation of geographic information, provide this on a separate presentation to avoid clutter; and
- .5 be designed according to a "fail-safe" principle. The documentation of the ICS should include failure analysis at ICS functional level ensuring that failure of one part of the ICS does not affect the functionality of other parts, except for those functions directly dependent on the defective part.

4 OPERATIONAL REQUIREMENTS OF THE COM-HMI

4.1 The COM-HMIs included in the ICS should:

- .1 have a consistent and identical layout of the included applications and their functions (use of different screen sizes is allowed);

³ EPIRB, locating and handheld devices are not part of the ICS.

- .2 have consistent access to the included applications (e.g. VHF, MF/HF, SAT-COM) and their functions;
- .3 be capable of being operated independently of each other; and
- .4 be capable of allowing simultaneous operation of at least two GMDSS radiocommunication sensors and sources from different COM-HMIs.

4.2 Only one COM-HMI should be in control of configuration of a "non-shareable function" (e.g. VHF-Voice) at any time, and only one COM-HMI should be assigned to accept control commands of a "non-shareable function" at any time.

4.3 A COM-HMI may be in control of all functions of the ICS or may be in control of selected individual functions of the ICS.

4.4 The ICS should ensure that no internal communication link is interrupted by communication access of another COM-HMI.

4.5 The bridge team should have a visual indication of which COM-HMI is in control of which functions. Means should be available on the COM-HMI to take over control of individual functions on that COM-HMI.

4.6 The COM-HMI may be integrated as a separate device or be part of an HMI of a navigation system which may be a separate task within an INS.

4.7 Integration of the VHF radiotelephone required for navigational safety should only be permitted if it does not prevent compliance with SOLAS regulation IV/6.3.

4.8 Remote COM-HMIs intended only for general radiocommunications may not have access to the distress alerting functions; nor should they impair or slow down the distress alerting and alert functions. The COM-HMIs accessing the GMDSS sensors and sources should have priority access over remote COM-HMI.

4.9 Additional sensors and sources not required for the GMDSS should neither impair nor slow down the distress alerting and alert functions.

4.10 The COM-HMI should provide an integrated protection against unintended activation of transmitters.

4.11 When an automatic identification system (AIS) is integrated or interconnected, the ICS should be capable of:

- .1 displaying received notices using the same rules as for maritime safety information (MSI) and search and rescue (SAR) related information;
- .2 sending and receiving broadcast and addressed AIS safety-related messages; and
- .3 enabling correlation of distress information received by DSC with available received AIS ship information and displaying the results on the COM-HMI.⁴

⁴ Refer to IEC 61162.

4.12 Remote COM-HMI:

- .1 Optionally, an ICS may support remote COM-HMI(s). Such a remote COM-HMI is an external equipment that is interfaced to the ICS.
- .2 The remote COM-HMI(s) may support all other communication functionality included in the ICS or a subset of the communication functionality included in the ICS.⁵
- .3 A COM-HMI within the ICS itself should automatically take priority in the case of a detected failure of the interface or data connection between the remote COM-HMI and the ICS. In such a case:
 - .1 the ICS should automatically move "control & use" of a communication function from the remote COM-HMI to a COM-HMI within the ICS; and
 - .2 the remote COM-HMI should indicate the interface failure state and the COM-HMI taking control should be clearly indicated to the user.

5 COM-HMI PERFORMING GMDSS FUNCTIONS

5.1 Initiation of a distress alert

5.1.1 A COM-HMI performing GMDSS functions should be capable of transmitting distress alerts. The distress alert should only be initiated by means of a dedicated physical button for each COM-HMI; the button should not be used for any other purpose. The COM-HMI should support the option to select individual sources and sensors for transmission of the distress alert or transmit on all sources and sensors simultaneously.

5.1.2 The dedicated distress button should be clearly identified; and be red in colour and marked "DISTRESS". Where a non-transparent protective lid or cover is used, it should also be marked "DISTRESS".

5.1.3 The dedicated distress button should be protected against inadvertent operation. The required protection of the distress button should consist of a spring-loaded lid or cover permanently attached to the equipment by, for example, hinges. It should not be necessary for the user to remove additional seals or to break the lid or cover in order to operate the distress button.

5.1.4 The operation of the distress button should generate a visible and audible indication. The distress button should be kept pressed for at least three seconds. A flashing light and an intermittent acoustic signal should start immediately. After the three seconds, the transmission of the distress alert is initiated and the indication should become steady. It should be clearly indicated when a distress button is active.

5.1.5 The distress alert initiation should require at least two independent actions. The lifting of the protective lid or cover is considered as the first action. Pressing the distress button as specified above is considered as the second independent action.

⁵ Note: Communication functionality is subdivided into "control & use" and "monitoring". "Control & use" means activation of communication or equipment and setup of parameters, etc. for that equipment. "Monitoring" means passive viewing of the communication and the equipment status.

5.1.6 The equipment should indicate the status of the distress alert transmission.

5.1.7 It should be possible to interrupt and initiate distress alerts at any time and to interrupt repetitive transmissions of distress messages. Such operation should not interrupt the transmission of a distress alert or distress message in progress but should prevent repetitive transmissions of a distress message.

5.1.8 Each distress button should have its own independent interconnection to the ICS.

5.2 Presentation of distress information

5.2.1 The COM-HMI should provide means to display a transmitted own-ship distress alert. The information should include the GMDSS subsystem(s) on which the alert was transmitted, the date and time the alert was transmitted, and all distress acknowledgement information received. If MF/HF is used, the information should also include the frequency/frequencies on which the alert was sent.

5.2.2 Means should be provided in the COM-HMI for displaying, for GMDSS, a received distress alert, distress alert relay, and distress acknowledgement information, with an indication of the receiving communication system.

5.3 Maritime safety information and search and rescue related information

5.3.1 The COM-HMI should fulfil the requirements for the dedicated display option as described in the related equipment performance standards for MSI and SAR related information.

5.3.2 The COM-HMI should indicate on which system the message was received, e.g. NAVTEX.

5.3.3 Where integration or interconnection with AIS is provided, maritime safety information should be provided and displayed.

6 COMMON STORAGE MEDIA

6.1 The ICS should provide a common storage media for display and optional printing of MSI and other messages received from GMDSS components included in the ICS. The stored messages should be non-editable within the ICS.

6.2 The common storage media should comply with the following:

- .1 a non-volatile storage medium with sufficient capacity for applicable communication subsystems as specified in individual performance standards for a period of three months; when the memory is full, the oldest messages should be overwritten by new messages;
- .2 messages older than three months should be erased automatically, unless annotated by the end user for long-time storage;
- .3 stored electronic information should be viewable on COM-HMIs and may be viewable on remote COM-HMIs;
- .4 stored electronic information should be accessible on an interface for physical printing or for storage on a removable storage device;

- .5 stored electronic information should be accessible on a suitable interface conforming to the appropriate international standard;⁶
- .6 means should be provided for the end user to remove messages which are processed or no longer valid;
- .7 annotations relating to the time of reception and from which system the message was received should remain available for three months; and
- .8 an alert of priority "caution" should be raised when the storage capacity for the three-month period is close to the capacity of the storage media.

7 SOFTWARE AND FIRMWARE MAINTENANCE

7.1 Adequate software and firmware maintenance arrangements should be supported by the ICS manufacturer in accordance with MSC.1/Circ.1389.

7.2 Means should be provided to replace or install updates to software/firmware in the ICS.

7.3 Appropriate means against cyber risks should be provided in accordance with the *Guidelines on maritime cyber risk management* (MSC-FAL.1/Circ.3).

8 MALFUNCTIONS AND RESTORATION

8.1 ICS system failure

8.1.1 In case of failure of all of the COM-HMIs, it should be possible to continue executing the following tasks:

- .1 to initiate and transmit a distress alert and conduct distress communications (transmit and receive) by bypass or alternative means on VHF and one of the main systems as relevant for the ships operational sea area as documented in the ship safety radio certificate;
- .2 making available received MSI, SAR related and other information from a common storage device; and
- .3 making accessible a printing or presentation capability if required by the individual IMO performance standards.

8.1.2 A failure of one part should not affect the functionality of other parts except for those processes and functions directly dependent upon the information from the defective part.

8.1.3 No single fault should impair the operation of more than one radiocommunication sensor or more than one COM-HMI at any time. For cases where duplication is required (sea areas A3 and A4), no single failure should render both the primary and duplicated systems inoperative at the same time.

⁶ Refer to IEC 61162.

8.2 Recovery from failure

Upon recovery of functionality after system failure, the COM-HMI should be provided with necessary information from the ICS to enable the COM-HMI to continue operation of the following as if no malfunction has occurred:

- .1 distress alerting;
- .2 distress and safety communication; and
- .3 reception of MSI and SAR related information on at least one service.

9 ACCURACY AND PERFORMANCE

9.1 The ICS processing should ensure that the mandatory information required to be provided by the subsystems meets the requirement for accuracy and content as specified in any performance standards of the Organization for the related individual subsystem integrated.

9.2 The ICS should ensure that same source of essential sensor information is distributed to the relevant parts of the system.

9.3 The ICS should ensure that all HMIs of the ICS should be consistent in the presentation of information.

10 INTEGRITY MONITORING

The ICS should support integrity and function monitoring by providing:

- .1 indication of availability, status and mode of operation of subsystems within the ICS network; and
- .2 validity of subsystem and sensor information within the ICS network.

11 ICS IN COMBINATION WITH ALERT MANAGEMENT

11.1 The ICS with its COM-HMIs should conform with alert management handling and provide relevant interfaces compliant with the requirements of resolution MSC.302(87) on *Adoption of performance standards for bridge alert management* for Modules A and C as applicable.

11.2 The alert management requirements of individual equipment standards remain applicable.

INTERFACING MODULE

12 POWER SUPPLY

12.1 Power supply arrangements

12.1.1 The ICS should have a power supply arrangement which ensures that it is not possible for an operator to inadvertently switch off any part of the ICS.

12.1.2 The ICS should include two independent power supply units, each supplied from the main source of electrical power, emergency source of electrical power (if available), and the reserve source of power. For cases where duplication is required (sea areas A3 and A4) one power supply unit should supply the primary systems and the second power supply unit should supply the duplicated systems.

12.2 Power supply failure

In the event of failure of, or switching between, the main and emergency sources of electrical power, the reserve power source should automatically and without interruption continue the supply of power to the ICS based on uninterruptible power supplies (UPS), as described in COMSAR/Circ.32, as revised.

13 EQUIPMENT AND NETWORK INTERFACES

13.1 Network interfaces

The interfaces to other networks and devices should conform to the appropriate international standard and be cybersecurity protected.

13.2 Interfaces to external equipment

13.2.1 The ICS should be capable of transmitting and receiving data using the relevant sentences specified in the appropriate international standard for communication to external equipment.

13.2.2 Where VHF communications is included in the ICS, the audio from the VHF is required to be connected to the VDR.

13.3 Integrated Navigation System (INS)/Global Navigation Satellite System (GNSS) interface

If external input is used, the consistent common reference system point (CCRS) from the INS should have priority.

14 DOCUMENTATION

14.1 Software/firmware version

14.1.1 The ICS itself and the equipment integrated in the ICS should provide means to display on demand the current software/firmware version in use.

14.1.2 The manufacturer should provide publicly available information regarding the ICS application software and firmware versions, compliance status and regulatory approvals for the listed configurations/versions. The procedures for this should be part of the recognized quality system of the manufacturer.
