

## ANNEX 12

### RESOLUTION MSC.569(109) (adopted on 6 December 2024)

#### PERFORMANCE STANDARDS FOR THE RECEPTION OF MARITIME SAFETY INFORMATION AND SEARCH AND RESCUE RELATED INFORMATION BY MF AND HF DIGITAL NAVIGATIONAL DATA (NAVDAT) SYSTEM

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.886(21) on *Procedure for the adoption of, and amendments to, performance standards and technical specifications*, by which the Assembly resolved that the functions of adopting performance standards and technical specifications, 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, regulation IV/7.1.4 of the Convention, which requires every ship to be provided with a receiver or receivers capable of receiving maritime safety information and search and rescue related information throughout the entire voyage in which the ship is engaged,

NOTING ALSO the works carried out by the International Telecommunication Union on a digital navigational data (NAVDAT) system and the allocated frequencies on MF and HF for its use,

NOTING FURTHER the *Guidance for the reception of maritime safety information and search and rescue related information as required in the Global Maritime Distress and Safety System (GMDSS)* (MSC.1/Circ.1645), which identifies related information broadcast services and the equipment which should be installed on board ships to meet the requirements of chapter IV of the Convention,

RECOGNIZING that further growth in information promulgated to ships is constrained by the capacity of the International NAVTEX Service and HF NBDP broadcasts, and that MF and HF digital NAVDAT broadcasts may be used in the GMDSS,

HAVING CONSIDERED, at its 109th session, the recommendation made by the Sub.Committee on Navigation, Communications and Search and Rescue at its eleventh session,

1 ADOPTS the *Performance standards for the reception of maritime safety information and search and rescue related information by MF and HF digital navigational data (NAVDAT) system*, set out in the annex to the present resolution;

2 RECOMMENDS Governments to ensure that NAVDAT receiver equipment conforms to performance standards not inferior to those specified in the annex to the present resolution.

## ANNEX

### **PERFORMANCE STANDARDS FOR THE RECEPTION OF MARITIME SAFETY INFORMATION AND SEARCH AND RESCUE RELATED INFORMATION BY MF AND HF DIGITAL NAVIGATIONAL DATA (NAVDAT) SYSTEM**

#### **1 INTRODUCTION**

1.1 The NAVDAT receiver equipment should be capable of receiving maritime safety information (MSI) and search and rescue (SAR) related information transmitted by NAVDAT system on MF and HF frequencies, and may be used to meet the requirements of SOLAS regulation IV/7.1.4.

1.2 In addition to meeting the requirements of the Radio Regulations, the NAVDAT receiver equipment should comply with the most recent versions of Recommendations ITU-R M.2010 and ITU-R M.2058 for NAVDAT in the MF and HF bands, respectively.

1.3 The NAVDAT receiver equipment should comply also with the requirements set out in resolutions A.694(17), MSC.191(79), as amended by resolution MSC.466(101), and MSC.508(105), and the following performance standards.

#### **2 GENERAL**

2.1 The NAVDAT system allows the broadcast of messages in the form of digital files providing texts, pictures or any other data. This broadcast can be done on the two international frequencies: 500 kHz in the MF band and 4 226 kHz in the HF band, and also on all other maritime radio frequencies assigned by the ITU for NAVDAT usage (see paragraph 4.2.1).

2.2 The NAVDAT receiver equipment should comprise a radio receiver, an appropriate antenna, a signal processor with non-volatile memory, a human-machine interface, data interfaces (see paragraph 9) and:

- .1 an integrated display; or
- .2 a connection to external equipment with a display (e.g. an integrated navigation system).

2.3 The NAVDAT receiver could either be a stand-alone equipment or combined with another equipment.

2.4 The NAVDAT receiver equipment should be provided with an antenna capable of receiving the entire maritime radio frequencies from, at minimum, 400 kHz to 30 MHz.

2.5 The NAVDAT receiver equipment 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 which may be an integral part of the equipment. For equipment which does not have an integral position-fixing aid, such facilities should include a suitable interface conforming to the appropriate international standards.<sup>1</sup>

2.6 When the NAVDAT receiver equipment has a dedicated antenna, it is recommended that the antenna be equipped with two outputs for sharing with another MF/HF receiver.

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<sup>1</sup> Refer to IEC 61162.

### **3 CONTROLS AND INDICATORS**

3.1 Subject messages<sup>2</sup> excluded by the operator from display should be readily available.

3.2 When a message is received correctly or with errors, the equipment may be able to emit a corresponding short audio notification. In addition, a distinctive alert should be built into the receiver for messages with distress and urgency priority.

3.3 The NAVDAT receiver equipment should be capable of displaying communication parameters, including received signal strength indication (RSSI), signal noise ratio (SNR) and bit error rate (BER).

3.4 Each time a NAVDAT message is received, the NAVDAT receiver equipment should display, in plain text, the priority, subject message, coast station identity and number of the message.

3.5 The NAVDAT receiver equipment should be able to configure parameters of data interfaces for communication with other ship equipment.

3.6 The stored tables of the NAVDAT receiver equipment should be able to be updated by using either a data interface or reception of stored tables update messages.

3.7 Human-machine interface, including the presentation of alerts, for the NAVDAT receiver equipment should be in accordance with the guidelines developed by the Organization.<sup>3</sup>

### **4 RECEIVER**

#### **4.1 Frequency management**

4.1.1 The NAVDAT receiver should be capable of receiving transmissions on MF (500 kHz) and HF (4 226 kHz) channels simultaneously.

4.1.2 The NAVDAT receiver should also be able to receive, via a scanning function, on at least one (or more) regional frequency allocated to NAVDAT in the MF and HF maritime bands.

4.1.3 The NAVDAT receiver should demodulate signal(s) received on the MF channel 500 kHz and the HF channel 4 226 kHz simultaneously.

4.1.4 The demodulated signal(s) received by scanning can be decoded simultaneously or non-simultaneously.

#### **4.2 Scan function**

4.2.1 To allow reception of transmissions on national or regional frequencies assigned to NAVDAT, the receiver should use a scan function on the following maritime frequency bands:

- .1 the MF band from 415 kHz to 526.5 kHz (except 500 kHz);

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<sup>2</sup> See the list of subject message codes in the most recent version of Recommendation ITU-R M.2010 or ITU-R M.2058.

<sup>3</sup> Refer to *Guideline on software quality assurance and human-centred design for e-navigation* (MSC.1/Circ.1512).

- .2 the channels assigned to NAVDAT in appendix 15 of the Radio Regulations: 6 337.5 kHz, 8 443 kHz, 12 663.5 kHz, 16 909.5 kHz and 22 450.5 kHz (except 4 226 kHz); and
- .3 the frequency bands assigned to wideband digital transmissions in appendix 17 of the Radio Regulations in the bands 4, 6, 8, 12, 16 and 22 MHz.

4.2.2 The signals received on the frequencies selected for scanning can be decoded simultaneously or non-simultaneously according to the resources of the NAVDAT receiver at that moment.

4.2.3 The transmitted pre-signal<sup>4</sup> should allow the NAVDAT receiver to detect the transmission and tune in to the frequency, measure its SNR and identify the transmitting NAVDAT coast station, including, based on its location, the associated NAVAREA/METAREA.

4.3 The receiver sensitivity should be better than – 95dBm in a bandwidth of 10 kHz, with a BER better than  $10^{-4}$  after error correction.

4.4 The NAVDAT receiver equipment should comply with the latest appropriate electromagnetic compatibility (EMC) standards (e.g. resolutions A.694(17) and A.813(19), and IEC 60945).

4.5 The NAVDAT receiver equipment should be able to receive any NAVDAT message and identify the priority level and the type of that message.

4.6 For identification purposes, the NAVDAT receiver equipment should use the Maritime Mobile Service Identity (MMSI) of the ship (see also paragraph 11).

4.7 The NAVDAT receiver equipment should be able to select automatically whether to receive subsequent messages according to the following broadcast modes:

- .1 General broadcast: Broadcasting messages to all ships.
- .2 Selective broadcast: Broadcasting messages to a group of ships or ships within a specific navigational area.
- .3 Dedicated broadcast: Addressing messages to one ship, using MMSI.

4.8 The NAVDAT receiver equipment should be able to select automatically demodulation mode, error correction decoding and message decoding methods according to the received modulation information stream (MIS).

4.9 NAVDAT message transmission is based on the transmission of data packets. The equipment should be able to correct received messages using forward error correction and by using repeatedly sent data packets.

4.10 The NAVDAT receiver equipment should have a built-in real-time clock that is automatically calibrated by a suitable electronic position-fixing aid (or clock reference through an onboard data network).

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<sup>4</sup> To ensure proper operation of the receiver scan function, the transmitters of active national or regional NAVDAT coast stations will broadcast a pre-signal before the NAVDAT frames. This pre-signal is a known data repeated eight times for a total duration of 3.2 seconds.

## **5 DISPLAY DEVICE**

5.1 The display device should be able to display different types of NAVDAT messages.

5.2 The design and size of the integrated display device should be such that displayed information is easily read under all conditions by observers at normal working distance and viewing angles. An interface to an external display device or appropriate navigational equipment should be provided.

5.3 On the display, the following requirements should be met:

- .1 an indication of newly received and unsuppressed messages should be immediately displayed until acknowledged or for 24 hours after their receipt; and
- .2 newly received unsuppressed messages should also be displayed.

5.4 When displaying received messages, a clear indication of the end of any message should be given.

5.5 The display resolution should be at least 640\*480 pixels.

5.6 The list of messages received on 500 kHz and 4 226 kHz can be displayed in different areas of the display screen at the same time.

5.7 In the list of received messages, the latest message is displayed on the first line with its number, contents, date and time.

## **6 STORAGE**

### **6.1 Non-volatile memory**

6.1.1 The NAVDAT receiver equipment should keep all information concerning NAVDAT coast stations in a non-volatile memory. This information should include name of the stations, their geographical positions, their numbering allocated by the NAVDAT coordination procedure, the frequency(s) used as well as the different slots that can be used by the stations. This information will be regularly updated upon receipt of stored tables update messages.

6.1.2 For each frequency provided, it should be possible to record at least 100 messages in the non-volatile memory provided. It should not be possible for the user to erase messages from the memory. When the memory is full, the oldest message should be replaced by new messages.

6.1.3 The user should be able to mark the individual messages for permanent retention. These messages can occupy up to 25% of available memory and should not be overwritten by new messages. When no longer needed, the user should be able to delete the tag on these messages, which can be overwritten normally.

6.1.4 The NAVDAT receiver equipment should be able to detect duplicate messages and discard repeated messages.

6.1.5 A memory capacity of not less than 1 gigabyte should be provided to store, as a minimum, the time, transmitter identity, subject and content of received messages.

6.1.6 After between 60 and 72 hours, a message should automatically be erased from the memory storage. If the number of received messages exceeds the capacity of the storage, the oldest message should be erased.

6.1.7 Only messages satisfactorily received (i.e. BER is better than  $10^{-4}$ ) should be stored.

## **6.2 Programmable control memories**

6.2.1 Information identifying the transmitter service area and the code of each subject message in programmable memory should not be erased by interruptions in the power supply of less than 24 hours.

6.2.2 The NAVDAT receiver equipment should be able to display, delete and query stored messages, and be able to output messages manually or automatically to appropriate ship equipment (e.g. ECDIS).

## **7 ALERT**

7.1 Upon receipt of new search and rescue related information messages with distress or urgency priority, the NAVDAT receiver equipment should give an alert, including information for decision-making.

7.2 The position information contained in the messages with distress and urgency priorities should be automatically transmitted to other navigation equipment (e.g. ECDIS, ENC plotter).

7.3 The NAVDAT receiver equipment should comply with the *Performance standards for bridge alert management* (resolution MSC.302(87)).

## **8 TEST FACILITIES**

The NAVDAT receiver equipment should be provided with a facility to test the radio receiver, the display and the non-volatile memory and to display the results of the test.

## **9 DATA INTERFACES**

9.1 The NAVDAT receiver equipment should include at least one interface for the transfer of all messages to other navigation or communication equipment.

9.2 All interfaces provided for communication with other navigation or communication equipment should comply with the relevant international standards.<sup>5</sup>

9.3 The NAVDAT receiver equipment may include a standard printer interface.

## **10 POWER SUPPLY**

10.1 The NAVDAT receiver equipment should normally be powered from the ship's main or emergency sources of electrical energy. In addition, it should be possible to operate the equipment and all equipment necessary for its normal functioning from the reserve source or sources of energy in accordance with SOLAS regulation IV/13.

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<sup>5</sup> Refer to IEC 61162.

10.2 The NAVDAT receiver equipment should continue to operate without any loss of software parameters or received messages stored in the memory in the presence of power supply variations normally to be expected in a ship.

## 11 RECEIVER IDENTIFICATION

It should be possible to configure the NAVDAT receiver equipment with:

- .1 the identity (MMSI) of the ship (according to Recommendation ITU-R M.585); or
- .2 the group identity (MMSI) (according to Recommendation ITU-R M.585); or
- .3 additional lists of identities (MMSIs).

## 12 STORED TABLES

The NAVDAT receiver equipment should have the possibility of memorizing some tables. For example:

- .1 The list of coast stations with:

Area;  
Country;  
Longitude;  
Latitude;  
Name;  
Slots; and  
Frequency used.

This stored table is queried when the identities of a NAVDAT coast station are received and the complete parameters of this NAVDAT coast station should be displayed in plain text.

- .2 The list of subject messages:

Table with subject message 01 to 63 (see the most recent versions of Recommendations ITU-R M.2010 and ITU-R M.2058).

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