

INTERNATIONAL STANDARD

NORME INTERNATIONALE

**Global maritime distress and safety system (GMDSS) –
Part 16: Ship earth stations operating in mobile-satellite systems recognized for
use in the GMDSS – Operational and performance requirements, methods of
testing and required test results**

[IEC 61097-16:2019](#)

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**Système mondial de détresse et de sécurité en mer (SMDSM) –
Partie 16: Stations terriennes de navire fonctionnant dans les systèmes mobiles
par satellite reconnus pour une utilisation dans le SMDSM – Exigences
opérationnelles et de fonctionnement, méthodes d'essai et résultats exigibles**





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GLOBAL MARITIME DISTRESS AND SAFETY SYSTEM (GMDSS) –**Part 16: Ship earth stations operating in mobile-satellite systems recognized for use in the GMDSS – Operational and performance requirements, methods of testing and required test results**

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International Standard IEC 61097-16 has been prepared by IEC technical committee 80: Maritime navigation and radiocommunication equipment and systems.

The text of this International Standard is based on the following documents:

FDIS	Report on voting
80/928/FDIS	80/932/RVD

Full information on the voting for the approval of this International Standard can be found in the report on voting indicated in the above table.

This document has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all parts in the IEC 61097 series, published under the general title *Global maritime distress and safety system (GMDSS)*, can be found on the IEC website.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under "<http://webstore.iec.ch>" in the data related to the specific document. At this date, the document will be

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- withdrawn,
- replaced by a revised edition, or
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GLOBAL MARITIME DISTRESS AND SAFETY SYSTEM (GMDSS) –

Part 16: Ship earth stations operating in mobile-satellite systems recognized for use in the GMDSS – Operational and performance requirements, methods of testing and required test results

1 Scope

This part of IEC 61097 specifies the minimum operational and performance requirements, methods of testing and required test results for any ship earth stations intended for operation in mobile-satellite systems and services which are recognized by the International Maritime Organization as meeting the criteria required by the IMO under regulation IV/4-1 of the International Convention for the Safety of Life at Sea, 1974, as amended, for the provision of mobile-satellite systems and services in the GMDSS, regardless of the mobile satellite provider used.

This document incorporates the minimum criteria and performance standards of the IMO, currently prescribed in IMO Resolution A.1001(25) in IMO Resolution MSC.434(98) and is also associated with IMO Resolution A.694(17) and IEC 60945.

All text of this document whose wording is identical to that of resolution MSC.434(98) is printed in *italics* and reference is made to that resolution and the sub-clause number.

Matters relating to the installation of the ship earth station are given in Annex A.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60945, *Maritime navigation and radiocommunication equipment and systems – General requirements – Methods of testing and required test results*

IEC 61162-1, *Maritime navigation and radiocommunication equipment and systems – Digital interfaces – Part 1: Single talker and multiple listeners*

IEC 61162-450, *Maritime navigation and radiocommunication equipment and systems – Digital interfaces – Part 450: Multiple talkers and multiple listeners – Ethernet interconnection*

IEC 61162-460, *Maritime navigation and radiocommunication equipment and systems – Digital interfaces – Part 460: Multiple talkers and multiple listeners – Ethernet interconnection – Safety and security*

IEC 62288, *Maritime navigation and radiocommunication equipment and systems – Presentation of navigation-related information on shipborne navigational displays – General requirements, methods of testing and required test results*

IEC 62923-1, *Maritime navigation and radiocommunication equipment and systems – Bridge alert management – Part 1: Operational and performance requirements, methods of testing and required test results*

IMO Resolution MSC.191(79), *Performance standards for the presentation of navigation related information on shipborne navigational displays*

IMO Resolution MSC.434(98), *Recommendation on performance standards for ship earth stations for use in the GMDSS*

3 Terms, definitions and abbreviated terms

3.1 Terms and definitions

No terms and definitions are listed in this document.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

3.2 Abbreviated terms

BAM	bridge alert management
CAM	central alert management
EGC	enhanced group call
EUT	equipment under test
GMDSS	global maritime distress and safety system
HMI	human machine interface
IMO	International Maritime Organization
ISO	International Organization for Standardization
ITU	International Telecommunications Union
MSI	maritime safety information
REDS	removable external data source
RCC	rescue coordination centre
SES	ship earth station
SET	simulated earth termination

4 Functional and operational requirements

4.1 General

(See 6.1)

4.1.1 System operator requirements

(MSC.434(98), Annex, 2.1.1) *The ship earth station shall operate using a recognized mobile-satellite service and meet the functional requirements of resolution A.1001(25). The ship earth station shall comply with the technical standard provided by the recognized mobile-satellite system provider and be certified by this provider for operation in the GMDSS, in order to ensure operational reliability.*

(MSC.434(98), Annex, 2.1.2) *The ship earth station shall comply with ITU Radio Regulations.*

4.1.2 General requirements

(MSC.434(98), Annex, 1) *The ship earth station installation capable of two-way radiocommunications shall comply with the general requirements set out in resolutions A.694(17), A.813(19), MSC.191(79), MSC.302(87).*

Annex D gives, for information purposes, details of ship motion likely to be experienced by ship earth stations.

4.2 Functional requirements

(See 6.2)

MSC.434(98), Annex, 2.2.1) The ship earth station shall be capable of automatically recognizing the priority of ship-to-ship, ship-to-shore and shore-to-ship communications and shall process them in accordance with the message priority defined by the ITU Radio Regulations. The order of processing these communications shall be:

- 1) *Distress;*
- 2) *Urgency;*
- 3) *Safety; and*
- 4) *other communications.*

(MSC.434(98), Annex, 3.1.1) The primary HMI shall provide all functions necessary to carry out all communication procedures, including those required by the GMDSS.

(MSC.434(98), Annex, 2.2.2) *The ship earth station shall provide a specific visual indication when unable to detect or otherwise make contact with the satellites of the mobile-satellite system for a period of one minute or more, as referred to in Table 3.*

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4.3 Integrated systems and equipment interfaces

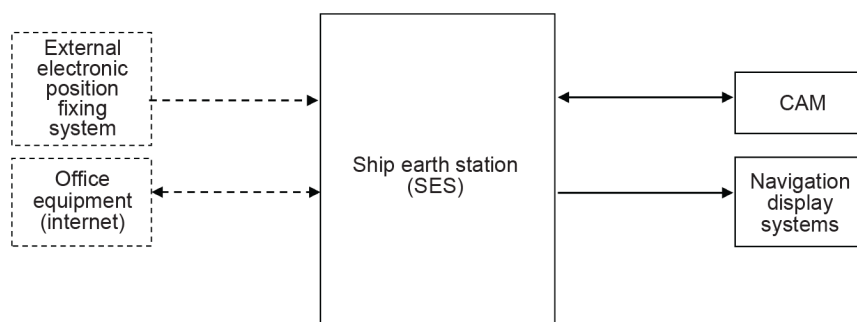
(See 6.3)

4.3.1 General

The ship earth station equipment shall be capable of at least transmitting and receiving data using the IEC 61162-1 sentences specified in Table 1 and Table 2. IEC 61162-460 shall be applied wherever reference to use of IEC 61162-450 interfaces is specified (see also 4.11).

Interfaces are shown in Figure 1, where required interfaces are indicated with solid lines and optional interfaces are indicated in dashed lines.

For systems that do not have an integral electronic position fixing system, the interface for the external device is mandatory.



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Figure 1 – Interfaces of ship earth station

Table 1 – IEC 61162-1 sentences received by the ship earth station equipment

Mnemonic	Interface	Name	Comment
ACN	CAM	Alert command	Alert command for instance acknowledge
HBT	CAM	Heartbeat	Support reliable alert related communication
GLL, GGA, GNS, RMC	External position information equipment	Position	If position not internally provided

Table 2 – IEC 61162-1 sentences transmitted by the ship earth station equipment

Mnemonic	Interface	Name	Comment
SM1, SM2, SM3, SM4, SMB and SMV	Navigation display systems	Maritime Safety Information	For SMV, see Annex C
ARC, ALC, ALF, HBT	CAM	Alert information	

4.3.2 CAM interface

(MSC.434(98), Annex, 2.3.1) *The equipment shall meet the requirements for Bridge Alert Management system (BAM). Equipment interfaces shall comply with recognized international standards. Where the ship earth station is part of an Integrated Communication System (ICS), Integrated Navigation System (INS) or Integrated Bridge System (IBS), or connected to a navigation system, this shall not impair any of the GMDSS functions of these systems or the ship earth station itself.*

In the BAM concept, the SES acts as the alert source and the CAM acts as the target of alert reporting by alert sources.

For bridge alert management, the classification of alerts shall be as given in Table 3.

Table 3 – Classification of ship earth station alerts

Cause	Alarm	Warning	Caution	Cat. A	Cat. B	Alert ID
No contact with satellites (4.2)			X		X	3116
Received distress alert relay (4.3.2)		X		X		3122
Received urgency message (4.8)		X		X		3122
Received MSI (4.9)			X		X	3123
Paper low/mass storage full (4.9)			X		X	3079
Loss of position (4.10)			X		X	3016
Manual position older than 4 h (4.10)			X		X	3013

NOTE A simplified description of the terms in accordance with IMO Resolution MSC.302(87) is:

- Alarm: Audible announcement until acknowledged by the operator
- Warning: Short audible announcement repeated every 5 minutes until acknowledged by the operator
- Caution: Silent
- Category A: Acknowledge possible only at source or when full source information is available. Audible announcement only at location at which acknowledge is possible.
- Category B: Acknowledge possible both at source and at CAM. Audible announcement in every location at which acknowledge is possible.

The SES shall be provided with a data interface for communication compliant with the BAM concept capable of transmitting the sentences ALC, ALF, ARC and HBT and receiving the sentences ACN and HBT in accordance with IEC 61162-1 or IEC 61162-450 and IEC 62923-1. The text information used in the ALF sentence shall be as given in Table 4.

Table 4 – Alert titles and text

Alert ID	Alert text (1 st ALF)	Additional information (2 nd ALF)
3116	Lost connection	Check GMDSS satellite terminal
3122	Distress Rx	Incoming distress. Check GMDSS display
3122	Urgency Rx	Incoming urgency warning. Check GMDSS display
3123	MSI Rx	Check new received maritime safety information
3079	Paper low	Check GMDSS printer paper
3079	Storage low	Check GMDSS message storage medium
3016	Lost position	Check GMDSS terminal for lost position
3013	Doubtful pos	GMDSS update manual position

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4.3.3 Other interfaces (standards.itech.ai)

(MSC.434(98), Annex, 2.3.2) *The ship earth station shall provide an interface from which data from Enhanced Group Call communications (EGC), including Maritime Safety Information (MSI), can be provided to navigation display systems, in accordance with the recognized international standards.*

The SES shall be provided with a data interface for communication with navigation display systems capable of transmitting the sentences SM1, SM2, SM3, SM4 and SMB in accordance with IEC 61162-1 or IEC 61162-450.

(MSC.434(98), Annex, 2.3.3) *The ship earth station shall provide either an integral electronic position fixing equipment or have an interface for position updating conforming to the recognized international standard.*

The SES shall be provided with a data interface for updating position information capable of receiving the sentences GLL, GGA, GNS, RMC in accordance with IEC 61162-1 or IEC 61162-450, unless an integral electronic position fixing equipment is provided.

Formatting and transmission of distress alert position information shall be clearly and unambiguously labelled as such and presented in the format of degrees, minutes and decimal fraction of minutes.

NOTE The format is specified in Volume II of the IAMSAR Manual. The position format is degrees-minutes.decimal minutes hemisphere (N,S,E,W, no preceding space as in dd-mm.mmmH ddd-mm.mmmH), leading zeros optional (because the "-" and "." remove the ambiguity that would result otherwise), latitude first, longitude second, space separating latitude and longitude.

(MSC.434(98), Annex, 2.3.4) *The ship earth station shall provide an interface in accordance with the recognized international standards to report a ship's identifier and location data from a received distress alert relay to navigation display systems in order to enable graphical display and possible linking to target information.*

The SES shall be provided with a data interface to report a ship's identifier and location data from a received distress alert relay capable of transmitting the sentence SMV in accordance with IEC 61162-1 or IEC 61162-450. The SMV sentence shall not be transmitted if the latitude and longitude information is not present or is invalid.

4.3.4 Interface to office equipment

The SES may optionally have an interface to provide an internet connection for the ship's office equipment. When this interface is provided, appropriate provisions shall be made to isolate the interface and functions from the interfaces and functions related to GMDSS. See 4.11.

4.4 Ship earth station identity

(See 6.4)

(MSC.434(98), Annex, 3.2.1) *No control external to the equipment shall be available for alteration of the ship station identity.*

Changes may only be carried out by authorised authorities or the manufacturer's representative.

4.5 Transmission of distress alerts/calls

4.5.1 Priority

(See 6.5.1)

(MSC.434(98), Annex, 3.3.1) *It shall be possible to initiate transmission of distress alerts/calls at any time. It shall be possible to initiate transmission of distress alerts/calls whilst the ship earth station is transmitting lower priority communications, and whilst it is receiving communications of any priority, if necessary by pre-emption of those communications.*

4.5.2 Distress initiation

(See 6.5.2)

(MSC.434(98), Annex, 3.3.2) *It shall be possible to initiate and make distress alerts/calls from the position at which the ship is normally navigated. The equipment shall include an option making it possible to initiate transmission of distress alerts/calls at a position remote from the primary HMI of the equipment.*

(MSC.434(98), Annex, 3.3.3) *The HMI shall include a dedicated distress button that has no other function than activating distress transmissions.*

(MSC.434(98), Annex, 3.3.4) *A distress alert/call shall be activated only by means of a dedicated distress button (a physical button, not a touchscreen button). The dedicated distress button shall not be any key of a digital input panel or a keyboard provided on the equipment. The distress button shall be clearly identified and protected against inadvertent activation, requiring at least two independent actions. 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.*

(MSC.434(98), Annex, 3.3.5) *The distress button shall be red in colour and marked "DISTRESS". Where a non-transparent protective lid or cover is used, it shall be red in colour and also be marked "DISTRESS".*

(MSC.434(98), Annex, 3.3.6) *The required protection of the distress button shall consist of a spring-loaded lid or cover permanently attached to the equipment by e.g. hinges. It shall not be necessary for the user to remove additional seals or to break the lid or cover in order to operate the distress button.*

(MSC.434(98), Annex, 3.3.7) *The equipment shall indicate the status of the distress alert/call. The operation of the distress button shall generate a visible and audible indication. The distress button shall be kept pressed for at least 3 seconds. A flashing light and an intermittent audible signal shall start immediately. After the transmission of the distress alert/call is initiated, the visual indication shall become steady and the audible signal shall cease.*

4.5.3 Automatic repetition of distress alert

(See 6.5.3)

(MSC.434(98), Annex, 3.3.8) *The equipment shall automatically initiate repetitive initial distress alerts/calls, which are repeated until cancelled on the ship or until appropriately acknowledged. It shall be possible to interrupt repetitive initial distress alerts/calls. Such operation shall not interrupt the transmission of a distress alert/call in progress but shall prevent repetitive transmissions of a distress alert/call.*

4.5.4 Content of distress alert

(See 6.5.4)

(MSC.434(98), Annex, 3.3.9) *The distress alert shall contain identification of the station in distress, its position and the time of the position fix.*

4.5.5 Subsequent distress communications

(See 6.5.5)

(MSC.434(98), Annex, 3.3.10) *The equipment shall be capable of transmitting and receiving subsequent distress communication.*

4.5.6 Cancellation of false distress alert/call

(See 6.5.6)

(MSC.434(98), Annex, 3.3.11) *After initiating a false distress alert/call, it shall be possible to send a cancellation of the alert/call. This cancellation alert/call shall not be initiated by cutting the power supply to the ship earth station nor by the operator switching the ship earth station off.*

4.6 Test facilities

(See 6.6)

(MSC.434(98), Annex, 3.4.1) *It shall be possible to test the distress capability of the ship earth station without initiating a distress alert/call.*

4.7 Reception of distress urgency and safety alerts/calls

(See 6.7)

(MSC.434(98), Annex, 3.5.1) *It shall be possible for the ship earth station to receive distress, urgency and safety priority alerts/calls whilst it is being used for communications of a lower priority than that being received.*

(MSC.434(98), Annex, 3.5.3) *For the presentation of received distress and urgency alerts/calls intended as text to be read, the equipment shall include or interface to either:*

- 1) *an integrated printing device; or*
- 2) *a dedicated display device, printer output port and a non-volatile message memory; or*
- 3) *a connection to a navigation system and a non-volatile message memory.*