IEC 63135

Edition 1.0 2018-11

INTERNATIONAL STANDARD

NORME INTERNATIONALE

colour inside

Maritime navigation and radiocommunication equipment and systems – Automatic identification systems (AIS) – SAR airborne equipment – Operational and performance requirements, methods of test and required test results

Matériels et systèmes de navigation et de radiocommunication maritimes – Systèmes d'identification automatique (AIS) – Équipement aéroporté SAR – Exigences d'exploitation et de fonctionnement, méthodes d'essai et résultats d'essai exigés

IEC 63135:2018-11(en-fr)

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

COMMISSION ELECTROTECHNIQUE INTERNATIONALE

ICS 47.020.70

ISBN 978-2-8322-6258-0

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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MARITIME NAVIGATION AND RADIOCOMMUNICATION EQUIPMENT AND SYSTEMS – AUTOMATIC IDENTIFICATION SYSTEMS (AIS) – SAR AIRBORNE EQUIPMENT – OPERATIONAL AND PERFORMANCE REQUIREMENTS, METHODS OF TEST AND REQUIRED TEST RESULTS

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

CDV	Report on voting
80/875/CDV	80/889/RVC

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.

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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MARITIME NAVIGATION AND RADIOCOMMUNICATION EQUIPMENT AND SYSTEMS – AUTOMATIC IDENTIFICATION SYSTEMS (AIS) – SAR AIRBORNE EQUIPMENT – OPERATIONAL AND PERFORMANCE REQUIREMENTS, METHODS OF TEST AND REQUIRED TEST RESULTS

1 Scope

This document specifies the minimum operational and performance requirements, methods of testing and required test results as applicable for automatic identification systems (AIS) VHF data link (VDL) related parts of an AIS SAR airborne station. This document incorporates the applicable technical characteristics of AIS SAR airborne equipment included in Recommendation ITU-R M.1371 and takes into account the ITU Radio Regulations, where applicable.

This document also specifies the minimum requirements for the interfaces to other equipment suitable to be used as means of input and display data.

Attention is drawn on that other requirements specific for airborne equipment can exist and are beyond the scope of this document.

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

ITU-R Recommendation M.1371-5:2014, *Technical characteristics for an automatic identification system using time division multiple access in the VHF maritime mobile frequency band*

ITU-T Recommendation O.153, *Basic parameters for the measurement of error performance at bit rates below the primary rate*

3 Terms, definitions, symbols 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 Symbols and abbreviated terms

For the purpose of this document, the following abbreviated terms apply.

AIS	automatic identification system
AIS-SART	AIS search and rescue transmitter
BITE	built-in test equipment
BT	bandwidth-time
COG	course over ground
CommState	communication state

NOTE 1 Communication state is defined in Recommendation ITU-R M.1371. It is used to organize the slot allocation for SOTDMA or ITDMA.

EPFS	electronic position-fixing systems
EPIRB-AIS	emergency positioning indicting radio beacon AIS
ETA	estimated time of arrival
EUT	equipment under test
FATDMA	fixed access time division multiple access
GMSK	Gaussian minimum shift keying
IMO	International Maritime Organization
ITDMA	incremental time division multiple access
locating device	group of devices including AIS-SART, EPIRB-AIS and MOB-AIS
MAC	medium access control
MMSI	maritime mobile service identity
MOB-AIS	man overboard AIS device
NavStatus	navigational status

NOTE 2 Navigational status is defined in Recommendation ITU-R M.1371. It consists of information that can be input by the ship's crew to indicate whether the ship is underway, moored, etc.

NSS	nominal start slot
NTS	nominal transmission slot
PER	packet error rate
PI	presentation interface
RAIM	receiver autonomous integrity monitoring
RATDMA	random access time division multiple access
RF	radio frequency
SI	selection interval
SOG	speed over ground
SOTDMA	self organizing time division multiple access
UTC	universal time co-ordinated
VDL	VHF data link
VSWR	voltage standing wave ratio
Rx	Receive
Tx	Transmit

4 General requirements

4.1 General

4.1.1 Overview

Requirements contained in Clause 4 are requirements not taken up in other clauses and are verified by observation and inspection of documented evidence.

This document specifies the requirements for the AIS SAR airborne station. The AIS SAR airborne station shall support search and rescue operations involving SAR aircraft.

4.1.2 Capabilities of the AIS

The AIS SAR airborne station shall be capable of providing to ships, and to competent authorities, information from the SAR aircraft, automatically and with the required accuracy and frequency, to facilitate accurate tracking. Transmission of the data shall be with the minimum involvement of personnel.

4.1.3 Transmitter shutdown procedure

An automatic transmitter hardware shutdown procedure and indication shall be provided in case a transmitter continues to transmit for more than 2 s. This shutdown procedure shall be independent of software control.

4.2 Modes of operation

The system shall be capable of operating in a number of modes:

1) an "autonomous and continuous" mode for operation in all areas; this mode shall be capable of being switched to/from one of the following alternate modes by a competent authority;
2) an "assigned" mode for operation in an area subject to a competent authority responsible for traffic monitoring such that the data transmission interval and/or time slots may be set remotely by that authority;
3) a "polling" or controlled mode where the data transfer occurs in response to interrogation from a ship or competent authority;
4) a "receive only" mode where the station does not transmit.

5 Performance requirements

5.1 Composition

The AIS SAR airborne station shall comprise (see Annex A):

1) a communication processor, capable of operating over a range of maritime frequencies, with an appropriate channel selecting and switching method;
2) at least one transmitter and two TDMA receiving processes;
3) a means of processing data from an electronic position-fixing system which provides a resolution of one ten thousandth of a minute of arc and uses the WGS 84 datum; an interface (see 6.6.2) may be provided to input the position used for navigation;
4) a means to automatically input data from other sensors meeting the provisions as specified in 5.5.1 2) may be provided;
5) a means of error checking the transmitted and received data (see Clause 6); and
6) built-in test equipment (BITE) as specified in 5.8.1.

The AIS SAR airborne station shall be capable of:

7) providing information automatically and continuously to other AIS stations, without involvement of personnel;
8) receiving and processing information from other AIS stations;
9) responding to high priority and safety related calls with a minimum of delay;
10) providing positional and manoeuvring information at a data rate adequate to facilitate accurate tracking by a competent authority and other AIS stations (see 5.5.2).

5.2 Time and position

5.2.1 Source for UTC

The AIS shall be provided with an internal GNSS receiver as primary UTC source which is required for synchronisation purposes and for position, COG and SOG.

NOTE UTC includes a provision for leap seconds.

The internal GNSS receiver shall meet appropriate requirements for position accuracy, COG/SOG, acquisition, re-acquisition, receiver sensitivity, RF dynamic range, interference susceptibility, position update, failure warnings, status indications and integrity flag.

If an external source of UTC is provided, it shall fulfil the requirement for synchronization timing.

If date and time is not available and Message 4 or 11 is being received, the unit shall use date and time from that message, and the seconds shall be omitted.

5.2.2 Source for AIS position reporting

The source for position reporting may vary depending on the conditions specified in 5.8.3.4.

When the external position is unavailable, the internal GNSS receiver shall be used as a source for AIS position reporting.

When the internal GNSS receiver is performing as a source for AIS position reporting, an appropriate BITE indication shall be output on the presentation interface (see 5.8.1).

The internal GNSS receiver may be capable of being differentially corrected.

Where DGNSS corrections are received from multiple sources, the DGNSS corrections from the nearest DGNSS reference station should be used taking into account the Z count, and the health of the DGNSS reference station.

5.3 User interface

To enable a user to access, select and display the information on a separate system, the AIS SAR airborne station shall be provided with an interface conforming to an appropriate international interface standard.

All interfacing shall be made via the system interface as described in 6.6 (called the "presentation interface").

5.4 Identification

(See 11.1)

For the purpose of station and message identification, the appropriate Maritime Mobile Service Identity (MMSI) shall be used.

The unit shall be supplied with a default MMSI of "000000000" (this is not a valid MMSI).

The unit shall check that any programmed MMSI is between 111200000 and 111799999, otherwise the unit shall reject the programming and be not capable of transmitting. However, a reset to the default value "000000000" shall be accepted, but the unit shall not be capable to transmit with this MMSI.

5.5 Information

(See 11.2)

5.5.1 Information provided by the AIS SAR airborne station

The information provided by the AIS SAR airborne station shall include:

1) Static:
   - MMSI;
   - call sign and name;
   - location of the in use position-fixing antenna on the aircraft if an external position input is implemented.

   Static information, voyage related information and the MMSI shall be stored in non-volatile memory.
2) Dynamic:
   - position of aircraft referenced to WGS 84 datum with accuracy indication and integrity status;
   - time in UTC, the date is established by the receiving equipment;
   - course over ground (COG);
   - speed over ground (SOG);
   - altitude of aircraft, including source.
3) Voyage related:
   - optional destination and estimated time of arrival (ETA).
4) Short safety-related messages.

5.5.2 Information reporting intervals

The different information types are valid for a different time period and thus need a different reporting interval.

Static information:	Every 6 min, when data has been amended, and on request.
Dynamic Information:	Every 10 s.
Voyage related information:	Every 6 min, when data has been amended, and on request.
Safety-related message:	As required.

NOTE An SSD or VSD sentence that does not amend the data does not generate a transmission of Message 24 A or Message 5.

The manufacturer can specify further reporting intervals of dynamic information. In this case, the reporting interval in use is set by configuration.

If the autonomous mode requires a shorter reporting interval than the assigned mode, the AIS shall use the autonomous mode reporting interval.

When transmitting on a single channel, the reporting interval shall be maintained by doubling the number of transmissions on the active channel.