

INTERNATIONAL STANDARD



**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**

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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

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This commented version (CMV) of the official standard IEC 62288:2021 edition 3.0 allows the user to identify the changes made to the previous IEC 62288:2014 edition 2.0. Furthermore, comments from IEC TC 80 experts are provided to explain the reasons of the most relevant changes.

A vertical bar appears in the margin wherever a change has been made. Additions are in green text, deletions are in strikethrough red text. Experts' comments are identified by a blue-background number. Mouse over a number to display a pop-up note with the comment.

This publication contains the CMV and the official standard. The full list of comments is available at the end of the CMV.

IEC 62288 has been prepared by IEC technical committee 80: Maritime navigation and radiocommunication equipment and systems. It is an International Standard.

This third edition cancels and replaces the second edition published in 2014. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

- a) Clause 4 has been revised to remove requirements for indications of alerts which are now given in IEC 62923-1;
- b) Clause 5 has been extensively revised to add new requirements for AIS, ASM and DSC presentation together with three new supporting annexes, Annex J, Annex K, Annex L;
- c) Annex A and Annex B have been revised to incorporate changes to IMO circular SN.1/Circ.243;
- d) Annex E has been revised to incorporate changes to IMO resolution MSC.191(79) and renamed as "Operational controls and logical grouping".
- e) two new annexes have been added, Annex H on operator actions and Annex I on default settings in support of IMO circular MSC.1/Circ.1609.

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

Draft	Report on voting
80/1013/FDIS	80/1017/RVD

Full information on the voting for its approval can be found in the report on voting indicated in the above table.

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/standardsdev/publications.

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

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

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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

1 Scope

This document specifies the general requirements, methods of testing, and required test results, for the presentation of navigation-related information on shipborne navigational displays in support of IMO resolutions MSC.191(79) as amended by MSC.466(101) in June 2019, and where applicable MSC.302(87). **1**

This document also supports the guidelines included in the related IMO Circulars MSC.1/Circ.1609 on the standardization of user interface design for navigation equipment and SN.1/Circ.243 as revised in June 2019 on the presentation of navigation related symbols, terms and abbreviations. **1**

This document also specifies the presentation of AIS data reports and the AIS Application Specific Messages defined for international use in IMO SN.1/Circ.289 and intended to be received by a ship for display onboard. **2**

NOTE All text in this document whose wording is identical to text contained in an IMO document is printed in *italics*. Reference to the document is noted at the beginning of the paragraph. The notation contains a prefix referring to the document and a suffix with the paragraph number from the document (for example, (MSC191/1); (SN243/1), etc.).

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 60945:2002, *Maritime navigation and radiocommunication equipment and systems – General requirements – Methods of testing and required test results*

IEC 61174, *Maritime navigation and radiocommunication equipment and systems – Electronic chart display and information system (ECDIS) – Operational and performance requirements, methods of testing and required test results*

IEC 61966-4, *Multimedia systems and equipment – Colour measurement and management – Part 4: Equipment using liquid crystal display panels*

~~IEC 62065, *Maritime navigation and radiocommunication equipment and systems – Track control systems – Operational and performance requirements, methods of testing and required test results*~~

IEC 62388, *Maritime navigation and radiocommunication equipment and systems – Shipborne radar – Performance 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*

IHO S-52, *Specifications for chart content and display aspects of ECDIS*

~~IMO S-52 Annex A, IHO ECDIS presentation library~~ **3**

IMO, Seafarers' Training, Certification and Watchkeeping Code (STCW Code)

IMO A.694(17):1991, *General requirements for shipborne radio equipment forming part of the global maritime distress and safety system (GMDSS) and for electronic navigational aids*

IMO MSC.191(79):2004, *Performance standards for the presentation of navigation related information on shipborne navigational displays*

IMO MSC.192(79):2004, *Performance standards for radar equipment*

IMO MSC.232(82):2006, *Revised performance standards for electronic chart display and information systems (ECDIS)*

IMO SN.1/Circ.243/~~Rev.1:2014~~Rev.2:2019+Corr.1, *Guidelines for the presentation of navigation related symbols, terms and abbreviations*

~~IMO MSC.252(83):2007, Performance standards for integrated navigation systems (INS)~~

IMO SN.1/Circ.289:2010, *Guidance on the use of AIS application-specific messages*

IMO MSC.302(87):2010, *Performance standards for bridge alert management (BAM)*

IMO MSC.1/Circ.1609:2019, *Guidelines for the standardization of user interface design for navigation equipment*

IMO A.1021(26):2009, *Code on Alerts and Indications*

VESA-2001-6, *Flat Panel Display Measurements (FPDM)*

3 Terms, definitions and abbreviated terms

For the purposes of this document, the following terms, definitions and abbreviated terms apply.

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>

3.1 Terms and definitions

3.1.1

activated AIS target

(MSC191/A) target ~~activated~~ *representing the automatic or manual activation of a sleeping target* **4** *for the display of additional graphically presented information*

~~EXAMPLE — Heading line, velocity vector, etc.~~

3.1.2

automatic identification system

AIS

system which complies with the requirements set forth in Annex 3 of IMO Resolution MSC.74(69)

3.1.3 5**AIS Application Specific Message****AIS ASM**

AIS Messages 6, 8, 25 or 26, excluding AIS synthetic targets

Note 1 to entry: This document specifically addresses only AIS ASM defined for international use in IMO SN.1/Circ.289 and that are intended to be received by a ship for display onboard. Various Administrations have implemented application specific messages not defined in IMO SN.1/Circ.289, but are catalogued by IALA at <https://www.iala-aism.org/asm/> which, if appropriate, may be displayed using the same symbols and rules in this document.

Note 2 to entry: See Annex J.

3.1.4 5**AIS ASM object**

information constructed from one or more AIS ASMs

Note 1 to entry: See Annex J.

3.1.5 5**AIS data report**

information derived from AIS Aids to Navigation (AtoN), AIS SAR Aircraft and AIS Base Stations reports

Note 1 to entry: See Annex J.

3.1.6 5**AIS locating devices**

AIS-SART, EPIRB-AIS and AIS MOB stations that transmit AIS Messages 1 and 14 using the burst transmissions as described in ITU-R M.1374

Note 1 to entry: AIS MOB means information derived from a DSC Class M device capable of reporting using AIS burst transmissions.

3.1.7 5**AIS safety related messages**

AIS Messages 12 or 14

3.1.8 5**AIS synthetic target**

object generated from an AIS Message 6, 8, 25 or 26 when FI=17 VTS-generated/synthetic target; or when FI=22 or FI=23 Area Notice with "Sub-areas" set to "0" circle or point and "Area shape" set to "0" and "Radius" set to "0" and "Notice Description" set to a value in range from 64 to 74

Note 1 to entry: AIS Synthetic targets are generated by shore-based information systems (for example VTS) and transmitted through AIS base stations.

Note 2 to entry: "Notice Description" set to a value in the range from 64 to 73 represents vessel distress situations and set to a value 74 represents person distress situation. These messages may or may not have an associated GMDSS Distress Alert.

3.1.9 5**AIS target****reported AIS target**

(MSC191/A) *target generated from an AIS position report message from a ship, vessel or craft, based on AIS Message 1, 2, 3 or 18*

Note 1 to entry: The MMSI number within AIS Messages 1, 2, 3 or 18 identifies the source as a ship, vessel or craft in accordance with ITU-R M.585-8:2019, Annex 1, Sections 1 and 5.

Note 2 to entry: AIS Class A uses Messages 1, 2 and 3. AIS Class B uses Message 18.

3.1.10

alarm

(MSC.302/A) *condition requiring immediate attention and action by the bridge team, to maintain the safe navigation of the ship*

Note 1 to entry: An alarm is a *high-priority alert*.

3.1.11

alert

(MSC.302/A) *announcement of abnormal situations and conditions requiring attention.*

Note 1 to entry: Alerts are divided in four priorities: emergency alarms, alarms, warnings and cautions. An alert provides information about a defined state change in connection with information about how to announce this event in a defined way to the system and the operator.

3.1.12

associated target

(MSC191/A) *target simultaneously representing a tracked radar target and a reported AIS target having similar parameters (for example, position, course, speed, etc.) and which comply with an association algorithm*

3.1.13

brilliance

adjustment of luminance of a display for ambient light

EXAMPLE Control of backlight for LCD (liquid crystal display).

3.1.14

caution

(MSC.302/A) *awareness of a condition which does not warrant an alarm or warning condition, but still requires attention out of the ordinary consideration of the situation or of given information*

Note 1 to entry: A caution is the *lowest priority of an alert*.

3.1.15

consistent common reference point

CCRP

(MSC191/A) *location on own ship, to which all horizontal measurements such as own ship position, heading, and target range, bearing, relative course, relative speed, closest point of approach (CPA) or time to closest point of approach (TCPA) are referenced, typically the conning position of the ship*

Note 1 to entry: An alternative location (or multiple locations) may be used, as necessary, where clearly indicated or distinctively obvious, for example, the origin of the reference axis of the ship.

3.1.16

composite presentation

integrated presentation that is derived from the simultaneous display of information from two or more navigational systems or from other pieces of equipment

3.1.17

dangerous target

(MSC191/A) *tracked radar or reported AIS target with a predicted CPA and TCPA that violates values preset by the user*

Note 1 to entry: The respective target is marked by a "dangerous target" symbol.

3.1.18**dead reckoned position****DR**

position extrapolated from the last accepted position update, based on present course and speed, and updated on a time interval ~~selected by the operator~~ **6**

3.1.19**display base**

(MSC191/A) *level of information which cannot be removed from the ECDIS display, consisting of information which is required at all times in all geographic areas and all circumstances*

Note 1 to entry: It is not intended to be sufficient for safe navigation.

3.1.20**display equipment**

device capable of representing information visually

3.1.21**doubtful integrity**

state when integrity cannot be verified

3.1.22 7**DSC received call**

information generated from a received DSC message

Note 1 to entry: DSC received call may be available from all DSC compliant equipment classes which are able to provide information through a standardized interface.

3.1.23**electronic chart display and information system****ECDIS**

system which complies with the requirements set forth in IMO Resolution MSC.232(82)

3.1.24**electronic chart information**

~~one or more~~ electronic chart database(s)

EXAMPLE ENC.

3.1.25**electronic navigational chart****ENC**

(MSC191/A) *database standardised as to content, structure and format according to IHO S-57 and its Appendix B.1 and issued by, or on the authority of, a Government*

3.1.26**emergency alarm**

(MSC.302/A) *alarms which indicate immediate danger to human life or to the ship and its machinery exists and require immediate action*

Note 1 to entry: An emergency alarm is the *highest priority of an alert*.

3.1.27**estimated position****EP**

position extrapolated from the last accepted position update, based on present course and speed (STW), including effects of wind, tide, current, and updated on a time interval ~~selected by the operator~~

3.1.28

fix

position of own ship determined, without reference to any former position, ~~by the common intersection of two or more LOPs~~

3.1.29

heading

(MSC191/A) horizontal *direction in which the bow of a ship is actually pointing* at any instant, expressed as an angular displacement from north

3.1.30

icon

graphical symbol with a particular meaning used to convey information independent of language

Note 1 to entry: Icons may be used for visual identification or reinforcement of a textual description, to invoke a function, or to open an object when selected with the cursor.

3.1.31

important indication

(MSC191/A) *marking of an operational status of displayed information which needs special attention, for example, information with low integrity or invalid information*

Note 1 to entry: The important indication is not part of alert classification.

3.1.32

indication

display of regular information and conditions, not part of alert management

3.1.33

integrated navigation system

INS

system which complies with the requirements set forth in IMO Resolution MSC.252(83) ~~as amended by IMO Resolution MSC.452(99)~~ **8**

3.1.34

integrity

property of information as being within the specified accuracy in a timely, complete and unambiguous manner

3.1.35

line of position

LOP

plotted line on which own ship is located determined by observation or measurement of the range or bearing to an aid to navigation or other charted element

3.1.36

lost target

(MSC191/A) tracked radar or reported ~~AIS~~ target for which the system is no longer receiving valid position data

Note 1 to entry: The target is *represented* by a "lost target" symbol.

3.1.37 **9**

maritime safety information

MSI

(SOLAS IV/2) *navigational and meteorological warnings, meteorological forecasts and other urgent safety-related messages broadcast to ships*

Note 1 to entry: MSI is promulgated using NAVTEX and EGC services (see IMO MSC.468(101)).

3.1.38**menu**

area of the display that is allocated to a structured list of options for the selection and entry of operational parameters, data and commands

3.1.39**multifunction display**

single visual display unit that can present, either simultaneously or through a series of selectable pages, information from multiple systems or equipment

Note 1 to entry: A multifunction display may typically be part of an INS (for example, providing dedicated presentation modes conforming to both radar and ECDIS presentation requirements), and may replace their individual display units.

3.1.40**operational display area**

(MSC191/A) *area of the display used to graphically present electronic chart and/or radar information, excluding the user dialogue area*

Note 1 to entry: On the chart display this is the area of the chart presentation. On the radar display this is the area encompassing the radar video image.

3.1.41**past positions**

(MSC191/A) *time-spaced marks on the past track of own ship, or a tracked radar or reported AIS target*

3.1.42**permanent**

property of information as existing for a long time (or forever) without change

3.1.43**persistent**

property of information as existing continuously

3.1.44**radar**

system which complies with the requirements set forth in IMO Resolution MSC.192(79)

3.1.45**radar echo**

returned radar signal (i.e. "paint") appearing in the radar video image

3.1.46**radar video image**

set of displayed information constructed from radar echoes processed, for example by anti-clutter means and other tools

Note 1 to entry: ~~For example, scan-to-scan correlation.~~

3.1.47**readily available**

~~property of~~ <information-as-being> directly accessible

Note 1 to entry: For example, in a top-level menu, from a screen function, or an icon, etc.

3.1.48**selected target**

(MSC191/A) *target selected manually or automatically for the display of detailed alphanumeric data, information and text in a separate user dialogue area*

Note 1 to entry: The target is represented by a "selected target" symbol.

3.1.49

simple operator action

(MSC252/A1) *procedure achieved by no more than two hard-key or soft-key actions, excluding any necessary cursor movements, or voice actuation using programmed codes or equivalent alternative means*

3.1.50

single operator action

(MSC252/A1) *procedure achieved by no more than one hard-key or soft-key action, excluding any necessary cursor movements, or voice actuation using programmed codes*

3.1.51

sleeping AIS target

(MSC191/A) *AIS target indicating the presence of a vessel equipped with AIS in a certain location*

Note 1 to entry: The target is represented by a "sleeping target" symbol indicating the vessel's orientation. No additional information is presented until the AIS target is activated.

3.1.52

standard display

(MSC191/A) *level of information that should be shown when a chart is first displayed on ECDIS*

Note 1 to entry: The level of the information it provides for route planning or route monitoring may be modified by the user according to the user's needs.

3.1.53

target tracking system

system which complies with the requirements set forth in IMO Resolution MSC.192(79)

3.1.54

task-at-hand

specific navigation-related activity performed by a user

Note 1 to entry: EXAMPLE Route planning, route monitoring, target tracking, collision avoidance, etc.

3.1.55

tracked radar target

object, fixed or moving, which is tracked by a radar or target tracking function

3.1.56

trial manoeuvre

(MSC191/A) *facility used to assist the user to perform a simulated manoeuvre for navigation and collision avoidance purposes, by displaying the predicted future status of all tracked radar and reported AIS targets as a result of the simulated manoeuvres*

3.1.57

user-added electronic chart information

electronic chart information manually entered by the user for presentation

Note 1 to entry: EXAMPLE Navigational notes, safety zones of interest, local notices to mariners, etc.

3.1.58

user-configured presentation

(MSC191/A) *auxiliary presentation configured by the user for a specific task-at-hand*

Note 1 to entry: The presentation may include radar and/or electronic chart information, in combination with other navigational or ship related data.

3.1.59**user dialogue area**

(MSC191/A) *area of the display consisting of data fields and/or menus that is allocated to the interactive presentation and entry or selection of operational parameters, data, information, text and commands mainly in alphanumeric form*

3.1.60**validity**

property of information as conforming to specified criteria, and the marking of such information as being "valid" or "invalid" (i.e. "good" or "no good") for its intended use

3.1.61**warning**

(MSC.302/A) *alert for condition requiring immediate attention, but no immediate action by the bridge team*

Note 1 to entry: Warnings are presented for precautionary reasons to make the bridge team aware of changed conditions which are not immediately hazardous, but may become so if no action is taken.

3.2 Abbreviated terms

DAC designated area code

FI function identifier

MID maritime identity digits

VTS vessel traffic services

4 General requirements for all displays on the bridge of a ship**4.1 Relationship to IMO standards**

(MSC191/1) IMO resolution MSC.191(79) *harmonizes the requirements for the presentation of navigation-related information on the bridge of a ship to ensure that all navigational displays adopt a consistent human machine interface philosophy and implementation.*

(MSC191/1) IMO resolution MSC.191(79) *supplements and, in the case of a conflict, takes priority over, the presentation requirements of the individual performance standards adopted by the IMO for relevant navigational systems and equipment and covers the presentation of navigation-related information by equipment for which Performance Standards have not been adopted by the IMO.*

This document supplements and, in the case of a conflict, takes priority over, the presentation requirements of the individual testing standards for relevant navigational systems and equipment and covers the presentation of navigation-related information by equipment for which testing standards are not available.

NOTE 1 Individual testing standards are, for example, standards for specific equipment published by IEC or ISO. An example of equipment without a testing standard at the time of publishing of this document is navigation lights control. **10**

(MSC302/3.6) *In case of conflict with alert requirements of existing performance standards, the present Performance standards (MSC.302(87)) will take precedence.*

NOTE 2 In case of conflict for alert presentation related issues, the priority of IMO performance standards is from the highest MSC.302(87), MSC.252(83), MSC.191(79), after which all performance standards are equal.

(MSC191/2) IMO resolution MSC.191(79) *as amended by IMO resolution MSC.466(101) specifies the presentation of navigational information on the bridge of a ship, including the consistent use of navigational terms, abbreviations, colours and symbols, as well as other presentation characteristics.*

(MSC191/2) IMO resolution MSC.191(79) *also addresses the presentation of information related to specific navigational tasks by recognising user selected presentations in addition to presentations required by the relevant individual performance standards adopted by the IMO.*

This document further addresses the guidelines for the presentation of navigation-related symbols, terms and abbreviations in Safety of Navigation circular SN/Circ.243.

(MSC191/3) This document *is applicable to any display equipment associated with the navigational systems and equipment for which individual performance standards have been adopted by the IMO.* It addresses the stand-alone displays for radar, ECDIS, multifunction displays and composite presentations that integrate information derived from two or more systems. This document *also addresses display equipment associated with navigational systems and equipment for which individual performance standards have not been adopted by the IMO.*

(MSC191/3) *The general principles and the physical characteristics specified in Clause 4 and Clause 7, respectively, of this document are applicable to all displays on the bridge of a ship.*

Some requirements set forth in MSC.191(79) duplicate requirements set forth in other IMO documents or in the IEC standards further specifying the methods of test and required test results for those requirements (for example, IEC 60945, IEC 61174, IEC 61993-2, IEC 62388, etc.). Where ~~a requirement in~~ this document duplicates a requirement in another standard, the method(s) of test for that requirement may refer to the other standard. Manufacturers may offer relevant test data from compliance tests to other standards as evidence of compliance with appropriate tests of this document.

AIS messages are defined in ITU-R M.1371. The IMO performance standards for Presentation and Radar use the term "AIS targets" and "reported targets" for targets received by AIS messages and use the term "AIS information" for information related to these AIS targets.

NOTE 3 The word "target" as used in "radar target", "AIS target" and "reported target" derives from the original development of radar for gunnery control.

The IMO performance standards for Integrated Navigation System (INS) refers to the following types of AIS messages:

- AIS targets;
- AIS reports of AtoNs;
- AIS safety related and binary messages;
- Application Specific Messages (ASM).

This document refers to the following types of AIS messages (see Annex K):

- AIS targets;
- AIS data reports;
- AIS locating devices;
- AIS synthetic targets;
- AIS safety related messages;
- AIS ASM.

This document uses the following terms for the concept that IMO refers to as "AIS targets" and "reported targets":

- AIS targets;
- AIS data reports;
- AIS locating devices;

- AIS synthetic targets.

IMO use the term "AIS report of AtoNs" for the concept referred to as:

- "AIS AtoNs" in this document.

NOTE Additional technical guidance on AIS ASM can be found in IMO SN.1/Circ.289.

The additional guidance on display and dialogue design in IMO MSC/Circ.982 is referenced in Annex C. **5**

4.2 Application of IEC 60945

4.2.1 Remark

If display equipment is permitted to be monochrome, then the colour-related requirements specified in 4.5.1, 4.7.1, 4.7.2, 4.7.3 and 4.8.2 will not apply.

4.2.2 General requirements

4.2.2.1 Requirement

(MSC191/3) *In addition to the general requirements set forth in IMO Resolution A.694(17) and further specified in IEC 60945, display equipment shall meet the requirements set forth in IMO Resolution MSC.191(79) and further specified in this document, as applicable.*

4.2.2.2 Methods of test and required results

See Annex D for guidance in the application of IEC 60945 for testing.

4.3 Arrangement of information

4.3.1 Consistency of layout and logical grouping

4.3.1.1 Requirement

(MSC191/5.1.1 *as amended by MSC.466*) *The presentation of information shall be consistent within the user interface with respect to screen layout and arrangement of information, for example, with respect to concepts, terminology, labelling and interaction paradigms used across the application and from screen to screen and/or from page to page. Data and control functions shall be logically grouped according to their function or the task-at-hand, see Annex E. Clause E.2 defines groups of related navigational information. Priority information essential to the task-at-hand shall be identified for each application (for example, radar, ECDIS, etc.), permanently or persistently displayed, as appropriate for the application, and presented to the user in a prominent manner by, for example, use of position (for example, screen location), size and colour.*

(MSC/Circ.1609/Appendix 3/1) *Clause E.2 defines groups of related navigational information that shall be displayed together on the user interface, to enable the user to quickly locate and react to essential navigation information, if available on the screen. Logical grouping in Clause E.2 applies to radar equipment, ECDIS and minimum INS functions. Logical grouping in Clause E.2 may be applied to other electronic navigation equipment and navigation sensors where applicable, to improve standardization and usability.*

(MSC/Circ.1609/Appendix 3/2) *Clause E.2 does not specify where the groups of information should appear on the screen, or the order in which the individual information elements should be grouped. The groups of related navigational information presented on the user interface are not limited to the information listed in Clause E.2. The groups in Clause E.2 may be extended by associated information. These groupings apply to both mandatory and non-mandatory information. Within an individual group, it is not required to display all information, only to group it, if displayed.* **11**

4.3.1.2 Methods of test and required results

The methods of test and the required results are as follows:

- a) confirm by analytical evaluation that the arrangement, logical grouping, operation and identification of controls, screen displays and indications are in accordance with Annex E and IEC 60945:2002, 4.2.1.2 through 4.2.1.5;
- b) confirm by analytical evaluation that the concepts, terminology, labelling and interaction paradigms, screen layout and arrangement of information is consistent from screen to screen and/or page to page;
- c) confirm by analytical evaluation that priority information essential to the task-at-hand is identified and permanently or persistently displayed in a prominent manner, as appropriate, for each application.

4.3.2 Consistent presentation of information

4.3.2.1 Requirement

(MSC191/5.1.2) *The presentation of information shall be consistent with respect to:*

- numerical *values* (for example, position, speed, distance, time, etc.);
- *units*;
- *meaning* of information (for example, using the terms and abbreviations in Annex B);
- *sources* of information (for example, using the terms and abbreviations in Annex B);
- *validity* of information (see also 4.8.1 and 4.8.2); and
- *integrity* of information, if available (see also 4.8.1 and 4.8.2).

(See also IEC 60945:2002, 4.2.1.5)

4.3.2.2 Methods of test and required results

Confirm by observation that numerical values and their units, the meaning and source(s) of information, and the validity and integrity of information are presented in a consistent manner.

4.3.3 Separation of operational display area

4.3.3.1 Requirement

(MSC191/5.1.3) *The presentation of information shall be clearly separated into one or more operational display areas (for example radar, chart) and one or more user dialogue areas (for example, menus, data, control functions).*

4.3.3.2 Methods of test and required results

Confirm by observation that the presentation is clearly separated into one or more operational display areas and one or more user dialogue areas.

4.4 Readability

4.4.1 Readability under all ambient light conditions

4.4.1.1 Requirement

(MSC191/5.2.1) *The presentation of alphanumeric data, text, symbols and other graphical information (for example, chart information, radar echoes or a radar video image, etc.) shall support readability from typical user positions (i.e. with respect to reading distance) under all ambient light conditions likely to be experienced on the bridge of a ship (for example, day, dusk and night), and with due consideration to the night vision of the officer of the watch. (See also 4.5.1 and 7.2.1)*

Table 1 characterizes light levels for the ambient light conditions day, dusk and night.

Table 1 – Ambient light conditions

Ambient condition	Light level
Day	200 cd/m ² ± 50 %
Dusk	10 cd/m ² ± 50 %
Night	Darkness (i.e. where the display is the predominant light source)

NOTE 1 Natural daylight is preferred for the day and dusk conditions.

NOTE 2 The adjustment of the appropriate ambient light conditions for calibrated monitors, for example to display charted information, is described in G.1.3 d). 12

NOTE 1 It is possible the white background used in the "Day" colour table provided in the IHO ECDIS Presentation Library ~~uses a white background that may does~~ not support readability under all light conditions and ~~may be is~~ a risk to safety of navigation for some navigational systems and equipment, including radar. Readability ~~may can~~ be achieved by using the black background in the "Dusk" or "Night" colour tables provided in the IHO ECDIS Presentation Library and adjusting brightness and contrast, if provided, for use under all light conditions.

Display equipment shall provide a luminance of at least 85 cd/m² measured at the centre of the display when set to the maximum brightness setting. The white luminance level of the display shall be adjustable down to 1 cd/m² ± 20 % and may be extinguishable below that point.

If provided, dimming below 0,8 cd/m² as white level shall continue to ensure readability of alerts (alarms, warnings and cautions) while readability of all other items is not required.

NOTE 2 General requirements for illumination are described in IEC 60945.

Transflective and reflective displays shall provide adjustable self-illumination suitable for all ambient light conditions likely to be experienced on the bridge of a ship (day, dusk and night) and with due consideration to the night vision of the officer of the watch. It shall be adjustable to produce display luminance at least from 1 cd/m² to 5 cd/m² under night conditions.

The luminance across the operational display area shall not have a variance of more than 30 % from the brightest point to the dimmest point.

NOTE 3 Variance is determined by the equation:

$$1 - \left(\frac{L_{\min}}{L_{\max}} \right)$$

where

$L_{\min}$ is the minimum luminance;

$L_{\max}$ is the maximum luminance measured across the operational display area, or the entire screen depending on the application.

It shall be possible to display alphanumeric data, text, symbols (see 4.6) and other graphical information using a lighter foreground (for instance character, symbol, etc.) against a dark background of high contrast, emitting as little light as possible at night. The brightest elements of the presentation shall be restricted to points and thin lines.

If display equipment is intended to present symbols for charted information (see 4.6.2), it shall provide a means or method for the user to verify that the colour black is visually distinguishable against a background set to dark grey and vice-versa.

NOTE 4 The IHO ECDIS Presentation Library provides "black-adjust" symbols BKAJ1 and BKAJ2, for the colours black and grey, respectively.

If display equipment is not intended to present symbols for charted information (see 4.6.2), it shall maintain that any colours used are visually distinguishable against the background.

NOTE 5 Visually distinguishable is at least luminance ratio 1:2 when using instrumental verification.

It is important to avoid affecting the night vision of the officer of the watch by excessive glow from displays on the bridge at night. The display shall be capable of providing a contrast of 100:1 between the 1 cd/m² white level and the black background.

NOTE 6 The white level can be created using a standardized method (i.e. RGB values or the CIE 1931 colour coordinates (x, y and L) for white) specified by the manufacturer or, if no manufacturer specification is available, using the RGB values 255, 255, 255. 13

4.4.1.2 Methods of test and required results

Set up the display equipment for measurements of luminance, contrast and colour according to the guidelines of IEC 61966-4 or the VESA Flat Panel Display Measurement (FPDM), see VESA-2001-6. Before measurements are taken, power up the display equipment and allow it to stabilize for the period of time specified by the manufacturer, as follows.

- a) Confirm by observation at the manufacturer's recommended viewing distance that alphanumeric data, text, symbols and other graphical information including alerts are readable under the ambient light conditions described in Table 1.
- b) For direct view displays (for example CRT (cathode ray tube), LCD (liquid crystal display) with backlight, etc.), confirm by measurement using a test image with a white square at the centre of the operational display area (to be provided by the manufacturer) that the brightness can be varied from a minimum level of at most 1 cd/m² ± 20 % to a maximum level of at least 85 cd/m² measured under dark condition. Confirm by measurement that the values for brightness used for the setup are stable after the stabilisation period defined by the manufacturer. Confirm by measurement in the night ambient condition that the contrast ratio between the 1 cd/m² white level and the black background is 100:1, minimum.
- c) For transflective and reflective displays, confirm by measurement using a test image with a white square at the centre of the operational display area (to be provided by the manufacturer) that the brightness can be adjustable at least from 1 cd/m² to 5 cd/m² under conditions of night ambient illumination to a maximum level of at least 85 cd/m² under conditions of daylight ambient illumination. Confirm by measurement that the values for brightness used for the setup are stable after the stabilisation period defined by the manufacturer. Confirm by measurement in the night ambient condition that the contrast ratio between the 1 cd/m² white level and the black background is 100:1, minimum. The ambient illumination levels shall be as specified in Table 1.

NOTE This test image is not generated internally by the display equipment.

- d) Confirm by observation that alphanumeric data, text, symbols and other graphical information including alerts can be presented using a lighter foreground against a dark background.
- e) Confirm by measurement that, when the display equipment is set to maximum brightness, the luminance does not vary across the operational display area by more than 30 % from the brightest point to the dimmest point.
- f) Confirm by observation that the brightest elements of the presentation in the night ambient light condition described in Table 1 are points and thin lines.
- g) Where display equipment is intended to present symbols for charted information, confirm by observation for each ambient light condition that the user can verify that the colour black is visually distinguishable against a background set to dark grey, and vice-versa.
- h) Where display equipment is not intended to present symbols for charted information, confirm by observation for each ambient light condition that any colours used are visually distinguishable against background.

- i) If dimming below 0,8 cd/m² as white level is provided, then confirm by observation after 10 min adaptation period to night ambient light condition by the observer that at least the alerts (alarms, warnings, cautions) are readable and different alert levels are distinguishable from each other.

4.4.2 Legibility of alphanumeric data and text

4.4.2.1 Requirement

(MSC191/5.2.2) *Alphanumeric data and text shall be presented using a clearly legible non-italic, sans-serif font. The font size shall be appropriate for the viewing distance from user positions (i.e. with respect to reading distance and viewing angles) likely to be experienced on the bridge of a ship.*

The character height in millimetres shall be not less than 3,5 times the nominal viewing distance in metres. The manufacturer's documentation shall identify the nominal viewing distance for the display equipment.

4.4.2.2 Methods of test and required results

The methods of test and the required results are as follows:

- a) confirm by observation that alphanumeric data and text is presented using non-italic, sans-serif font;
- b) confirm by measurement that the character height (i.e. the distance between the top and bottom edges of the smallest capital letter used in the presentation) in millimetres is not less than 3,5 times the nominal viewing distance in metres;
- c) confirm by inspection of manufacturer's documentation that the nominal viewing distance for the display equipment is identified in the manufacturer's documentation. 14

4.4.3 Presentation of text and icons

4.4.3.1 Requirement

(MSC191/5.2.3 as amended by MSC.466) *Text shall be presented using simple unambiguous language that is easy to understand (for example, standard marine terminology or text that provides clear meaning by its context). Navigational terms and abbreviations shall be presented using the nomenclature set forth in Annex B and Clause E.3.*

(MSC191/5.2.4 as amended by MSC.466) *When icons are used, their purpose shall be intuitively recognized by appearance, placement, and grouping as defined in Clause E.3.*

Circ.1609/Appendix 2 and Clause E.3 identify commonly-used functions on navigation equipment and for each function specifies the associated terminology, abbreviation and (where appropriate) icons to achieve consistency of presentation across navigation equipment.

For the functions listed in Clause E.3, the following applies.

- a) (Circ.1609/Appendix 2/2) *Where icons, terms and/or abbreviations are used, they shall meet the requirements of Clause E.3. Where a standard term, abbreviation, or icon is not available, another icon, term or abbreviation may be used, but these shall not conflict with those listed in Clause E.3.*
- b) (Circ.1609/Appendix 2/3) *The icons specified may indicate a status, may execute a specific function (hot key), or may provide access to a group of related functions (shortcut).*
- c) (Circ.1609/Appendix 2/4) *Only the shape of the icon is specified; Clause E.3 does not specify a colour scheme for icons, except for the icons depicted in colour in Table E.6 which shall follow the IHO colour scheme or similar.*

- d) (Circ.1609/Appendix 2/5) *Where appropriate and practical, a brief explanation of the purpose of an icon shall be easily obtainable by the user. This functionality shall be able to be turned off easily by the user.*

Icons used for the presentation of alerts shall be presented according to Annex F. **11**

4.4.3.2 Methods of test and required results

The methods of test and the required results for text are as follows:

- a) confirm by analytical evaluation that text is presented using simple unambiguous language;
- b) confirm by observation that navigational terms and abbreviations are presented using the nomenclature in Annex B and in Clause E.3;
- c) confirm by inspection of documented evidence that other terminology or abbreviations, if used, are explained in the operator's manual and do not conflict with those listed in Clause E.3.

The methods of test and the required results for icons are as follows:

- d) for icons not specified in Clause E.3 or Annex F, confirm by analytical evaluation that icons and their purpose can be intuitively recognized by appearance, placement, and grouping and that these icons do not conflict with those in Clause E.3;
- e) confirm by observation that shape of icons used for data and control function are presented according to Clause E.3;
- f) confirm by observation that colours of icons specified in Table E.6 follows the IHO colour scheme or similar;
- g) confirm by observation that icons used for the presentation of alerts are presented according to Annex F (see also 5.6.1.2). **11**

4.4.4 Icons

4.4.4.1 Requirement

~~(MSC191/5.2.4) When icons are used, their purpose shall be intuitively recognized by appearance, placement, and grouping. (See also ISO 80416-4).~~

~~Icons used for data and control functions shall be presented according to Annex E. Icons used for the presentation of alerts shall be presented according to Annex F.~~

4.4.4.2 Methods of test and required results

~~The methods of test and the required results are as follows:~~

- ~~a) confirm by analytical evaluation that icons and their purpose can be intuitively recognized by appearance, placement, and grouping;~~
- ~~b) confirm by observation that icons used for data and control function are presented according to Annex E;~~
- ~~c) confirm by observation that icons used for the presentation of alerts are presented according to Annex F (see also 5.6.1.2).~~

4.5 Colours and intensity

4.5.1 Discrimination of colours – Requirement

(MSC191/5.3.1) *The colours used for the presentation of alphanumeric data, text, symbols and other graphical information shall provide sufficient contrast for discrimination and identification against the background under all ambient light conditions likely to be experienced on the bridge of a ship (for example, day, dusk and night) and with due consideration to the night vision of the officer of the watch.*

(MSC191/5.3.2) *The colours and brightness shall take into account the ambient light conditions of day, dusk and night. The presentation shall support night viewing by showing lighter foreground information on a dark non-reflecting background.*

(MSC191/5.3.3) *The background colour and contrast shall be chosen to allow displayed information to be easily discriminated without degrading the colour coding aspects of the presentation.*

Display equipment may use a range of tones of basic colours, provided they are identifiable and visually distinguishable from each other. Colours used for the presentation of information in the user dialogue areas shall not detract from the presentation of information in the operational display area.

If display equipment is intended to present symbols for charted information, it shall use colours that comply with or are based upon the colours specified in the relevant IHO standards, for example the IHO ECDIS Presentation Library in IHO S-52 and its Appendices 15, or an equivalent set of colour tables, as far as practical.

NOTE It is possible the white background used in the "Day" colour table provided in the IHO ECDIS Presentation Library ~~uses a white background that may does~~ not support readability under all light conditions and ~~may be is~~ a risk to safety of navigation for some navigational systems and equipment, including radar. Readability ~~may can~~ be achieved by using the black background in the "Dusk" or "Night" colour tables provided in the IHO ECDIS Presentation Library and adjusting brightness and contrast, if provided, for use under all light conditions.

4.5.2 Methods of test and required results

The person conducting this test shall have passed the minimum colour vision and acuity tests required for users by IMO STCW Code Part B and have adapted to night viewing for 10 min before checking the night display.

- Confirm by observation that the colours used for the presentation of alphanumeric data, text, symbols and other graphical information provide sufficient contrast for identification and discrimination against the background under the ambient light conditions described in Table 1.
- Confirm by observation that the colours used for the presentation of alphanumeric data, text, symbols and other graphical information support night viewing by showing lighter foreground information on a dark non-reflecting background.
- Confirm by observation that the colours used for the presentation of alphanumeric data, text, symbols and other graphical information are identifiable and visually distinguishable from each other.
- Confirm by observation that the colours used in the user dialogue areas do not detract from the presentation of information in the operational display area.
- Where display equipment is intended to present symbols for charted information, confirm by analytical evaluation that the colours used conform to the IHO specified colours in the IHO S-52 ECDIS Presentation Library, or equivalent, as far as practical (see Clause G.1 for additional guidance).

4.6 Symbols

4.6.1 Operational information

4.6.1.1 Requirement

(MSC191/5.4.1) *Symbols used for the presentation of operational information other than chart information shall comply with or be based upon the symbols set forth in Annex A.*

(SN-Circ.243/1/3) *Where a standard symbol is not available, another symbol may be used, but this symbol shall not conflict with the symbols listed in Annex A or in the IHO S-52 ECDIS presentation library. (For additional guidance, see also ISO 80416-4.)*

Colours used for the presentation of operational information shall be discriminated from the colours used for the presentation of the radar image, target trails, additional processed radar information and electronic chart information.

For symbols for which the size is not specified by this document, the following applies: A symbol shall subtend at least 5 mm/m (17 min of arc) at the nominal viewing distance. Where accurate colour identification of a symbol is required by an individual equipment standard, then, in the absence of size requirements in that standard, the symbol shall subtend at least 8,7 mm/m (30 min of arc) at the nominal viewing distance. The use of spectrally extreme blue ($v' < 0,2$) shall be avoided for images subtending less than 35 mm/m (2° of arc) of viewing distance.

Annex A specifies standardized symbols including the size at a viewing distance of 1 m. Where the manufacturer declares a different viewing distance, the symbol size shall be measured according to the ratio to a viewing distance (e.g. a symbol of 5 mm at 1 m viewing distance shall be 7,5 mm if the declared viewing distance is 1,5 m). 16

4.6.1.2 Methods of test and required results

The methods of test and the required results are as follows:

- a) confirm by inspection of documented evidence that the symbols used to present operational information are presented in accordance with Annex A;
- b) confirm by measurement that the largest dimension of the symbol is at least 5 mm/m (17 min of arc) at the nominal viewing distance, and includes at least 16 pixels;
- c) where accurate colour identification is required for a symbol, confirm by measurement that the largest dimension of the symbol is at least 8,7 mm/m (30 min of arc) at the nominal viewing distance, and includes at least 29 pixels;

4.6.2 Electronic chart information

4.6.2.1 Requirement

(MSC191/5.4.2) Symbols used for the presentation of ~~vector format electronic charted~~ information shall comply with ~~or be based upon the symbols specified~~ relevant IHO standard, for example, the IHO ECDIS Presentation Library in IHO S-52 and its Appendices 15, or an equivalent symbol set, as far as practical.

NOTE It is possible some symbols provided in the IHO ECDIS Presentation Library may are not be suitable for the display of electronic chart information on radar or in a composite presentation based upon radar. IHO S-52 and its Appendices allow minor deviations to symbology. It provides a framework and guidelines for chart symbolization from which manufacturers can derive a customized symbol set.

If symbols that deviate from the IHO S-52 ECDIS Presentation Library are used for the presentation of any chart information, then they shall:

- be legible;
- be certain and unambiguous in their meaning;
- be of sufficient size to support the nominal viewing distance (see also 4.4.2);
- have the same general shape as IHO S-52 ECDIS Presentation Library symbols used for the same or similar purpose(s).

Symbols added to the ECDIS Presentation Library shall not be confused with IHO S-52 ECDIS Presentation Library symbols.

4.6.2.2 Methods of test and required results

The methods of test and the required results are as follows:

- a) confirm by inspection of documented evidence that the symbols used to present charted information are presented in accordance with relevant IHO standards, for example IHO S-52 and its Appendices;
- b) where symbols deviate from the IHO S-52 ECDIS Presentation Library, confirm by observation that they:
 - 1) are legible;
 - 2) are certain and unambiguous in their meaning;
 - 3) are of sufficient size to support the nominal viewing distance;
 - 4) have the same general shape as IHO S-52 ECDIS Presentation Library symbols used for the same or similar purposes;
- c) confirm by observation that symbols added to the ECDIS Presentation Library cannot be confused with IHO S-52 ECDIS Presentation Library symbols.

4.7 Colour coding of information

4.7.1 Colour coding for discrimination

4.7.1.1 Requirement

(MSC191/5.5.1) If colour coding is used for discrimination or conspicuousness of alphanumeric text, symbols and other graphical information all colours in each colour table shall clearly differ from one another (see also 4.5.1).

4.7.1.2 Methods of test and required results

Confirm by observation that the colours within each colour table clearly differ from one another.

4.7.2 Colour coding of information

4.7.2.1 Requirement

(MSC191/5.5.2) If colour coding is used, then the colour red shall be used for the coding of alert related information for alarm and emergency alarm conditions unless otherwise specified by the IMO (for example in Tables 7.1.1 and 7.1.2 of the IMO A.1021(26) Code on Alerts and Indications).

If colour coding is used and if the colour red is used for other purposes than for the coding of alert related information for alarm and emergency alarm conditions, its purpose (e.g. for the indication of port vs starboard, colour of a buoy, colour of a light, etc.) shall be sufficiently clear. 17

4.7.2.2 Methods of test and required results

If colour coding is used, confirm by inspection of documented evidence or by observation that the colour red is used to indicate an alarm or emergency alarm condition unless otherwise specified by the IMO or unless the purpose is sufficiently clear.

4.7.3 Colour coding in combination with other attributes

4.7.3.1 Requirement

(MSC191/5.5.3). If colour coding is used it shall be used in combination with other symbol attributes, such as size, shape and orientation.

A specific implementation shall not rely solely on a single saturated colour. If the display equipment technology relies on the separate transmission of primary colours, the presentation of alerts shall be visible and identifiable even after the failure of any one primary colour input to the display.

4.7.3.2 Methods of test and required results

The methods of test and the required results are as follows:

- a) confirm by inspection of documented evidence **or by observation** that the colour coding is always combined with another symbol attribute;
- b) where the display equipment technology relies on the separate transmission of primary colours, confirm by observation that alerts remain identifiable even after transmission of each of the primary colours is disabled one at a time.

4.7.4 Flashing of information

4.7.4.1 Requirement

(MSC191/5.5.4) *Flashing of information shall be reserved for indicating the state of unacknowledged alerts.*

4.7.4.2 Methods of test and required results

Confirm by observation that flashing of information is only used for unacknowledged alerts.

4.8 Integrity marking

4.8.1 Indication of source, validity and integrity status

4.8.1.1 Requirement

(MSC191/5.6.1) *The source, validity, and where possible, the integrity of information shall be indicated. Invalid information or information with low integrity shall be clearly marked qualitatively and/or quantitatively (see important indication). Invalid information or information with low integrity may be quantitatively indicated by displaying absolute or percentage values.*

4.8.1.2 Methods of test and required results

The methods of test and the required results are as follows:

- a) confirm by observation that the source of information can be indicated;
- b) confirm by observation that the validity of information is indicated;
- c) confirm by observation that the integrity of information is indicated, where available. Where integrity is indicated quantitatively, confirm by observation that either absolute values or percentage values are displayed.

4.8.2 Colour coding of validity and integrity

4.8.2.1 Requirement

(MSC191/5.6.2) *If colour coding is used, then information with low or doubtful integrity shall be qualitatively marked by using the colour as defined in Table 2, and invalid information shall be qualitatively marked by using the colour as defined in Table 2.*

4.8.2.2 Methods of test and required results

If colour coding is used, the methods of test and the required results are as follows:

- a) confirm by observation that the colour as defined in Table 2 is used to indicate information with low or doubtful integrity;
- b) confirm by observation that the colour as defined in Table 2 is used to indicate invalid information.

4.8.3 Indication of presentation failure

4.8.3.1 Requirement

(MSC191/5.6.3) In many cases, information on the display does not change frequently enough to make presentation failure immediately obvious to the user. *In order to show that the screen is being refreshed, a means or method shall be provided to immediately make the user aware of a presentation failure on an operational display (for example, "picture freeze").*

A conspicuous periodically time-varying element shall be provided as a prominent indication of normal screen refresh (for example two alternating dots, etc.).

4.8.3.2 Methods of test and required results

Confirm by observation that a conspicuous periodically time-varying indication is provided in all presentation modes.

4.9 Alerts and indications

4.9.1 Operational status

4.9.1.1 Requirement

(MSC191/5.7.1) *The operational status of information (indications) shall be indicated as in Table 2 unless otherwise specified by the IMO (for example in Tables 7.1.1 and 7.1.2 of the Code on Alerts and Indications, 2009).*

~~(MSC 302/7.6.2) An unacknowledged warning shall be:~~

- ~~1) repeated as a warning after a limited time period not exceeding 5 min; or~~
- ~~2) changed to alarm priority after a limited time period not exceeding 5 min; or~~
- ~~3) changed to alarm priority after a user selectable time not more than 5 min, if provided; or~~
- ~~4) changed to alarm priority, as required by specific requirements for the individual equipment and system.~~

For alerts, the equipment shall comply with IEC 62923-1.

Table 2 – Operational status of indications

Status	Visual Indication	Audible Signal
Emergency alarm	As specified in Table 7.1.1 of the Code on Alerts and Indications 2009 (IMO resolution A.1021(26))	As specified in Tables 7.1.1 and 7.2 of the Code on Alerts and Indications 2009 (IMO resolution A.1021(26))
Alarm, not acknowledged	Red, Flashing	Accompanied by an audible signal, as 3 short audible signals repeated every 7 s to 10 s
Alarm, silenced	Red, Flashing	Silent
Alarm, acknowledged	Red	Suppression of audible signal (= silent)
Invalid information	Yellowish orange	Silent
Information with low integrity	Yellow	Silent
Warnings, not acknowledged	Yellowish orange, Flashing	Accompanied by an audible signal, as 2 short audible signals, to be repeated at least once per 5 min or be replaced by an alarm.
Warnings, silenced	Yellowish orange, Flashing	Silent
Warnings, acknowledged	Yellowish orange	Silent
Caution	Yellow	Silent
Important Indications	Yellow	Silent
Indication	No special requirement	Silent
Invalid information	Red	Silence
Information with low integrity	Yellow	Silence
Important Indications	Yellow	Silence
Indication	No special requirement	Silence
Normal state	Optionally green	Silence

NOTE Code on Alerts and Indications 2009 (IMO resolution A.1021(26)) specifies frequency range (in 5.11) and sound pressure level (in 5.13) for audible signal.

4.9.1.2 Method of test and required results

Confirm by inspection of documented evidence that ~~alerts and~~ indications are presented in accordance with Table 2 unless otherwise specified by the IMO and that the equipment complies with IEC 62923-1.

NOTE Alert management for integrated navigation systems is described in detail in IEC 61924-2.

4.9.2 List of alerts

4.9.2.1 Requirement

~~(MSC191/5.7.2) A list of alerts shall be provided based on the sequence of occurrence. Additional indication of priority, as set by the user, shall be provided on displays that present alerts from multiple sources. Alerts that have been acknowledged and are no longer relevant shall be deleted from the list of alerts, but may be retained in an alert history list.~~

4.9.2.2 Methods of test and required results

~~The methods of test and the required results are as follows:~~

- ~~a) confirm by observation that the display equipment provides a sequential list of alerts;~~

~~b) where display equipment supports the presentation of alerts from multiple sources (for example, from multiple navigational systems and equipment):~~

- ~~1) confirm by observation that there is the capability for the user to set a priority for the alerts;~~
- ~~2) confirm by observation that an indication of priority is included in the list of alerts;~~

~~c) confirm by analytical evaluation that acknowledged alerts which are no longer relevant are deleted from the list of alerts.~~

See IEC 62923-1 for the requirements and tests regarding the list of active alerts.

NOTE Resolution MSC.302 and derived IEC 62923-1 have superseded the requirement: (MSC191/5.7.2).

4.9.3 Alert related information from multiple sources

4.9.3.1 Requirement

~~(MSC191/5.7.3) If a single display is used to present alert related information from multiple navigational systems and equipment, then the presentation of alerts and indications shall be consistent for the display of:~~

- ~~• the time of alert occurrence,~~
- ~~• the cause of the alert,~~
- ~~• the source of the alert, and~~
- ~~• the status of the alert (for example, acknowledged, not acknowledged).~~

4.9.3.2 Methods of test and required results

~~Where display equipment supports the presentation of alerts and indications from multiple navigational systems and equipment, confirm by observation that the presentation of alert related information is consistent with respect to the time of alert occurrence, the cause of the alert, the source of the alert, and the status of the alert.~~

See IEC 62923-1 for the requirements and tests.

NOTE Resolution MSC.302 and derived IEC 62923-1 have superseded the requirement: (MSC191/5.7.3).

4.9.4 Speech output for alarms and warnings

4.9.4.1 Requirement

~~(MSC 302/7.3.2.3) An unacknowledged alarm condition may be accompanied by speech output presented at least in English, using harmonized alert voice messages according to the regulations of the Organization.~~

~~(MSC 302/7.4.2.3) An unacknowledged warning condition may be accompanied by speech output presented at least in English, using harmonized alert voice messages according to the regulations of the Organization.~~

~~(MSC 252/20.2.2) The visual announcement and speech output shall occur simultaneously. The audio signal shall be announced before the speech output.~~

NOTE IEC 60945:2002, 4.2.1.6 contains generic requirements for voice announcements.

~~The speech output shall only announce the visually indicated unacknowledged alert(s) which will be acknowledged by the next operation of the alert acknowledge. The speech output may announce them individually or may announce that multiple alerts are present.~~

~~The speech output shall be followed by at least a 2 s pause before repetition or new announcement. For alarms the speech output shall be repeated for every second cycle.~~

~~If a new higher priority alert arrives during speech output of a lower priority alert then the lower priority alert shall be interrupted to allow audio signal as defined in Table 2 to occur before the speech output of the new higher priority alert.~~

~~The speech output shall be interrupted when the associated alert is acknowledged.~~

~~The speech output shall use plain language using marine terminology as defined in SMCP (see IMO A.918(22)), as appropriate. The speech output shall be clearly understandable.~~

~~The volume shall be adjustable from 85 dB(A) at 1 m to extinction without affecting the sound pressure level of the audible alert signal.~~

~~Failure of the speech output shall not degrade operation of visual indication. Failure of the speech output shall not degrade operation of audible alert signal except when common components are used for both audible signals and speech output.~~

4.9.4.2 Methods of test and required results

~~If speech output is provided, confirm by observation that:~~

- ~~• the audio signal as defined in Table 2 occurs before the speech output;~~
- ~~• for alarms the same speech is repeated as long as the alarm is unacknowledged;~~
- ~~• for warnings the same speech is repeated only when repeating the warning based on requirement 4.9.1.1;~~
- ~~• the speech output only announce visually indicated unacknowledged alerts which can be acknowledged by the next operation of the alert acknowledge;~~
- ~~• the speech output has at least a 2 s pause before repetition or a new announcement and the speech output for alarms is repeated for every second cycle;~~
- ~~• the speech output of a lower priority alert is interrupted when a new higher priority alert arrives;~~
- ~~• the speech output is interrupted when the associated alert is acknowledged;~~
- ~~• it is possible to adjust the speech volume to extinction without affecting the audible signal.~~

~~If speech output is provided, confirm by analytic evaluation that:~~

- ~~• speech output is at least in plain English language, using marine terminology conforming with the SMCP (see IMO A.918(22)) where appropriate;~~
- ~~• announcements are clearly understandable at the maximum loudness level.~~

~~If speech output is provided, follow manufacturer's instructions and cause failure of the speech output. Confirm by observation that visual indication and audible signal remain as defined in Table 2.~~

See IEC 62923-1 for the requirements and tests. **18**

4.10 Presentation mode

4.10.1 Requirement

(MSC191/5.8) *If displays are capable of presenting information in different modes, then there shall be a clear indication of the modes in use, for example:*

- *orientation* (north-up, course-up, head-up);
- *stabilisation* (ground-stabilised, sea-stabilised);
- *motion* (true, relative); and

- *chart projection* (Mercator, gnomonic, etc.).

NOTE—The indication of chart projection is only required when electronic chart information is presented. It ~~may~~ **can** be provided to the user on request.

4.10.2 Methods of test and required results

Confirm by observation that the presentation modes in use are clearly indicated.

4.11 User manuals, instructions and reference guides

4.11.1 Requirement

(MSC191/5.9) *The user manual and instructions and reference guides shall be available in the English language at least. The user manual or reference guide shall include a list of all terms, abbreviations, symbols, icons and their explanations presented by the ~~system or~~ equipment.* (See also Annex A, Annex B and Annex E.)

4.11.2 Methods of test and required results

The methods of test and the required results are as follows:

- a) confirm by observation that user manual, instructions and reference guide are available in the English language;
- b) confirm by inspection of documented evidence that the user manual and/or reference guide includes a list of all terms, abbreviations, symbols, icons and their explanations used by the system.

5 Presentation of operational information

5.1 Application

The provisions of Clause 5 are applicable to displays on the bridge of a ship that provide functionality as described in 5.2 to 5.20.

5.2 Presentation of own ship information

5.2.1 Graphical representation of own ship – Requirement

(MSC191/6.1.1) *When a graphical representation of own ship is provided, it shall be possible for the user to select either a true scaled ship's outline or a simplified symbol as set forth in Annex A. The size (length) of the ship's true scaled outline or the simplified symbol in the graphical presentation shall be the true scale size of the ship or 6 mm, at a nominal viewing distance of 1 m, whichever is greater.*

The manufacturer should adjust the symbol sizes to properly account for the nominal viewing distance of the display equipment.

Display equipment may (unless stipulated as mandatory in an equipment standard) provide the capability to automatically switch from the ship's true scaled outline to the simplified symbol when the beam of own ship's true scale outline is less than 3 mm **at the nominal viewing distance 16**, and vice versa. The true scaled outline shall not be used when the heading is not known in a gyro/THD-stabilized mode. The user shall always have the capability to select the simplified symbol in lieu of the scaled ship's outline.

(MSC191/6.1.2) *A heading line, and where appropriate a velocity vector, shall be associated with own ship symbol and shall originate at the position of the consistent common reference point (CCRP) as set forth in Annex A.*

The combination of the heading line and beam line (the minimised symbol) may be used as an alternative to the simplified symbol and may be selectable as such. Display equipment may provide the capability to automatically switch from the ship's true scaled outline to the heading and beam line when the beam of own ship's true scale outline is less than 3 mm **at the nominal viewing distance 16**, and vice versa.

5.2.2 Methods of test and required results

Where display equipment provides a graphical representation of own ship:

- a) confirm by observation that the system provides a ship's true scaled outline and a simplified symbol in accordance with Annex A;
- b) confirm by observation that the display equipment provides the user with the capability to select the representation of own ship as either the ship's true scaled outline or the simplified symbol;
- c) confirm by measurement that the size of the ship's outline is correct for the scale of the display;
- d) confirm by observation that the simplified symbol is automatically selected when the beam of the ship's true scaled outline is less than 3 mm, and vice versa;
- e) confirm by observation that the display equipment provides a heading line in accordance with Annex A;
- f) confirm by observation that the display equipment provides a velocity vector in accordance with Annex A.

Note that the minimised symbol may be used as alternative to the simplified symbol.

5.3 Presentation of chart information

5.3.1 Alteration of chart information

5.3.1.1 Requirement

It shall not be possible to alter the electronic chart information, except by update.

5.3.1.2 Methods of test and required results

Confirm by observation that it is not possible to alter the electronic chart information.

5.3.2 Colours and symbols for charted information

5.3.2.1 Requirement

(MSC191/6.2.1) *The presentation of official electronic **charted** information that is issued by, or on the authority of a government authorized hydrographic office, or other relevant government institution or agency (for example, ENC), shall comply with ~~or be based upon~~ the **relevant IHO standards, for example**, colours and symbols specified for the IHO ECDIS Presentation Library in IHO S-52 and its Appendices, or an equivalent colour and symbol set, as far as is practicable.*

(MSC191/6.2.2) *The presentation of proprietary electronic chart information shall comply with ~~or relevant IHO standards, as far as practical, for example~~, be based upon the colours and symbols specified for the IHO ECDIS Presentation Library in IHO S-52 and its Appendices, or an equivalent colour and symbol set, ~~as far as practical~~. There shall be a clear indication when the presentation is not in accordance with IHO standards.*

(MSC191/6.2.3) *The presentation of user-added electronic chart information shall comply with ~~or the relevant IHO standards, as far as practical, for example~~, be based upon the colours and symbols specified for the IHO ECDIS Presentation Library in IHO S-52 and its Appendices, or an equivalent colour and symbol set, ~~as far as practical~~.*

NOTE It is possible some colours and symbols provided in the IHO ECDIS Presentation Library or otherwise specified by IHO in S-52 and its Appendices ~~may are~~ not be suitable for the display of electronic chart information on radar or in a composite presentation based upon radar. IHO S-52 and its Appendices allow minor deviations to symbology. It provides a framework and guidelines for chart symbolization from which manufacturers can derive a customized symbol set.

(MSC191/6.2.4) *If electronic chart information derived from different scales appears in the presentation, the scale boundary shall be clearly indicated as defined in the relevant IHO standards, for example, IHO ECDIS Presentation Library in IHO S-52 and its Appendices.* 15

5.3.2.2 Methods of test and required results

The methods of test and the required results are as follows:

- a) ~~verify~~ confirm by observation that the presentation of official and user-added electronic charted information, as applicable, is in accordance with 5.3.2.1 and ~~4.6.2~~ 4.5.1;
- b) ~~where the presentation of proprietary electronic chart information is not in accordance with 4.5.2, confirm by observation that an indication is provided~~ confirm by observation that the presentation of proprietary electronic charted information, as applicable, is either in accordance with 5.3.2.1 and 4.5.1 or that an indication is provided;
- c) when electronic chart information derived from different scales (for example, adjacent ENC cells) is displayed, confirm by observation that a scale boundary is presented between the scales.

5.4 Presentation of radar information

5.4.1 Radar video images

5.4.1.1 Requirement

(MSC191/6.3.1) *Radar video images shall be displayed by using a basic colour that provides optimum contrast. Radar echoes shall be clearly visible when presented on top of a chart background. The relative strength of radar echoes may be differentiated by tones of the same basic colour. The colours may be different for operation under different ambient light conditions (day, dusk and night) likely to be experienced on the bridge of a ship, and with due consideration to the night vision of the officer of the watch.*

Additional processed radar information that is not a part of the radar video image may be discriminated from the radar video by tones of the basic colour used to present the image. Alternatively, it may be differentiated by tones of other basic colours.

For radar displays, a dark non-reflecting background shall be used. The colour used for the radar image shall provide contrast against the background and shall be clearly visible when presented over a chart background.

NOTE 1 ~~It is possible the "Day" table based on a white background included in the colour tables specified by IHO and provided in IHO ECDIS Presentation Library include a "Day" table based on a white background that may does~~ not support readability under daylight conditions and ~~may can~~ be a risk to safety of navigation for some navigational systems and equipment, including radar. Readability under daylight conditions ~~may can~~ be achieved by using the black background in the "Dusk" or "Night" colour tables provided in IHO ECDIS Presentation Library and adjusting brightness and contrast, if provided.

If the colour red is used for the radar video image, then it shall be distinguishable from other uses of the colour red, for example, alarms including dangerous targets.

If electronic chart information overlays radar information (i.e. a radar video image), or a radar image overlays chart information, then the overlay may be displayed as transparent or opaque. If a transparent overlay is used, then it may be variable so that the underlying information is visible through the overlay. If an opaque chart overlay is used, then the colour fill of area objects shall be excluded. Optionally, the colour fill of point objects may also be excluded. In either case, the background of the radar image shall be the same basic colour as the chart's water surfaces.

NOTE 2 If display equipment provides facilities for the overlay of radar information that are independent of a shipborne radar system (for example, by a separate radar scan converter), then the facilities ~~should comply with~~ **are described in** the relevant clauses of IEC 62388.

5.4.1.2 Methods of test and required results

The methods of test and the required results are as follows:

- a) confirm by observation, under each of the ambient light conditions described in Table 1, that radar information is presented using a contrasting colour against the background and that the background shall be dark for radar displays;
- b) confirm by observation that radar information is clearly visible when presented on top of a chart background for the ambient light conditions described in Table 1;
- c) if the colour red is used for the radar video image, confirm by observation that it is distinguishable from other uses of the colour red, for example, alarms including dangerous targets. **17**

5.4.2 Target trails

5.4.2.1 Requirement

(MSC191/6.3.2) If display equipment provides *target trails*, then they shall *be distinguishable from radar echoes and clearly visible under all ambient light conditions* (day, dusk and night) likely to be experienced on the bridge of a ship, and with due consideration to the night vision of the officer of the watch. Target trails may be differentiated by tones of the basic colour used for the radar video image. Alternatively, they may be distinguished by tones of another basic colour.

If display equipment provides target trails, then there shall be an indication of trail time and motion stabilisation *mode*.

5.4.2.2 Methods of test and required results

Where target trails are provided:

- a) confirm by observation that they are distinguishable from radar echoes and clearly visible under the ambient light conditions described in Table 1;
- b) confirm by observation that the trail time and motion stabilization mode are indicated.

5.5 Presentation of target information

5.5.1 Providing target information

5.5.1.1 Requirement

(MSC191/6.4.1.1) *Target information may be provided by a radar target tracking system and/or by the AIS.*

A radar target tracking system detects and tracks radar targets. Other navigational systems may provide remote presentation of tracked radar targets. These systems shall present reported radar targets in accordance with Annex A.

NOTE If display equipment provides facilities for radar target detection and tracking that are independent of a shipborne radar system, then the facilities ~~should comply with~~ **are described in** the relevant clauses of IEC 62388.

Any navigational system or equipment may provide remote presentation of reported AIS targets. These systems shall present reported AIS targets in accordance with Annex A.

Navigational system or equipment may receive information of AIS targets via an interface from a radar and receive information of AIS targets from an AIS. AIS target information from these

sources shall be combined using the MMSI of each AIS target to avoid duplication of AIS targets.

NOTE Radar can report AIS targets using TTD and TLB sentence. The MMSI value included in the TLB sentence is the basis for the combination process of both radar and AIS as sources of AIS targets.

An AIS target may be repeated ~~or VTS-generated~~ (see 5.5.4.1). In such case, the presentation shall be as for reported AIS target in accordance with Annex A. **5**

5.5.1.2 Methods of test and required results

The methods of test and the required results are as follows:

- a) where display equipment provides the capability to connect to a radar target tracking system, confirm by observation that the presentation is in accordance with Annex A;
- b) where display equipment provides the capability to connect to an AIS, confirm by observation that the presentation is in accordance with Annex A;
- c) where display equipment provides the possibility to receive AIS targets both via an interface from a radar and from an AIS, use a radar simulation arrangement and an AIS simulator to provide AIS target information from both sources and confirm by observation that AIS target information has been combined from both sources to avoid duplication of AIS targets. **5**

5.5.2 Consistent user interface for target information

5.5.2.1 Requirement

(MSC191/6.4.1.3) *As far as practical, the user interface and data format for operating and presenting tracked radar target information and reported AIS target information shall be consistent.*

5.5.2.2 Methods of test and required results

Confirm by observation that the presentation of tracked radar target information and reported AIS target information is consistent.

5.5.3 Indication of exceeding target capacity

5.5.3.1 Requirement

(MSC191/6.4.2.1) *There shall be an indication when the target tracking and/or reported target processing/display capacity is about to be exceeded unless otherwise specified in individual equipment standards (for example as a caution).*

(MSC191/6.4.2.2) *There shall be an indication when the target tracking and/or reported target processing/display capacity have been exceeded unless otherwise specified in individual equipment standards (for example as a warning).*

Target tracking means the capability of a target tracking system to track targets. Reported targets means targets reported by AIS. The manufacturer shall declare the processing and display capacity of the equipment separately for tracked and reported targets (i.e. 4 values of capacity).

NOTE A definition of minimum target capacities is given in IEC 62388.

Processing capacity means the number of targets that it is possible to process simultaneously by the equipment. Display capacity means the number of targets that it is possible to display at same time. Processing capacity may be higher than display capacity. If the manufacturer declared processing capacity is higher than the manufacturer declared display capacity, there shall be separate indications, or alerts, if specified by individual equipment standards, for exceeding the display and processing capacities.

NOTE Equipment can provide functionality to select or filter displayed targets. This can lead to a situation in which processing capacity is about to be exceeded or exceeded while the display capacity is not.

The user manual shall describe the operational consequences of the processing and displaying of current and new targets in the event that the capacity for processing or displaying has been reached and further targets occur.

5.5.3.2 Methods of test and required results

Confirm by inspection of manufacturer documentation that the processing and display capacity of the equipment are declared separately for tracked and reported targets (i.e. 4 values of capacity).

Then there are two methods of test depending on the capability of the equipment.

- a) Where display equipment provides the capability to connect to a radar target tracking system:
 - 1) confirm by ~~measurement~~ observation that it provides an indication, or an alert (e.g. a caution) if specified by an individual equipment standard, that the tracked radar target display capacity is about to be exceeded, for example, when the number of tracked radar targets presented exceeds 95 % of the display capacity;
 - 2) confirm by ~~measurement~~ observation that it provides an indication, or an alert (e.g. a warning) if specified by an individual equipment standard, that the tracked radar target display capacity has been exceeded when the number of tracked radar targets presented exceeds 100 % of the display capacity;
 - 3) if processing capacity is higher than display capacity, confirm by observation that it provides an indication, or an alert (e.g. a caution) if specified by an individual equipment standard, that the tracked radar target processing capacity is about to be exceeded, for example, when the number of tracked radar targets processed exceeds 95 % of the processing capacity;
 - 4) if processing capacity is higher than display capacity, confirm by observation that it provides an indication, or an alert (e.g. a warning) if specified by an individual equipment standard, that the tracked radar target processing capacity has been exceeded when the number of tracked radar targets processed exceeds 100 % of the processing capacity.
- b) Where display equipment provides the capability to connect to an AIS:
 - 1) confirm by ~~measurement~~ observation that it provides an indication, or an alert (e.g. a caution) if specified by an individual equipment standard, that the reported AIS target display capacity is about to be exceeded, for example, when the number of reported AIS targets presented exceeds 95 % of the display capacity;
 - 2) confirm by ~~measurement~~ observation that it provides an indication, or an alert (e.g. a warning) if specified by an individual equipment standard, that the reported AIS target display capacity has been exceeded when the number of reported AIS targets presented exceeds 100 % of the display capacity;
 - 3) if processing capacity is higher than display capacity, confirm by observation that it provides an indication, or an alert (e.g. a caution) if specified by an individual equipment standard, that the reported AIS target processing capacity is about to be exceeded, for example, when the number of reported AIS targets processed exceeds 95 % of the processing capacity;
 - 4) if processing capacity is higher than display capacity, confirm by observation that it provides an indication, or an alert (e.g. a warning) if specified by an individual equipment standard, that the reported AIS target processing capacity has been exceeded when the number of reported AIS targets processed exceeds 100 % of the processing capacity.

Confirm by inspection of the user manual that it contains a description of the operational consequences of the processing and display of current and new targets in the event that the capacity for processing or displaying has being reached and further targets occur. 19

5.5.4 Merging AIS targets from multiple source

5.5.4.1 Requirement

~~AIS Base Stations may relay or repeat AIS information and target reports with a lower update rate than transmitted from the sending vessel and with latency that is significant and variable. If both relayed and direct AIS reports are received for the same target, the relayed reports shall not be processed for display of AIS target or information.~~

~~An AIS target may be VTS-generated (AIS ASM(17)) as described in IMO SN.1/Circ.289. If both VTS-generated and direct AIS reports are received for the same target (MMSI, IMO number, call sign), the VTS-generated reports shall not be processed for display of AIS target or information.~~

~~If both VTS-generated and relayed AIS reports are received for the same target, the relayed reports shall not be processed for display of AIS target or information.~~

~~If multiple relayed AIS reports are received for the same target, the report with the highest repeat count shall not be processed for display of AIS target or information.~~

~~If direct and VTS-generated AIS target information are both available as not merged by MMSI, IMO number or Call sign AIS information and where the direct and VTS-generated targets are considered as one target, then the direct AIS target shall be automatically used and displayed as set forth in Annex A.~~

5.5.4.2 Methods of test and required results

~~The methods of test and the required results are as follows:~~

- ~~a) confirm by analytical evaluation and using the AIS simulator to produce AIS reports for a nearby AIS target moving at 24 kn and relayed AIS reports for this target with delayed and reduced update rate (for example: delayed by 30 s with a 10 s update rate), that the relayed data is not displayed;~~
- ~~b) confirm by analytical evaluation and using the AIS simulator to produce AIS reports for a nearby AIS target moving at 24 kn and VTS-generated AIS reports with equal MMSI for this target, that the VTS-generated data is not displayed;~~
- ~~c) confirm by analytical evaluation and using the AIS simulator to produce VTS-generated AIS reports with equal MMSI for a nearby AIS target moving at 24 kn and relayed AIS reports for this target with delayed and reduced update rate (for example: delayed by 30 s with a 10 s update rate), that the relayed data is not displayed;~~
- ~~d) confirm by analytical evaluation and using the AIS simulator to produce two or more relayed VTS-generated AIS reports with equal MMSI for a nearby AIS target moving at 24 kn and two or more relayed AIS reports for this target with delayed and reduced update rate (for example: delayed by 30 s with a 10 s update rate), that only data from lowest repeat count is displayed;~~
- ~~e) confirm by analytical evaluation and using the AIS simulator to produce AIS reports for a nearby AIS target moving at 24 kn and VTS-generated AIS reports with target identifier set as 3 (other) for this target, that the VTS-generated data is not displayed.~~

5.5.4 Presentation of repeated AIS reports

5.5.4.1 Requirement

AIS Base Stations and AIS Repeater Stations may repeat AIS information and target reports with a lower update rate than transmitted from the sending vessel and with latency that is significant and variable.

If both repeated and direct AIS reports are received for the same target, the repeated reports shall not be processed for display of the AIS target or related information.

If multiple repeated AIS reports are received for the same target, only the report with the lowest repeat count shall be processed for display of the AIS target or related information.

5.5.4.2 Methods of test and required results

The methods of test and the required results are as follows:

- confirm, by analytical evaluation and using the AIS simulator to produce AIS reports for a nearby AIS target moving at 24 kn and repeated AIS reports for this target with delayed and reduced update rate (for example: delayed by 30 s with a 10 s update rate), that the repeated data is not displayed;
- confirm, by analytical evaluation and using the AIS simulator to produce two or more repeated AIS reports for a target with delayed and reduced update rate (for example: delayed by 30 s with a 10 s update rate), that only data from lowest repeat count is displayed. **5**

5.5.5 Filtering sleeping AIS targets

5.5.5.1 Requirement

(MSC191/6.4.3.1) *It shall be possible to filter the presentation of sleeping AIS targets (for example, by target range, CPA/TCPA, AIS target class A/B, or proximity to or otherwise related to a monitored route, etc.).*

Criteria for filtering shall only include sleeping class A or sleeping class B when combined with one or more other factors, for example including CPA/TCPA, Speed, Range or Course.

~~If display equipment provides facilities for the calculation of CPA/TCPA that are independent of a shipborne radar target tracking system, then the facilities should comply with the relevant clauses of IEC 62388.~~

~~It shall be possible to filter the presentation of AIS data reports other than sleeping AIS targets (for example, AIS AtoN (aids to navigation), AIS Base Station, AIS SART, AIS SAR Aircraft).~~

(MSC191/6.4.3.2) *If a filter is applied, then there shall be a clear and permanent or persistent indication, as appropriate for the application. The filter criteria in use shall be readily available to the user.*

(MSC191/6.4.3.3) *It shall not be possible to remove individual AIS targets from the presentation.*

5.5.5.2 Methods of test and required results

The methods of test and the required results are as follows:

- a) confirm by observation that the user can filter the presentation of sleeping AIS targets **and that filtering criteria includes only sleeping class A or sleeping class B combined with one or more other factors;**
- ~~b) confirm by observation that the user can filter the presentation of AIS data reports; **5**~~
- b) confirm by observation that an indication is provided when sleeping targets are filtered from the presentation;
- c) confirm by observation that the indication remains while the filter is active;
- d) confirm by analytical evaluation that the filter criteria in use is readily available;
- e) confirm by observation that the user cannot remove individual AIS targets from the presentation.

5.5.6 Activation of AIS targets

5.5.6.1 Requirement

(MSC191/6.4.4.1) *If zones for the automatic activation of AIS targets are provided, they shall be the same as for automatic radar target acquisition, if available. Any user defined zones (for example, acquisition/activation zones) in use shall be presented in graphical form with their relevant symbols set forth in Annex A.*

(MSC191/6.4.4.2) *In addition, sleeping AIS targets shall be automatically activated when they meet user defined parameters (for example, target range, activation zones, CPA/TCPA or AIS target class A/B).*

Automatic activation is independent of AIS target filtering. If means are provided for automatic activation of AIS targets, then means for disabling that function shall be provided and the disable status shall be indicated.

NOTE If display equipment provides facilities for the calculation of CPA/TCPA that are independent of a shipborne radar target tracking system, then the facilities ~~should comply with~~ **are described in** the relevant clauses of IEC 62388.

5.5.6.2 Methods of test and required results

Where display equipment provides zones for the automatic activation of AIS targets:

- a) confirm by observation that the zones are the same as for automatic radar target acquisition, if provided;
- b) confirm by observation that the zones are presented in accordance with Annex A;
- c) confirm by observation that ~~sleeping AIS targets entering a zone are activated~~ **it is possible to disable automatic activation and that the disabled status is indicated;**
- d) confirm by observation that **both filtered and displayed** sleeping AIS targets **entering a zone** are automatically activated when they meet user defined criteria. **5**

5.5.7 Graphical presentation of targets

5.5.7.1 Requirement

(MSC191/6.4.5.1) *Targets shall be presented with their relevant symbols as set forth in Annex A.*

(MSC191/6.4.5.2) *Reported AIS targets shall be graphically presented at predicted positions either as sleeping or activated. Where no separate symbol is defined for the active and sleeping states, the reported AIS target shall be graphically presented with the single symbol type available in Annex A.*

EXAMPLE AIS SAR vessel (symbol 2.16) keeps all requirements for AIS sleeping target and AIS activated target except for the graphical representation of the symbol.

(MSC191/6.4.5.3) *The course and speed of a tracked radar target or an activated reported AIS target shall be indicated by a vector that clearly shows the predicted motion. The vector time (i.e. length) shall be consistent for presentation of any target regardless of its source.*

(MSC191/6.4.5.4) *The presentation of vector symbols shall be consistent irrespective of the source of information. The presentation mode shall be clearly and permanently or persistently indicated, as appropriate for the application, including for example,*

- *True/Relative motion,*
- *vector time, and*
- *stabilisation.*

(MSC191/6.4.5.5) *The orientation of the AIS target symbol shall indicate its heading (HDG). If the heading information is not received, the orientation of the AIS symbol shall be aligned to the reported course over ground (COG). If neither heading nor course over ground (COG) is available, the orientation of the AIS symbol shall be aligned towards top of the operational display area. If available, the turn or rate of turn (ROT) indicator and/or the path prediction shall indicate the manoeuvre of an activated AIS target.*

(MSC191/6.4.5.6) *Own ship's CCRP shall be used for alignment of tracked radar target symbols and reported AIS target symbols with other information on the same display.*

(MSC191/6.4.5.7) *On large scale, low range displays, a means or method to present a true scale outline of an activated AIS target shall be provided in accordance with Annex A.*

(MSC191/6.4.5.8) *It shall be possible to display the past positions of activated AIS targets.*

The user manual shall describe the length in time or in number of the past positions available for each target.

5.5.7.2 Methods of test and required results

The methods of test and the required results are as follows:

- a) confirm by observation that targets are presented with their relevant symbols according to Annex A;
- b) confirm by observation that reported AIS targets are graphically presented **at predicted position** as sleeping or activated targets in accordance with Annex A;
- c) confirm by observation that the predicted motion of tracked radar targets and activated reported AIS targets is clearly indicated by a vector;
- d) confirm by observation that the vector time (i.e. length) is consistent for all targets;
- e) confirm by observation that the presentation of vector symbols are consistent irrespective of the source of information;
- f) verify that the presentation mode is clearly indicated in accordance with 4.10.1;
- g) confirm by observation that the vector time is clearly indicated;
- h) confirm by observation that the orientation of the AIS target symbol clearly indicates its heading. Change the heading information to "not available" for one reported AIS target and confirm by observation that the orientation of the AIS symbol is aligned to the reported COG. **Change also the COG information to "not available" for the same reported AIS target and confirm by observation that the orientation of that reported AIS target is aligned towards the top of the operational display area;**
- i) confirm by observation that the turn or rate of turn (ROT) flag and/or the path prediction, **if available**, indicates the manoeuvre of an activated AIS target changing course;
- j) confirm by analytical evaluation that own ship's CCRP is used to align tracked radar target symbols and reported AIS target symbols with other information on the same display;
- k) confirm by observation that on large scale, low range displays, a means or method to present a true scaled outline of an activated AIS target is provided;
- l) confirm by observation that it is possible to display the past positions of activated AIS targets **for the length in time or in number as described in the user manual.** **5**

5.5.8 Target selection

5.5.8.1 Requirement

(MSC191/6.4.6.1) *A target selected for the display of its alphanumeric information shall be identified by the relevant symbol set forth in Annex A. If more than one target is selected for data display, the symbols and the corresponding target data shall be clearly identified.*

5.5.8.2 Methods of test and required results

The methods of test and the required results are as follows:

- a) confirm by observation that a selected target is identified in accordance with Annex A;
- b) confirm by observation that, if more than one target is selected, the symbols and corresponding target information is clearly identified in accordance with Annex A.

5.5.9 Indication of target derivation

5.5.9.1 Requirement

(MSC191/6.4.6.2) *There shall be a clear indication to show that target information is derived from radar or AIS or from a combination of these.*

5.5.9.2 Methods of test and required results

Confirm by analytical evaluation that there is a clear indication of the source of target information.

5.5.10 Presentation of tracked radar target information

5.5.10.1 Requirement

(MSC191/6.4.6.3) *For each selected tracked radar target the following information shall be presented in alphanumeric form:*

- *source(s) of target information,*
- *measured range of target,*
- *measured bearing of target,*
- *predicted target range at the closest point of approach (CPA),*
- *predicted time to CPA (TCPA),*
- *calculated CTW of target (or calculated COG if ground stabilised),*
- *calculated STW of target (or calculated SOG if ground stabilised).*

Additional target information, where available, shall *be provided* to the user *on request*. If additional target information is available, an indication shall be provided when viewing alphanumeric information of the selected target.

If multiple targets are selected, a subset of alphanumeric data, information and text may be presented.

Target information shall be logically "paired" for presentation (i.e. range and bearing, CPA and TCPA, course and speed).

NOTE If display equipment provides facilities for the calculation of CPA/TCPA that are independent of a shipborne radar target tracking system, then the facilities ~~should comply with~~ **are described in** the relevant clauses of IEC 62388.

5.5.10.2 Methods of test and required results

The methods of test and the required results are as follows:

- a) confirm by observation that the information listed above is presented in alphanumeric form for each selected target;
- b) confirm by observation that additional information, where available, is indicated and provided to the user on request;
- c) confirm by analytical evaluation that the target information is logically "paired" for presentation.

5.5.11 Presentation of reported AIS target information

5.5.11.1 Requirement

(MSC191/6.4.6.4) *For each selected reported AIS target, the following information shall be presented in alphanumeric form:*

- source(s) of target information (for example, repeated, ~~VTS-generated, etc.~~);
- target *identification* ~~(for example, MMSI, call sign, ship's name, etc.)~~ (at least one of MMSI, call sign, name or IMO number);
- reported *position* and where available *its quality* (Position accuracy as " $\leq 10\text{m}$ " or " $> 10\text{m}$ " and RAIM as "not in use" or "in use");
- calculated *range* of target;
- calculated *bearing* of target;
- calculated CPA;
- calculated TCPA;
- reported COG ~~(or calculated course of target if the sea is stabilised)~~ (or calculated CTW if the display is sea stabilised). In sea stabilized display, the reported COG shall at least be available on demand;
- reported SOG ~~(or calculated speed of target if the sea is stabilised)~~ (or calculated STW if the display is sea stabilised). In sea stabilized display, the reported SOG shall at least be available on demand;
- reported *navigational status*;
- reported *heading* (HDG) and reported *rate of turn* (ROT) shall *also be made available*.

~~Target heading and reported rate of turn (ROT) shall also be made available. All additional target information, where available from the same MMSI source (including for example most recent AIS safety messages), shall be provided to the user on request. If additional target information is available, an indication shall be provided when viewing alphanumeric information of the selected target.~~

Additional target information shall be provided to the user on request. If additional target information is available, an indication shall be provided when viewing alphanumeric information of the selected target. Additional target information consists of:

- MMSI, if not yet presented;
- call sign, if not yet presented;
- name, if not yet presented;
- IMO number, if not yet presented;
- dimensions;
- ship and cargo type;
- destination;
- ETA;
- static draught;
- DTE indicator;
- AIS class;
- if supported, extended reported AIS target information (see Table 8 and 5.18);
- if receiving of AIS safety related messages is supported, on user request, where available, a link to or full content of most recent received AIS safety related messages related to the same MMSI, see 5.19;

- optionally, if sending of AIS safety related messages is supported, a link to or full content of all AIS safety related messages sent by the own ship to the target (basis is MMSI), see 5.20.

Further target information may be presented as well.

If multiple targets are selected, a subset of alphanumeric data, information and text may be presented.

Target information shall be logically "paired" for presentation (i.e. range and bearing, CPA and TCPA, COG and SOG, heading and ROT).

(MSC191/6.4.6.5) *If the received AIS target information is incomplete, then the absent information shall be clearly indicated in the target data field as missing.*

~~If display equipment provides facilities for the calculation of CPA/TCPA that are independent of a shipborne radar target tracking system, then the facilities should comply with the relevant clauses of IEC 62388.~~

5.5.11.2 Methods of test and required results

The methods of test and the required results are as follows.

Select a reported AIS target and:

- confirm by observation that the information listed above is presented in alphanumeric form;
- confirm by observation that all additional target information, where available, is provided to the user on request;
- confirm by analytical evaluation that the target information is logically "paired" for presentation;
- confirm by observation that there is a clear indication of absent information in the target data field.
- confirm by observation that when available there is a clear indication that additional information is available. 5

5.5.12 Continual update of target information

5.5.12.1 Requirement

(MSC191/6.4.6.6) *The information for a selected target shall be displayed and continually updated, until another target, AIS data report, AIS locating device or AIS synthetic target is selected for information display or, if applicable, until the user dialogue area is closed.*

NOTE Information can be displayed in a separate user dialogue area.

5.5.12.2 Methods of test and required results

The methods of test and the required results are as follows:

- confirm by observation that information displayed for a selected target is continually updated;
- confirm by observation that the information displayed for a selected target remains displayed until another target, AIS data report, AIS locating device or AIS synthetic target is selected or the user dialogue is closed. 5

5.5.13 Own ship's AIS information

5.5.13.1 Requirement

(MSC191/6.4.6.7) *A means or method shall be provided to present own ship AIS data on request.*

Own ship AIS data includes:

- identification (MMSI, call sign, name, IMO number);
- navigational status;
- additional information (dimensions, ship and cargo type, destination, ETA, static draught);
- if supported, extended information (see Table 8). **5**

5.5.13.2 Methods of test and required results

Confirm by observation that it is possible to present own ship's AIS data on request.

5.5.14 Obscuring the operational display area

5.5.14.1 Requirement

(MSC191/6.4.6.8) *The display of alphanumeric data, information and text shall not obscure graphically presented operational information.*

5.5.14.2 Methods of test and required results

Confirm by analytical evaluation that the display of alphanumeric data, information and text does not obscure graphically presented operational information.

5.6 Operational alerts

5.6.1 Alert status

5.6.1.1 Requirement

(MSC191/6.4.7.1) *A clear indication of the status of the alerts and the alert criteria (i.e. identification) shall be given to the user. (See also 4.9.1 and 4.9.3.)*

The equipment shall comply with IEC 62923-1 to ensure that the status of alerts is clearly given to the user, see 4.9.1.2.

Except for IMO requirements for radar and AIS target symbols displayed in the operational area and for ECDIS highlight of danger, warnings, and caution in the chart area, only text-based visual indication of alert (e.g. in user dialog area) is mandatory. Optionally icons can be presented together with the text, see IEC 62923-1 and Annex F.

5.6.1.2 Methods of test and required results

Confirm by analytic evaluation that a clear indication of ~~the status of alerts and~~ the alert criteria is provided as text to the user.

Confirm by observation that, if icons are additionally provided, they conform to IEC 62923-1 and Annex F (see also 4.4.3.2) **18**

5.6.2 CPA/TCPA alarms

5.6.2.1 Requirement

(MSC191/6.4.7.2) *A CPA/TCPA alarm of a tracked radar or activated AIS target shall be clearly indicated and the target shall be clearly marked by a dangerous target symbol as set forth in Annex A (both acknowledged and unacknowledged state). This includes cases when CPA/TCPA alarm information is received by TTD-sentence (see IEC 61162-1).*

NOTE 1 If display equipment provides facilities for the calculation of CPA/TCPA that are independent of a shipborne radar target tracking system, then the facilities ~~should comply with~~ are described in the relevant clauses of IEC 62388.

CPA/TCPA alarms shall not be repeated as an alert by the equipment receiving target information by TTD sentence.

NOTE 2 The presentation of the symbol is related to state of the target and is not related to the alert functionality of the equipment.

5.6.2.2 Methods of test and required results

Confirm by observation that dangerous targets are presented in accordance with Annex A.

For equipment receiving target information by TTD sentence, confirm by observation that there are no alerts generated from targets with active CPA/TCPA alarms indicated by the TTD sentence. 20

5.6.3 Acquisition/activation zones warnings

5.6.3.1 Requirement

(MSC191/6.4.7.3) *If a user defined acquisition/activation zone facility is provided, a target entering or within the zone shall be clearly identified with the relevant symbol set forth in Annex A and for tracked radar targets a warning shall be given. The zone shall be identified with the relevant symbology set forth in Annex A, and shall be applicable to both tracked radar and reported AIS targets.*

A radar target tracking system shall control radar target acquisition zones. The target tracking system shall provide all warnings and indications associated with target detection and tracking including entry into or detection within an acquisition area. Other navigational systems and equipment may provide acquisition zone warnings and indications only if they provide a radar target tracking function complying to IEC 62388.

~~Other navigational systems and equipment that provide remote presentation of tracked radar targets shall not provide warnings and indications associated with acquisition zones.~~

NOTE 1 The TTD sentence does not provide other navigational systems and equipment that provide remote presentation of tracked radar targets with information about whether the target was manually or automatically acquired nor the status of any automatic acquisition alert.

Any navigational system or equipment may provide remote presentation of reported AIS targets. These systems shall provide their own AIS activation zone facilities.

NOTE 2 If display equipment provides facilities for acquisition zones for the detection of radar targets that are independent of a shipborne radar target tracking system, then the facilities ~~should comply with~~ are described in the relevant clauses of IEC 62388.

5.6.3.2 Methods of test and required results

Where display equipment provides zones for automatic acquisition/activation:

- ~~verify~~ confirm by observation that the zones are presented with their relevant symbology in accordance with ~~5.5.7 Annex A~~;

- b) confirm by observation that detected radar targets entering or within a zone are acquired;

NOTE The acquisition status of tracked radar targets is reported by the radar target tracking system, for example, in accordance with IEC 61162 (all parts).

- c) confirm by observation that radar targets in acquisition state are presented in accordance with Annex A;
- d) ~~verify~~ confirm by analytical evaluation that the zones apply to both radar targets and reported AIS targets in accordance with 5.5.7; 20

5.6.4 Lost target warnings

5.6.4.1 Requirement

(MSC191/6.4.7.4) *The last ~~reported~~ predicted position of a lost target shall be clearly marked by a lost target symbol on the display as set forth in Annex A, and the lost target warning shall be given if the lost target warning function is enabled. The lost target symbol shall disappear if the signal (or message) for the target is received again or after the warning has been acknowledged. A means or method shall be provided for the user to enable/disable the lost target warning function. There shall be a clear indication whether the lost target warning function for tracked radar targets and activated AIS targets is enabled or disabled. If a target is beyond a user defined range, then no warning shall be generated.*

Navigational systems and equipment that provide remote presentation of received tracked radar targets and activated AIS targets (for example by TTD sentence) shall present the lost target symbol and shall not provide warnings in lost target state.

5.6.4.2 Methods of test and required results

The methods of test and the required results are as follows:

- a) confirm by observation that, when a tracked radar target or reported AIS target ~~that is not received from remote equipment (for example by TTD sentence)~~ is lost, a warning is given and the last ~~reported~~ predicted position is clearly marked by the lost target symbol in accordance with Annex A;
- b) ~~for navigational system or equipment that provides remote presentation of received tracked radar targets and activated AIS targets (for example by TTD sentence) in lost target state, confirm by observation that there is the lost target symbol and that there is no related warning; 20~~
- c) confirm by observation that the lost target symbol disappears if the signal for the target is received again or after the lost target warning has been acknowledged;
- d) confirm by observation that a means or method is provided to enable/disable the lost target warning function;
- e) confirm by observation that there is a clear indication of whether the lost target warning function for tracked radar targets and activated AIS targets is enabled or disabled;
- f) confirm by observation that no warning is generated for a lost target that is beyond the user defined range.

5.7 AIS and radar target association

~~5.7.1 Target association~~

5.7.1 Requirement

(MSC191/6.4.8.1) *If target information from AIS and radar tracking are both available and where the AIS and radar information are considered as one target, then as a default condition, the activated AIS target symbol and the alphanumeric AIS target information shall be automatically selected and displayed as set forth in Annex A. The user shall have the option to change the default condition to the display of tracked radar targets and shall be permitted to select either radar tracking or AIS alphanumeric information.*

~~If the radar target tracking system distributes tracked radar target data that identifies associated targets including the MMSI for the associated AIS target, then other navigational systems and equipment displaying these targets may display them as a single target according to Annex A. Where these systems and equipment also receive reported targets directly from AIS, they shall filter the display of the reported AIS targets using the MMSI to avoid duplicated targets.~~

(MSC191/6.4.8.2) Where the AIS and radar information are considered as two distinct targets, one activated AIS target symbol and one tracked radar target symbol shall be displayed as set forth in Annex A. No alert shall be raised.

NOTE If display equipment provides facilities for the automatic association of reported AIS targets with tracked radar targets that are independent of a shipborne radar target tracking system, then the facilities ~~should comply with~~ **are described in** the relevant clauses of IEC 62388.

5.7.2 Methods of test and required results

Where display equipment provides the capability to automatically associate reported AIS targets with tracked radar targets:

- a) confirm by observation that a reported AIS target associated with a tracked radar target is presented in accordance with Annex A:
 - 1) as an activated AIS target, the default condition;
 - 2) as a tracked radar target, based upon user-selection as the default condition;
- b) confirm by observation that the user can select either AIS or radar tracking information.
- ~~c) where the equipment also receives reported targets directly from an AIS, confirm by observation that it filters the display of reported AIS targets to avoid duplicated targets.~~ **20**

5.8 AIS presentation **user selectors and their status indications**

5.8.1 Requirement

Where applicable (i.e. if equipment provides related functionality for presentation), the user selectors for AIS presentation shall be provided according to Table 3.

Table 3 – User selectors for AIS presentation

Selector	Function
AIS ON/OFF This is master selector for all AIS presentation	Select all AIS related graphical presentation on or off
AIS sleeping target filter Separate selector for each provided AIS sleeping target filter criteria (see 5.5.5)	Select AIS sleeping target filter for criteria N on or off ^a
AIS locating devices (see 5.14.3.1)	Select AIS locating devices presentation on or off
AIS base stations (see 5.13.3.1 a))	Select AIS base stations presentation on or off
AIS SAR aircraft (see 5.13.3.1 b))	Select AIS SAR aircraft presentation on or off
AIS AtoNs, physical (see 5.13.3.1 c) and symbol 2.10 a)	Select AIS AtoN, physical presentation on or off or unhealthy (unhealthy AtoNs include symbol '2.10a' versions "Off Posn", "Unlit", "Racon err", "Error" and "Missing")
AIS AtoNs, virtual (see 5.13.3.1 c) and symbol 2.10 b)	Select AIS AtoN, virtual presentation on or off
AIS AtoNs, mobile physical (see 5.13.3.1 c) and symbol 2.10 c)	Select AIS AtoN, mobile physical presentation on or off

Selector	Function
AIS AtoNs, mobile virtual (see 5.13.3.1 c) and symbol 2.10 c)	Select AIS AtoN, mobile virtual presentation on or off
AIS AtoNs, synthetic (see 5.13.3.1 c) and symbol 2.10 a)	Select AIS AtoN, synthetic presentation on or off
AIS AtoNs, dimension outline (see 5.13.4 and symbol 2.10 d)	Select AIS AtoN outline presentation on or off
AIS ASMs Separate selector for each layer or sub-layers (see 5.15 and Annex J)	Select AIS ASM presentation for layer/sub-layer N on or off ^b
AIS ASMs Optionally separate selector for each display criteria (see 5.15.4.1)	Select AIS ASM presentation for criteria N on or off ^a
AIS Synthetic targets (see 5.16)	Select AIS Synthetic targets presentation on or off
AIS safety related messages (see 5.19 and symbol 5.16)	Select AIS safety related messages on or off
^a Replace "N" by each available criteria. ^b Replace "N" by each available layer or sub-layer.	

When a user selector in Table 3 has caused any related AIS object not to be displayed, a permanent or persisting indication shall be provided (see also 5.5.5.1). The details of individual selectors shall be readily available to the user.

(MSC191/6.4.9) Where applicable (i.e. if equipment provides related functionality), the AIS presentation status shall be indicated as follows in Table 4.

Table 4 – AIS status indications

Function	Cases to be presented		Presentation
	<i>AIS processing switched ON/ graphical presentation switched OFF</i>	<i>AIS processing switched ON/ graphical presentation switched ON</i>	
<i>AIS ON/OFF</i>	Indicate AIS graphical presentation is switched OFF	Indicate AIS graphical presentation is switched ON	<i>Alphanumeric or graphical (see Table E.4)</i>
<i>Filtering of sleeping AIS targets (see 5.5.5)</i>	Indicate whether the <i>filter status</i> for sleeping AIS targets is switched ON or OFF	Indicate whether the <i>filter status</i> for sleeping AIS targets is switched ON or OFF	Indications may be <i>alphanumeric or graphical (for example by icon)</i>
<i>Activation of targets (see 5.5.6)</i>		Indicate the <i>status of automatic activation criteria</i> for AIS targets, including <i>graphical presentation of automatic activation zones in use</i>	Indications shall be <i>graphical (see symbol 2.14)</i>
<i>CPA/TCPA alarm (see 5.6.2)</i>	Indicate whether the CPA/TCPA Alarm <i>function</i> is switched ON/OFF Indicate the <i>CPA/TCPA Criteria</i> Indicate whether <i>Sleeping AIS targets</i> are included or excluded from CPA/TCPA processing	Indicate whether the CPA/TCPA Alarm <i>function</i> is switched ON/OFF Indicate the <i>CPA/TCPA Criteria</i> Indicate whether <i>Sleeping AIS targets</i> are included or excluded from CPA/TCPA processing	Indications shall be <i>alphanumeric and, if applicable, graphical (for example by icon)</i>
<i>Lost target warning (see 5.6.4)</i>	Indicate whether the Lost Target Warning <i>function</i> is switched ON/OFF <i>If applicable</i> , indicate the <i>Lost target Filter Criteria</i>	Indicate whether the Lost Target Warning <i>function</i> is switched ON/OFF <i>If applicable</i> , indicate the <i>Lost target Filter Criteria</i>	Indications shall be <i>alphanumeric and, if applicable, graphical</i>
<i>Target association (see 5.7)</i>	Indicate whether the Target Association <i>function</i> is switched ON/OFF Indicate the <i>Association Criteria</i> Indicate the <i>target priority as AIS (Default) or Tracked Target Priority</i>	Indicate whether the Target Association <i>function</i> is switched ON/OFF Indicate the <i>Association Criteria</i> Indicate the <i>target priority as AIS (Default) or Tracked Target Priority</i>	Indications shall be <i>alphanumeric</i>
This table is a simplified matrix for the presentation of indications associated with AIS functions.			

5.8.2 Methods of test and required results

Where applicable, the methods of test and the required results are as follows:

- ~~a) verify the filtering of sleeping AIS targets in accordance with 5.5.6;~~
- ~~b) verify the activation of AIS targets in accordance with 5.5.7;~~
- ~~c) verify CPA/TCPA alarm functionality in accordance with 5.6.2;~~
- ~~d) verify lost target warning functionality in accordance with 5.6.4;~~
- ~~e) verify the association of AIS targets to tracked radar targets in accordance with 5.7.1.~~
- a) confirm by observation that the user selectors for AIS presentation are provided according to Table 3;

- b) confirm by observation that when a user selector in Table 3 has caused any related AIS object not to be displayed, a permanent or persisting indication is provided and that the details of individual selectors are readily available to the user;
- c) confirm by observation that the AIS presentation status is indicated according to Table 4. **5**

5.9 Trial manoeuvre

5.9.1 Requirement

(MSC191/6.4.10) *A trial manoeuvre simulation shall be clearly identified by the relevant symbol set forth in Annex A, positioned in a conspicuous location within the operational display area, for example, nominally centred at the bottom of the presentation area or astern of own ship symbol.*

NOTE If display equipment provides facilities for trial manoeuvre that are independent of a shipborne radar target tracking system, then the facilities ~~should comply with~~ are described in the relevant clauses of IEC 62388.

5.9.2 Methods of test and required results

Where display equipment provides a trial manoeuvre simulation:

- a) confirm by observation that the manoeuvre is identified in accordance with Annex A;
- b) confirm by analytical evaluation that the symbol is positioned in a conspicuous location.

5.10 Measurement

5.10.1 Measurement from own ship

5.10.1.1 Requirement

Measurements from own ship (for example, range rings, range and bearing, cursor, tracking data) shall be made with respect to the CCRP (for example, conning position).

For consistency of measured ranges and bearings, the recommended reference location should be the conning position. Alternative reference locations may be used where clearly indicated or distinctively obvious.

5.10.1.2 Methods of test and required results

The methods of test and the required results are as follows:

- a) confirm by observation that the means of taking measurements are centred on to the CCRP and not centred on any other position except where specifically selected and clearly indicated;
- b) confirm by measurement, by comparing at least two alternative sensor inputs that have different position offsets from CCRP, that the range and bearing measurements are correct to the CCRP position and, if provided, alternative reference position;
- c) confirm by measurement that, when switching from CCRP to an alternative reference position, displayed data is changing accordingly but data transmitted via the interface remains referenced to the CCRP.

5.10.2 Bearing and range measurements

5.10.2.1 Requirement

Bearings and distances (ranges) drawn on the display, or bearing and range measurements between features already drawn on the display, shall have an accuracy no less than that afforded by the scale and resolution of the display.

Range measurements shall be in nautical miles. In addition, facilities for metric measurements may be provided. All indicated values for range measurement shall be consistent and unambiguous. Where metric range measurements are required, the accuracy shall not be inferior to other range measurements.

5.10.2.2 Methods of test and required results

The methods of test and the required results are as follows:

- a) confirm by analytical evaluation that bearings and distances are measured to an accuracy consistent with the scale and resolution of the display;
- b) confirm by observation that distances can be measured in nautical miles;
- c) confirm by observation that the units used for range measurements and range scales are consistent within the system;
- d) confirm by observation that an indication of the units used for measurement is provided.

5.11 Navigation tools

5.11.1 General requirements

Subclause 5.11 addresses user tools that are common to navigational systems and equipment. Requirements for the provision of these tools are addressed in the relevant individual performance standards. When provided, these tools shall be presented with their relevant symbol(s) as set forth in Annex A.

5.11.2 Range rings

5.11.2.1 Requirement

(MSC191/7.1.4) *If range rings are displayed, then the range ring scale shall be indicated.*

Range rings shall be spaced to logically separate the range scale into equal divisions. Typically from two to six range rings would be provided for nautical mile range scale units, and up to five rings for metric range scale units.

The system accuracy of range rings shall be within 1 % of the maximum range of the range scale in use or 30 m, whichever is the greater distance.

Range rings shall always be centred at the CCRP.

A means or method shall be provided to enable and disable the set of range rings (see also 6.1.4).

5.11.2.2 Methods of test and required results

Where range rings are provided:

- a) confirm by observation that range rings are presented in accordance with Annex A;
- b) confirm by observation that the range ring separation (scale) is indicated;
- c) confirm by analytical evaluation that the range ring spacing logically separates each range scale into equal divisions;
- d) confirm by measurement that the accuracy of the range rings is within ± 1 % of the range scale in use or 30 m, whichever is greater;
- e) confirm by observation that the range rings are always centred at the CCRP;
- f) confirm by observation that a means or method is provided to enable and disable the set of range rings.

5.11.3 Variable range marker (VRM)

5.11.3.1 Requirement

Variable range marker(s) (VRMs) may be provided to measure the range of any point object within the operational display area.

Each active VRM shall have a numerical readout and the readout shall have a resolution compatible with the range scale in use.

Each active VRM shall be capable of adjustment to resolution of 0,01 NM, or to appropriate metric equivalent. A coarser resolution may be provided for higher range scales. The readout shall be available in the user dialogue area or, additionally, adjacent to the cursor when the cursor is over the VRM.

The VRM shall enable the user to measure the range of an object within the operational display area with a maximum system error of 1 % of the range scale in use or 30 m, whichever is the greater distance.

It shall be possible to use each VRM to measure the range to any point within the operational area and with the specified accuracy within 5 s.

A means or method to switch each VRM on and off shall be provided.

The VRM range set by the user shall be retained when there is a change in range scale.

If means are provided to move VRM origin from the CCRP to other points within the operational display area, geographically fixed or moving with the velocity of own ship, then a means shall be provided to reset the VRM origin to the CCRP position by a simple operator action.

5.11.3.2 Methods of test and required results

Where a VRM is provided:

- a) confirm by observation that each VRM is presented in accordance with Annex A;
- b) confirm by observation that a dedicated readout is available for each active VRM;
- c) confirm that the VRMs are capable of adjustment to 0,01 NM (or appropriate metric equivalent). A coarser adjustment may be provided for ranges greater than 24 NM or appropriate metric equivalent;
- d) confirm by measurement that the accuracy of the VRMs meet the requirement using a calibrated target or marker;
- e) confirm by measurement that, when metric measurements are provided, the readout and accuracy is equivalent to those relevant to nautical miles;
- f) confirm by measurement that the range to any object within the operational display area can be measured within 5 s with the required accuracy;
- g) confirm by observation that a means or method to switch each VRM on and off is provided;
- h) confirm by observation that the range of the VRM is maintained from range scale to range scale;
- i) confirm by observation that, if means are provided to move VRM origin from the CCRP to other points, means are provided to reset the VRM origin to the CCRP position by a simple operator action.

5.11.4 Bearing scale

5.11.4.1 Requirement

A bearing scale may be provided. The bearing scale shall indicate the bearing from the CCRP.

For radar display equipment, including radar with charted information, the bearing scale shall be outside of the operational display area (i.e. around its periphery and outside of which no radar video shall be displayed). For other display equipment, the bearing scale may be inside the operational display area. It shall be numbered at least every 30° division and shall have division marks of at least 5°. The 5° and 10° division marks shall be clearly distinguishable from each other. 1° division marks may be presented where they are clearly distinguishable from each other and from the 5° and 10° division marks.

If the display is off-centred or the position of own ship is outside of the operational display area, then the bearing scale shall be suppressed or its marks shall be adjusted to represent the bearing from CCRP.

For display equipment not presenting radar, a means or method shall be provided to enable and disable the bearing scale.

5.11.4.2 Methods of test and required results

Where a bearing scale is provided:

- a) confirm by analytical evaluation that the bearing scale indicates bearings as measured from the CCRP;
- b) for radar display equipment, confirm by observation that the bearing scale is around the periphery of the operational display area;
- c) confirm by observation that the bearing scale remains centred at the CCRP (for example, in a true motion display mode);
- d) confirm by observation that the bearing scale is numbered at least every 30° and has division marks at least every 5°;
- e) confirm by observation that the 5° division marks are clearly distinguishable from the 10° division marks;
- f) where 1° division marks are provided, confirm by observation that they are clearly distinguishable from each other and from the 5° and 10° division marks;
- g) for display equipment not presenting radar, confirm by observation that a means or method is provided to enable and disable the bearing scale.

5.11.5 Electronic bearing line (EBL)

5.11.5.1 Requirement

Electronic bearing line(s) (EBLs) may be provided to measure the bearing of any point object within the operational display area, with a maximum system error of 1° at the periphery of the display.

The EBL(s) shall be capable of measurement from the CCRP relative to the ships heading and relative to true north. There shall be a clear indication of the bearing reference (i.e. true or relative).

It shall be possible to move the EBL origin from the CCRP to any point within the operational display area and to reset the EBL to the CCRP by a simple operator action.

It shall be possible to fix the EBL origin or to move the EBL origin at the velocity of own ship.

A means or method shall be provided to ensure that the user is able to position the EBL smoothly in either direction, with an incremental adjustment adequate to maintain the system measurement accuracy requirements.

It shall be possible to use the EBL to measure the bearing to any point object in the operational display area within 5 s.

Each active EBL shall have a numerical readout with a resolution of $0,1^\circ$ adequate to maintain the system measurement accuracy requirements based on a measurement uncertainty of $\pm 0,5^\circ$.

A means or method shall be provided to enable and disable each EBL.

The bearing of the EBL (i.e. set by the user) shall be retained while the EBL is enabled (for example, after a change in range scale or after a change in display orientation).

5.11.5.2 Methods of test and required results

Where an EBL is provided:

- a) confirm by observation that each EBL is presented in accordance with Annex A;
- b) confirm by measurement that the bearing to any point object within the operational display area can be measured to within an accuracy of 1° ;
- c) confirm by analytical evaluation that bearings can be measured relative to the ships heading and relative to true north, and that a clear indication of the bearing reference is provided;
- d) confirm by observation that a means or method is provided to move the origin of an EBL from the CCRP to any point within the operational display area;
- e) confirm by observation that it is possible to return the origin of the EBL to the CCRP by a simple user action;
- f) confirm by observation that a means or method is provided to fix the origin of the EBL in a geographic location;
- g) confirm by observation that a means or method is provided to move the origin of the EBL at the velocity of own ship;
- h) confirm by observation that the EBL can be rotated smoothly in either direction;
- i) confirm by observation that the incremental adjustment is at least $0,1^\circ$;
- j) confirm by measurement that the EBL can be used to measure the bearing to any point object in the operational display area within $\pm 0,5^\circ$ in less than 5 s;
- k) confirm by observation that a numerical readout with a resolution of $0,1^\circ$ is available for each active EBL;
- l) confirm by observation that a means or method is provided to enable and disable each EBL;
- m) confirm by observation that an enabled EBL remains over the same point object during a change of range scale and a change of orientation mode.

5.11.6 Parallel index lines (PI)

5.11.6.1 Requirement

Parallel index (PI) lines may be provided. If parallel index lines are provided:

- independent parallel index lines with a means or method to truncate and switch off individual lines shall be provided;
- a simple and quick means or method of setting the bearing and beam range of a parallel index line shall be provided.

The bearing and beam range of any selected parallel index line shall be available on demand.

It shall be possible to set the bearing and beam range of a parallel index line within 5 s.

PI line range settings shall remain constant when the operator changes the range scale of the display and PI line bearing settings shall remain constant when own ship heading changes.

In addition to on/off selection of individual PI lines, means shall be provided to turn on/off all PI lines as a group.

5.11.6.2 Methods of test and required results

Where parallel index lines are provided:

- a) confirm by observation that parallel index lines are presented in accordance with Annex A;
- b) confirm by observation that a means or method is provided to truncate the length of each PI line;
- c) confirm by observation that PI lines are selectable for display on/off individually and as a group including all PI lines;
- d) confirm by measurement that a means or method is provided to set the bearing or range of a parallel index line within 5 s;
- e) confirm by observation that means are provided to display the bearing and range for any parallel index line on demand;
- f) confirm by observation that the distance of a PI line from the own ship and the true bearing of PI line does not change when a different range scale is selected, when own ship heading changes, and during True motion operation.

5.11.7 Offset measurement of range and bearing

5.11.7.1 Requirement

There may be a means or method to measure the range and bearing of one position on the display relative to any other position within the operational display area. This may be accomplished, for example, using an electronic range and bearing line (ERBL), a combination of a VRM and an EBL, or the cursor.

If a separate tool is provided to measure the combination of range and bearing (for example, an ERBL):

- it shall have a numerical range and bearing readout. The resolution of the range readout shall be compatible with the range scale in use. The resolution of the bearing readout shall be 0,1° adequate to maintain the system measurement accuracy requirements;
- it shall enable the user to measure the range of an object within the operational display area with a maximum system error of 1 % of the range scale in use or 30 m, whichever is the greater distance, and the bearing of any point object with a maximum system error of 1° based on a measurement uncertainty of $\pm 0,5^\circ$ at the periphery of the display;
- the user setting shall be retained while the tool is enabled (for example, after a change in range scale or after a change in display orientation);
- it shall enable the user to position its bearing component smoothly in either direction, with an incremental adjustment adequate to maintain the system measurement accuracy requirements.

It shall be possible to measure the range and bearing to any object in the operational display area within 5 s.

5.11.7.2 Methods of test and required results

Where a means or method is provided to measure the range and bearing from one position to another in the operational display area:

- a) confirm by observation that numerical readouts are available to display the range and bearing;
- b) confirm by analytical evaluation that the resolution of the range readout is compatible with each range scale;
- c) confirm by observation that the resolution of the bearing readout is 0,1°;

- d) confirm by measurement that the range from one position within the operational display area to any other position can be measured to ~~within~~ an accuracy of ± 1 % of the range scale in use or 30 m, whichever is greater;
- e) confirm by measurement that the bearing from one position within the operational display area to any position can be measured to ~~within~~ an accuracy of $0,5^\circ$ at the periphery of the display;
- f) confirm by observation that the bearing component can be rotated smoothly in either direction;
- g) confirm by measurement that the range and bearing to any object within the operational display area can be measured within 5 s;
- h) where a separate tool is provided to measure the combination of range and bearing, confirm by observation that a means or method is provided to enable and disable that tool;
- i) confirm by observation that the user settings are retained after the change of the range scale and a change of orientation mode while the tool is enabled.

5.11.8 User cursor

5.11.8.1 Requirement

A user cursor may be provided to enable a fast and concise means or method to designate any position on the operational display area. If a user cursor is provided:

- the cursor position shall have a continuous numerical readout to provide the range and bearing, measured from the CCRP, and the latitude and longitude of the cursor position presented either alternatively or simultaneously;
- a means or method shall be provided to easily locate the cursor position in the operational display area;
- the accuracy of the range and bearing measurements provided by the cursor shall meet the relevant requirements for VRM and EBL.

It shall be possible to measure the range and bearing to any object in the operational display area within 5 s.

5.11.8.2 Methods of test and required results

Where a user cursor is provided:

- a) confirm by observation that the cursor is presented in accordance with Annex A;
- b) confirm by observation that a numerical readout is available and that it continuously displays, either alternatively or simultaneously, the range and bearing of the cursor's position measured from own ship's CCRP, and the latitude and longitude of the cursor's position;
- c) confirm by observation that a means or method is provided to locate the cursor in the operational display area;
- d) confirm by analytical evaluation that the resolution of the range readout is compatible with each range scale;
- e) confirm by observation that the resolution of the bearing readout is $0,1^\circ$;
- f) confirm by analytical evaluation that the resolution of the latitude and longitude readout is compatible with each display scale;
- g) confirm by measurement that the range to an object within the operational display area can be measured to within an accuracy of ± 1 % of the range scale in use or 30 m, whichever is greater;
- h) confirm by measurement that the bearing to any point object within the operational display area can be measured to within an accuracy of $0,5^\circ$ at the periphery of the display;
- i) confirm by observation that the cursor can be moved smoothly to create rotation in either direction;

- j) confirm by measurement that the range and bearing to any object within the operational display area can be measured within 5 s.

5.12 AIS data link message processing capacity

5.12.1 General

Presentation of AIS related information may be provided. If provided, the following requirements and tests apply.

5.12.2 Requirements

The data link message processing capacity of the equipment shall provide the capability to process the number of VDM (VHF data link messages) corresponding to 90 % of fully loaded VDL (VHF data link). In that condition, continuous and smooth update of displayed AIS data shall be maintained.

NOTE IEC 61162-1 describes the AIS interface as having a maximum data rate of 4 500 messages per minute.

5.12.3 Methods of test and required results

Use the AIS simulator to generate a scenario of VDM sentences for 130 moving AIS targets updated every 2 s and for 10 other AIS objects supported by the equipment and updated every 3 min, corresponding to approximately 90 % of a fully loaded VDL. Confirm by observation that the displayed update of AIS objects supported by the equipment shows smooth and continuous updates.

If AIS targets are supported, use the AIS simulator to generate a scenario of VDM sentences for 6 000 AIS targets at anchor updated every 3 min with one or more moving AIS targets updated every 2 s. Confirm by observation that the displayed update of a sample set of 10 displayed AIS targets of both types selected at random shows smooth and continuous updates.

5.13 AIS data report

5.13.1 General

AIS data reports include AIS AtoNs, AIS SAR aircraft and AIS base stations.

Presentation of AIS data reports may be provided. If provided, then the following requirements and tests apply.

5.13.2 AIS data report capacity

5.13.2.1 Requirements

The equipment shall provide the capability to display a minimum number of AIS data reports according to Table 5 if no higher number is specified in individual equipment standards.

The user manual shall specify the processing and display capacity of AIS data reports. In addition, the user manual shall describe the operational consequences to the processing and display of current and new AIS data reports in the event that the capacity is at the maximum provided for each case when further AIS data reports are received.

There shall be an indication, or an alert (e.g. a caution) if specified by individual equipment standards, when the AIS data report processing or display capacity has been exceeded.

Table 5 – AIS data report capacity

Requirement	Capacity
Minimum display capacity for AIS data reports	20
Minimum processing capacity for AIS data reports	20

5.13.2.2 Methods of test and required results

The methods of test and the required results are as follows:

- confirm by inspection of the user manual that it specifies the processing and display capacity of AIS data reports and that at least the minimum capacities are provided;
- use the AIS simulator and confirm by observation that there is an indication, or an alert (e.g. a caution) if specified by individual equipment standards, when the capacity of processing or display of AIS data reports has been exceeded and that the EUT operates as described in the user manual;
- confirm by inspection of the user manual that it describes the operational consequences to the processing and display of current and new AIS data reports in the event that the processing or display capacity is at the maximum provided for each case when further AIS data reports are received.

5.13.3 AIS data report display

5.13.3.1 Requirement

It shall be possible to add or remove AIS data reports from the display by layer, but not as individual objects. The following layers shall be provided:

- AIS AtoNs, physical (including unhealthy state);
- AIS AtoNs, virtual;
- AIS AtoNs, mobile physical;
- AIS AtoNs, mobile virtual;
- AIS AtoNs, synthetic;

NOTE 1 Synthetic AtoN is a physical AtoN structure, without an AIS transmitter, but for which AIS messages are broadcast from another (usually land-based) location. An AtoN is a physical AtoN when "virtual AtoN flag = 0" and "repeat indicator = 0". An AtoN is a synthetic AtoN when "virtual AtoN flag = 0" and "repeat indicator = 1, 2 or 3".

- AIS SAR aircraft;
- AIS base stations.

The "unhealthy" state provides an easy-to-use method to detect charted AtoNs which cause significant issues for navigation. The unhealthy AtoN includes symbol 2.10 a versions "Off Posn", "Unlit", "Racon err", "Error" and "Missing".

AIS data reports shall be presented by means of an appropriate symbol displayed using the reported/predicted position, see Annex A. Requirements related to the graphical presentation of AIS AtoN dimensions are in 5.13.4.

An AIS data report selected for display of its alphanumeric information shall be identified by the relevant symbol 2.12 given in Annex A.

For each selected AIS data report, the following information shall be presented in alphanumeric form:

a) Message 4, Base station report

- identification (Name, from AIS Message 24A, and/or MMSI. Both available at least on demand);
- reported position;
- if receiving of AIS safety related messages is supported, on user request, where available a link to or full content of the most recent received AIS safety related messages related to the same MMSI, see 5.19.

b) Message 9, SAR aircraft position report

- identification (Name from AIS Message 5 or 24A, Call sign from AIS Message 5 or 24B and MMSI. All available at least on demand);
- reported position and where available its quality (Position accuracy as " ≤ 10 m" or " > 10 m" and RAIM as "not in use" or "in use");
- reported altitude and where available its source;
- calculated range of target (2-dimensional calculation without altitude);
- calculated bearing of target;
- reported COG;
- reported SOG;
- if receiving of AIS safety related messages is supported, on user request, where available a link to or full content of the most recent received AIS safety related messages related to the same MMSI, see 5.19.

c) Message 21, AtoN report

- identification (Name, if not available then MMSI. MMSI at least available on demand);

NOTE 2 Name for an AtoN is a combination from "Name of Aid-to-Navigation" and "Name of Aid-to-Navigation Extension".
- reported position and where available its quality (Position accuracy as " ≤ 10 m" or " > 10 m" and RAIM as "not in use" or "in use") and source (Type of electronic position fixing device);
- indication of type (nature);
- AtoN status, see Annex L;
- dimensions, at least available on demand;
- if receiving of AIS safety related messages is supported, a link to a list or full content of all AIS safety related messages received from the AIS AtoN report (basis is MMSI). It shall at least be possible to present the most recent AIS safety related message for each AtoN. The AIS safety related messages received from the AIS AtoN shall be automatically removed after a timeout period of 18 min after reception or after removal of the related AtoN itself;
- optionally for Mobile AtoN, if derived from movement of position, calculated COG/SOG if ground stabilised (or calculated CTW/STW if sea stabilised).

If the received AIS data report information is incomplete, then the absent information shall be clearly indicated in the related data field as missing.

The information for a selected AIS data report shall be displayed and continually updated, until another target, AIS data report, AIS locating device or AIS synthetic target is selected for information display or, if applicable, until the user dialogue area is closed.

NOTE 3 Information can be displayed in a separate user dialogue area.

AIS data reports shall become lost after 6 times the nominal reporting interval for AtoNs, SAR aircraft and base stations from the last received report.

NOTE 4 Nominal reporting intervals are given in ITU R M.1371.

For lost AIS SAR aircraft and AIS base stations, there shall be no lost AIS data report symbol and the AIS data report symbol shall be removed automatically from the display.

The last reported/predicted position of an AIS AtoN shall be clearly marked by a lost AIS AtoN symbol on the display as set forth in Annex A, and the lost AIS AtoN warning shall be given if the lost AIS AtoN warning function is enabled. If the lost AIS AtoN warning function is disabled or if the AIS AtoN is beyond a user defined range, there shall be no lost AIS AtoN symbol and the AIS AtoN symbol shall be removed automatically from the display.

The lost AIS AtoN symbol shall disappear if the signal (or message) for the AIS AtoN is received again or after the warning has been acknowledged.

A means or method shall be provided for the user to enable/disable the lost AIS AtoN warning function. There shall be a clear indication of whether the lost AIS AtoN warning function is disabled. If an AIS AtoN is beyond a user defined range, then no warning shall be generated.

The lost AIS AtoN function enable/disable and the user defined range parameters may be shared with the lost target function, see 5.6.4, and/or the lost AIS locating device function, see 5.14.3.1.

5.13.3.2 Methods of test and required results

Use the AIS simulator and confirm by observation that the user can add and remove information from the presentation by layers, but not as individual objects.

Use the AIS simulator and confirm by observation that AIS data reports are displayed at the reported/predicted position and that the symbol is as defined in Annex A.

Use the AIS simulator and confirm by observation that an AIS data report selected for the display of its alphanumeric information is identified by the relevant symbol 2.12 given in Annex A.

Use the AIS simulator and confirm by observation that, for each selected AIS data report, the required information is presented in alphanumeric form or that there is a clear indication of absent information in the related data field.

Use the AIS simulator and confirm by observation that, for each AIS AtoN, the received AIS safety related messages are automatically removed after 18 min or after removal of the related AtoN itself.

Use the AIS simulator and confirm by observation that information displayed for a selected AIS data report is continually updated and that the information displayed for a selected target. AIS data report, AIS locating device or AIS synthetic target remains displayed until another AIS data report is selected or the user dialogue is closed.

For the following tests related to the lost AIS data reports, the timeout for the state of the lost AIS data report is 6 times the nominal reporting interval for AtoNs from the last received report.

Use the AIS simulator to simulate a lost AIS SAR aircraft and a lost AIS base station and confirm by observation that no lost AIS data report symbol is displayed and that the AIS data report symbol is removed automatically from the display.

Confirm by observation that a means or method is provided for the user to enable/disable the lost AIS AtoN warning function; and that there is a clear indication of whether the lost AIS AtoN warning function is disabled; and that a user defined range is available to control the functionality of the lost AIS AtoN.

Use the AIS simulator to simulate a lost AIS AtoN and confirm by observation that, when the lost AIS AtoN warning function is enabled, the last reported/predicted position of a AIS AtoN is clearly marked by a lost AIS AtoN symbol on the display and that the lost AIS AtoN warning is created.

Use the AIS simulator to simulate a lost AIS AtoN and confirm by observation that, when the lost AIS AtoN function is disabled or when the AIS AtoN is beyond a user defined range, no lost AIS AtoN symbol is displayed and that the AIS AtoN symbol is removed automatically from the display.

Use the AIS simulator and confirm by observation that, when signal (or message) for the AIS AtoN is received again or after the lost AIS AtoN warning has been acknowledged, the lost AIS AtoN symbol disappears.

5.13.4 Graphical presentation of AIS AtoN dimensions

5.13.4.1 Requirements

Graphical presentation of physical AIS AtoN dimensions may be provided. If provided, the following requirements and tests apply.

The user shall have means to select and deselect the graphical display of the true scaled dimensional outline of physical AIS AtoNs (symbol 2.10 d) in addition to the related physical AIS AtoN symbol as set forth in Annex A. The size of this outline shall be the true scale representation based on the reported dimensions. The true scaled outline shall only be presented when the largest of the ABCD values is at least 9 mm at a nominal viewing distance of 1 m.

Equipment may provide user selectable means to automatically select or deselect display of the AIS AtoN true scaled outline based on conditions provided by the manufacturer. The user shall be able to disable the functionality of the automatic selection.

5.13.4.2 Methods of test and required results

Use the AIS simulator to send the physical AIS AtoN objects including true scaled outline and:

- a) confirm by observation that the true scaled outline and the related symbol are as given in Annex A;
- b) confirm by observation that means are provided to select and deselect the graphical presentation of AIS AtoN dimensions;
- c) confirm by measurement that the dimension of the outline of the AIS AtoN is correct for the scale of the display;
- d) confirm by observation that the true-scaled outline of the AIS AtoN is not presented when none of the ABCD values is at least 9 mm at the nominal viewing distance of 1 m;
- e) if provided, confirm by observation that user selectable means to automatically select or deselect the display of the AIS AtoN true scaled outline are based on conditions described in the user manual.

5.14 AIS locating device

5.14.1 General

Presentation of AIS locating devices may be provided. If provided, then the following requirements and tests apply.

5.14.2 AIS locating device capacity

5.14.2.1 Requirements

The equipment shall provide the capability to display a minimum number of AIS locating devices nearest to the own ship according to Table 6 if no higher number is specified in individual equipment standard.

The user manual shall specify the processing and display capacity of AIS locating devices. In addition, the user manual shall describe the operational consequences to the processing and display of AIS locating devices in the event that the capacity is at the maximum provided for each case when further AIS locating devices are received.

There shall be an indication, or an alert (e.g. a caution) if specified by individual equipment standards, when the AIS locating devices processing or display capacity has been exceeded.

Table 6 – AIS locating devices capacity

Requirement	Capacity
Minimum display capacity for AIS locating devices	20
Minimum processing capacity for AIS locating devices	20

5.14.2.2 Methods of test and required results

The methods of test and the required results are as follows:

- confirm by inspection of user manual that it specifies the processing and display capacity of AIS locating devices; and that at least the minimum capacities are provided;
- use the AIS simulator and confirm by observation that there is an indication, or an alert (e.g. a caution) if specified by individual equipment standards, when the capacity of processing or display of AIS locating devices has been exceeded; that the displayed AIS locating devices are the nearest and that the EUT operates as described in the user manual;
- confirm by inspection of the user manual that it describes the operational consequences to the processing and display of AIS locating devices in the event that the processing or display capacity is at the maximum provided for each case when further AIS locating devices are received.

5.14.3 AIS locating device display

5.14.3.1 Requirement

It shall be possible to add or remove AIS locating devices from the display by a single layer (see Table 3) and it may be possible to add or remove AIS locating devices from the display by sub-layer (AIS-SART, EPIRB-AIS and AIS MOB), but not as individual objects.

AIS locating devices shall be presented by means of an appropriate symbol displayed using the predicted position, see Annex A.

An AIS locating device selected for display of its alphanumeric information shall be identified by the relevant symbol 2.12 given in Annex A;

For each selected AIS locating device, the following information shall be presented in alphanumeric form:

- Message 1 and 14, for AIS locating devices
 - identification (Name, from AIS Message 24A, 15-character HEX ID (applicable for EPIRB AIS), from Message 14, and/or MMSI. All available at least on demand);

- reported position, its age (based on current time and 'Time stamp' from AIS Message 1) and where available its quality (Position accuracy as " ≤ 10 m" or " > 10 m" and RAIM as "not in use" or "in use");
- calculated range of target;
- calculated bearing of target;
- reported COG (or calculated CTW if the display is sea stabilised). In sea stabilized display, the reported COG shall at least be available on demand;
- reported SOG (or calculated STW if the display is sea stabilised). In sea stabilized display, the reported SOG shall at least be available on demand;
- reported navigational status (active or under test);
- on user request, where available for AIS-SART and AIS MOB text from last received and for EPIRB-AIS text from the last two received unique AIS Message 14 related to the same MMSI. Received AIS Messages 14 having identical source and content shall replace existing messages that they duplicate. Received AIS Message 14 shall be automatically removed when the related AIS locating device is removed.

NOTE 1 Some examples of textual content of AIS Message 14 for AIS locating devices are: "SART ACTIVE", "SART TEST", "MOB ACTIVE", "MOB TEST", "EPIRB ACTIVE", "EPIRB TEST" and the 15-character HEX-ID of a Cospas-Sarsat beacon.

If the received AIS locating device information is incomplete, then the absent information shall be clearly indicated in the related data field as missing.

The information for a selected AIS locating device shall be displayed and continually updated, until another target, AIS data report, AIS locating device or AIS synthetic target is selected for information display or, if applicable, until the user dialogue area is closed.

NOTE 2 Information can be displayed in a separate user dialogue area.

AIS locating devices shall become lost after 6 min from the last received report.

NOTE 3 Nominal reporting intervals are given in ITU R M.1371.

The last predicted position of an AIS locating device shall be clearly marked by a lost AIS locating device symbol on the display as set forth in Annex A, and the lost AIS locating device warning shall be given if the lost AIS locating device warning function is enabled. If the lost AIS locating device warning function is disabled or if the AIS locating device is beyond a user defined range or if the AIS locating device is in testing, there shall be no lost AIS locating device symbol and the AIS locating device symbol shall be removed automatically from the display.

The lost AIS locating device symbol shall disappear if the signal (or message) for the AIS locating device is received again or after the warning has been acknowledged.

A means or method shall be provided for the user to enable/disable the lost AIS locating device warning function. There shall be a clear indication of whether the lost AIS locating device warning function is enabled or disabled. If an AIS locating device is beyond a user defined range, then no warning shall be generated.

The lost AIS locating device function enable/disable and the user defined range parameters may be shared with the lost target function, see 5.6.4, and/or the lost AIS data report device function, see 5.13.3.1.

5.14.3.2 Methods of test and required results

Use the AIS simulator and confirm by observation that the user can add and remove information from the presentation by layer and optionally sub-layers, but not as individual objects.

Use the AIS simulator and confirm by observation that AIS locating devices are displayed at the predicted position and that the symbol is as defined in Annex A.

Use the AIS simulator and confirm by observation that an AIS locating device selected for the display of its alphanumeric information is identified by the relevant symbol 2.12 given in Annex A.

Use the AIS simulator and confirm by observation that, for each selected AIS locating device, the required information is presented in alphanumeric form or that there is a clear indication of absent information in the related data field.

Use the AIS simulator and confirm by observation that information displayed for a selected AIS locating device is continually updated and that the information displayed for a selected AIS locating device remains displayed until another target, AIS data report, AIS locating device or AIS synthetic target is selected or the user dialogue is closed.

For the following tests related to the lost AIS reports, the timeout for the state of the lost AIS report is 6 min from the last received report.

Confirm by observation that a means or method is provided for the user to enable/disable the lost AIS locating device warning function; and that there is a clear indication of whether the lost AIS locating device warning function is disabled; and that a user defined range is available to control the functionality of the lost AIS locating device.

Use the AIS simulator to simulate a lost AIS locating device and confirm by observation that, when the lost AIS locating device warning function is enabled, the last predicted position of a AIS locating device is clearly marked by a lost AIS locating device symbol on the display and that the lost AIS locating device warning is created.

Use the AIS simulator to simulate a lost AIS locating device and confirm by observation that, when the lost AIS locating device function is disabled or when the AIS locating device is beyond a user defined range, no lost AIS locating device symbol is displayed and that the AIS locating device symbol is removed automatically from the display.

Use the AIS simulator and confirm by observation that, when signal (or message) for the AIS locating device is received again or after the lost AIS locating device warning has been acknowledged, the lost AIS locating device symbol disappears.

Use the AIS simulator to send an AIS locating device with associated AIS Message 14 and allow the AIS locating device to be lost and to be removed. Resend the AIS locating device after it has been removed and confirm by observation that no information remains available from the associated AIS Message 14.

5.15 AIS ASM

5.15.1 General

AIS ASMs used in this document are specified in IMO SN.1/Circ.289. An AIS ASM object represents information received from one or more AIS ASMs related to same uniquely identified AIS ASM object. See Annex J for the combinations of AIS ASMs to be combined as an AIS ASM object.

AIS ASMs are uniquely identified by their Application Identifier (AI), which is the combination of Designated Area Code (DAC) and Function Identifier (FI). All AIS ASMs described in this document have the DAC set as 1.

The AIS ASM objects used in this document are identified by the AI and one of the following:

- "Message linkage ID" and first six digits of source MMSI (FI = 18);
- "Message linkage ID" and first six digits of source MMSI (FI = 19);
- "Centre position of Berth, Latitude", "Centre position of Berth, Longitude" (FI = 20);
- "Position of observation, Latitude" and "Position of observation, Longitude" (FI = 21);
- "Message linkage ID" and first six digits of source MMSI (FI = 22);
- "Message linkage ID" and full source MMSI (FI = 23);
- "Latitude (from site location)" and "Longitude (from site location)" (FI = 26 and 31);
- "Message linkage ID" and first six digits of source MMSI (FI = 27 and 28);
- "Position #1 Latitude" and "Position #1 Longitude" (FI = 32).

NOTE 1 For the AIS base station as source, the first six digits of the source MMSI are $0_1 0_2 M_3 I_4 D_5 X_6$ of $0_1 0_2 M_3 I_4 D_5 X_6 X_7 X_8 X_9$. This leaves the last three digits $X_7 X_8 X_9$ available for possible repeated transmission of AIS ASMs by multiple sources coordinated by the shore operator.

NOTE 2 MMSI of the AIS ASM identifies the transmission source. For example, for redundancy purposes or expanded range, there cannot be multiple AIS Base or AIS AtoN stations with different MMSIs transmitting the same AIS ASM object.

Some AIS ASMs support a concept of "end of validity". This concept is based on the following combination of attributes related to AIS ASM validity, where provided and depending on the FI:

- End of "Duration" after "Start Date and Time" (FI=22 or 27);
- End of "Duration (forecast)" after "Valid time of forecast" (FI=26);
- End of "Data timeout (from site location)" (FI=26); or
- End of "Expected Next Signal" (FI=19).

NOTE 3 The validity period can include the current time or can start in the future.

Text description AIS ASMs (FI = 29 and 30) provide additional information related to an AIS ASM object (FI = 18, 19, 22, 23, 27 and 28). In the case that "Message linkage ID" and "MMSI of the source" from the text description AIS ASM matches an existing AIS ASM object, the text is combined into the AIS ASM object.

5.15.2 Categories

There are three categories of AIS ASM objects. For some categories of AIS ASM objects, the user can manage the storage by removing individual AIS ASM objects from the storage. The user may be able to remove and exclude AIS ASM objects from the storage by setting criteria. The user may also be able to control the display of AIS ASM objects in the storage by setting display criteria. The criteria can be for example, by layer, by range, by category.

For all categories of AIS ASM objects, only AIS ASM objects available from the storage can be displayed. Removing an AIS ASM object from the storage also causes it to be removed from the display.

NOTE Many AIS related objects, for example AIS targets, have one user functionality rule both for removal from storage and for add/remove from the display. AIS ASM does not apply one user functionality rule both for removal from storage and for add/remove from the display.

The three categories of AIS ASM objects are:

1) Addressed (FI = 18, 20, 23, 28, 30 and 32)

- a) transmitted as addressed to a single vessel identified by the MMSI (AIS Message 6, Destination ID);
- b) transmission is repeated until the source ends repetition or the destination has acknowledged received AIS ASM (AIS Message 7);
- c) there is no timeout for automatic removal of the received AIS ASM;
- d) automatic removal of AIS ASM object FI = 23 or FI = 28 happens after reception of a cancellation message as per IMO SN.1/Circ.289;
- e) when the storage capacity limit is reached, the oldest AIS ASM object is replaced by the new AIS ASM object. The oldest AIS ASM object is the object for which the last reception of any related AIS ASM is the oldest;
- f) an individual AIS ASM object can be removed from the storage by the user;
- g) optionally received AIS ASM objects may be excluded and AIS ASM objects may be automatically removed from the storage by user selectable criteria. Examples of criteria are:
 - i) selected range: when outside, then excluded from reception and removed from the storage;
 - ii) selected by sub-layers (see Annex J): when de-selected, then excluded from reception and removed from the storage;
 - iii) selected by source (MMSI of source): when de-selected, then excluded from reception and removed from the storage;
 - iv) selected by FI: when de-selected, then excluded from reception and removed from the storage;
 - v) selected time since reception, when time passed, then excluded from reception and removed from the storage;

2) Broadcast – Date dependent (FI = 19, 22, 26, and 27; Include "end of validity")

- a) transmitted as broadcast (AIS Message 8) with the combination of received AIS ASM information (i.e. AIS ASM object) and including "end of validity" concept related information;
- b) transmission is repeated until end of validity;
- c) optionally received AIS ASM may be excluded and AIS ASM objects may be automatically removed from the storage by user selectable criteria. Examples of criteria are:
 - i) selected range: when outside, then excluded from reception and removed from the storage;
 - ii) selected by sub-layers (see Annex J): when de-selected, then excluded from reception and removed from the storage;
 - iii) selected by source (MMSI of source): when de-selected, then excluded from reception and removed from the storage;
 - iv) selected by FI: when de-selected, then excluded from reception and removed from the storage;
 - v) selected time since reception, when time passed, then excluded from reception and removed from the storage;
- d) automatic removal of AIS ASM object from the storage happens at the end of validity or after reception of a cancellation message as per IMO SN.1/Circ.289;
- e) when the storage capacity limit is reached, the behaviour is as described by the manufacturer in the user manual;

- 3) Broadcast – Other (FI = 19, 21, 22, 26, 27, 29 and 31; Not including "end of validity")
- a) transmitted as broadcast (AIS Message 8) with the combination of received AIS ASM information (i.e. AIS ASM object) and does not include "end of validity" concept related information;
 - b) transmission is repeated as long as the information is valid;
 - c) timeout for automatic removal of AIS ASM objects from the storage is 18 min from the last AIS ASM reception for a single AIS ASM object;
 - d) when the storage capacity limit is reached, the oldest AIS ASM object is replaced by the new AIS ASM object;
 - e) optionally received AIS ASM may be excluded and AIS ASM objects may be automatically removed from the storage by user selectable criteria. Examples of criteria are:
 - i) selected range: when outside, then excluded from reception and removed from the storage;
 - ii) selected by sub-layers (see Annex J): when de-selected, then excluded from reception and removed from the storage;
 - iii) selected by source (MMSI of source): when de-selected, then excluded from reception and removed from the storage;
 - iv) selected by FI: when de-selected, then excluded from reception and removed from the storage.

5.15.3 AIS ASM capacity

5.15.3.1 Requirements

If implementation of AIS ASM is provided, the equipment shall provide the capability to process and to display a minimum number of AIS ASM objects according to Table 7.

Table 7 – AIS ASM object capacity

AIS ASM object category	Minimum display capacity	Minimum processing capacity
Addressed and intended for own ship	10	10
Broadcast – Data dependent	20	20
Broadcast – Other	12	12
Storage capacities for each category should be bigger than or equal to display capacities for each category.		

The user manual shall specify the processing and display capacity of AIS ASM objects for each category. In addition, the user manual shall describe the operational consequences to the processing and display of current and new AIS ASM objects from the user point of view in the event that the capacity is at the maximum provided for each case specified in Table 7 when further AIS ASM objects are received.

For the AIS ASM categories "Addressed" and "Broadcast – Other" when reaching the capacity limit, on reception of AIS ASMs for a new AIS ASM object, the oldest AIS ASM object shall be replaced in the storage by the new AIS ASM object.

There shall be an indication, or an alert (e.g. a caution) if specified by individual equipment standards, when the AIS ASM processing or display capacity has been exceeded.

For AIS ASM objects of category "Addressed", the user shall be able to remove individual AIS ASM objects from the storage.

AIS ASM objects shall be automatically removed from the storage after reception of a cancellation message as per IMO SN.1/Circ.289.

Optionally, the functionality of the exclusion of received AIS ASMs and removal of AIS ASM objects from the storage may be provided by criteria. If provided, the user manual shall describe the functionality including details of the user selectable criteria. The functionality shall operate based on the criteria described in the user manual.

AIS ASM objects of category "Broadcast – Date dependent" shall be automatically removed from the storage after the end of validity (see 5.15.1).

AIS ASM objects of category "Broadcast – Other" shall be automatically removed from the storage after 18 min from the last received AIS ASM related to the AIS ASM object.

NOTE The nominal reporting interval is assumed to be 6 min.

EXAMPLE An area notice exists as long as reports for it are received at least once within the timeout period of 18 min and as long as it is within its specified validity period (i.e. until end of "duration" starting from "start date and time of area") and as long as it is not cancelled (i.e. "duration = 0").

5.15.3.2 Methods of test and required results

The methods of test and the required results are as follows:

- a) confirm by inspection of user manual that it specifies the processing and display capacity of AIS ASM objects and that at least the minimum capacities according to Table 7 are provided;
- b) confirm by inspection of the user manual that it describes the operational consequences to the processing and display of AIS ASM objects in the event that the capacity is at the maximum provided for each case when further AIS ASM objects are received;
- c) use the AIS simulator and confirm by observation that for AIS ASM categories "Addressed" and "Broadcast – Other" at reaching the capacity limit on reception of AIS ASMs for a new AIS ASM object the oldest AIS ASM object is replaced in the storage by the new AIS ASM object;
- d) use the AIS simulator and confirm by observation that there is an indication, or an alert (e.g. a caution) if specified by individual equipment standards, when the capacity of processing or display of AIS ASM objects has been exceeded and that the EUT operates as described in the user manual;
- e) use the AIS simulator and confirm by observation that AIS ASM objects of the AIS ASM category "Addressed" can be removed from the storage by user selection of individual AIS ASM object;
- f) use the AIS simulator and confirm by observation that AIS ASM objects are automatically removed from the storage after reception of a cancellation message as per IMO SN.1/Circ.289;
- g) if provided, confirm by inspection of the user manual that it describes the functionality of the exclusion of received AIS ASMs and removal of AIS ASM objects from the storage including details of the user selectable criteria;
- h) if provided, use the AIS simulator and confirm by observation that the functionality of exclusion of received AIS ASMs and removal of AIS ASM objects from the storage operate based on the user selectable criteria as described in the user manual and does not operate based on individual AIS ASM objects;
- i) use the AIS simulator and select display of all provided cases and confirm by observation that AIS ASM objects of the AIS ASM category "Broadcast – Date dependent" are removed after the end of validity;
- j) use the AIS simulator and select display of all provided cases and confirm by observation that AIS ASM objects of AIS ASM category "Broadcast – Other" are automatically removed after 18 min from the last received AIS ASM related to the AIS ASM object.

5.15.4 AIS ASM display

5.15.4.1 Requirement

Presentation on case-by-case basis for each AIS ASM Functional Identifier and display sub-layer (see Table J.1) may be provided.

If implementation of AIS ASM is provided, the user manual shall specify which AIS ASM Functional Identifiers and display sub-layers are supported (see Table J.1).

It shall be possible to add or remove AIS ASM objects from the display by layer or sublayer as defined in Table J.1, but not as individual objects.

Optionally, the equipment may allow the user to select by criteria which AIS ASM objects are displayed. Examples of criteria are:

- a) selected range: when outside, then not displayed;
- b) selected by source (MMSI of source): when de-selected, then not displayed;
- c) selected time since reception: when time passed, then not displayed.

AIS ASM objects shall be presented by means of an appropriate symbol or symbols displayed using the reported position. For selection of appropriate symbols, see Annex J. The shape of the symbol shall be as defined in Annex A.

NOTE Some AIS ASM objects require more than one symbol to present the information therein.

Where the user settings cause multiple different AIS ASM point symbols to be presented in the same position, a symbol shall be presented to represent all the AIS ASM point symbols at that position as follows:

- when the multiple different AIS ASM point symbols only include two or more of the symbols 5.6 (tidal and water level info), 5.7 (signal station) and/or 5.13 (environmental report) in Table A.5, the representing symbol shall be 5.13 (without optional addition of symbol 3.4 (tidal stream));
- when the multiple different AIS ASM point symbols include two or more different symbols including at least one symbol that is not symbol 5.6, 5.7 or 5.13, the representing symbol shall be symbol 5.18 (co-located AIS ASM objects).

Selection of an AIS ASM object for display of its alphanumeric information shall be possible from a list of available AIS ASM objects and by selecting the related symbol of the AIS ASM object.

When selecting the single symbol that represents multiple AIS ASM objects, the details of all the represented AIS ASM objects shall be provided to the user.

An AIS ASM object selected for display of its alphanumeric information shall be identified for point geometry objects by the symbol 2.12 given in Annex A and for line and area geometry objects the user manual shall describe the method used to identify the selection.

For each AIS ASM object selected for the display of its alphanumeric information, the values of the applicable and available fields contained in Table J.1 and Source ID (i.e. MMSI) shall be presented at least in alphanumeric form. The field of text description shall only be shown if content is available.

The alphanumeric presentation of the reason of an AIS ASM "Area Notice" (FI = 22 or 23) is based on "Notice Description". For values 0 to 125 of the "Notice Description", the alphanumeric presentation is the standardized text from the table in IMO SN.1/Circ.289. For value 127 of the "Notice Description", the alphanumeric presentation is the content of the "Associated Text".

The viewing date or viewing date range shall determine which date dependent objects are displayed. The viewing date or viewing date range shall be user selectable. When charted information is present, then the viewing date or viewing data range shall be common with charted information (for example S-57 ENC charts). If a date dependent AIS ASM object does not provide a start of validity information, it shall be considered valid up to the end of the validity.

There shall be a permanent indication when the viewing date or viewing date range does not include the current date. When an equivalent indication is required for charted information, a single, common, indication shall be presented.

AIS ASM objects that include the "end of validity" concept shall only be presented graphically when the viewing date or viewing date range overlaps the validity period.

AIS ASM objects shall not initiate any alerts.

5.15.4.2 Methods of test and required results

Confirm by inspection of user manual that it specifies which AIS ASM Functional Identifiers and display sub-layers are supported (see Table J.1).

If the equipment allows the user to select by criteria which AIS ASM objects are displayed, use the AIS simulator and confirm by observation that the selected criteria are used for the display of AIS ASM objects.

Use the AIS simulator and confirm by observation that the user can add and remove AIS ASM objects from the presentation by layers or sublayers as defined in Table J.1, but not as individual objects.

Use the AIS simulator and confirm by observation for each case supported and available in Table J.1 that AIS ASM objects are displayed at the reported position and that the symbol is as defined in Annex J and that the shape of the symbols is as defined in Annex A.

Use the AIS simulator to create cases of multiple point AIS ASM objects that are supported and that are in the same position (at least, where supported, the cases of: Air Gap + Berthing data; Wind + Weather; Wind + Water level; Tidal window + Water level) and confirm by observation for each case that symbol 5.13 or 5.18 is displayed as required in 5.15.4.1.

Use the AIS simulator and confirm by observation that it is possible to select an AIS ASM object for display of its alphanumeric information from the list of available AIS ASM objects and by selecting the related symbol of the AIS ASM object.

Use the AIS simulator and confirm by observation that, when selecting a single symbol that represent multiple AIS ASM objects, the details of all the represented AIS ASM objects are available to the user.

Use the AIS simulator and confirm by observation that an AIS ASM object selected for the display of its alphanumeric information is identified for point geometry objects by the symbol 2.12 given in Annex A and for line and area geometry objects by the method described in the user manual.

Use the AIS simulator and confirm by observation that, for each AIS ASM object selected for the display of its alphanumeric information, the values of the applicable and available fields contained in Table J.1 and Source ID (i.e. MMSI) are presented and that the field of text description is only shown if content is available.

Use the AIS simulator and confirm by observation that, for each AIS ASM "Area Notice" (FI = 22 or 23), the reason is based on "Notice Description" and that, for values 0 to 125 of the "Notice Description", the alphanumeric presentation is the standardized text from IMO SN.1/Circ.289 and that, for value 127 of the "Notice Description", the alphanumeric presentation is the content of the "Associated Text".

Confirm by observation that the viewing date and viewing date range are user selectable and that, when charted information is present, then the viewing date or viewing data range is common with charted information.

Confirm by observation that there is a permanent indication when viewing date or viewing date range does not include current date and that, when charted information is present, this indication is common with the indicator for the charted information.

Use the AIS simulator and confirm by observation that graphical presentation of AIS ASM objects which include the "end of validity" concept are only presented graphically when the viewing date or viewing date range overlaps the validity period.

Use the AIS simulator and confirm by observation that AIS ASM objects do not initiate any alerts.

5.16 Presentation of AIS synthetic target

5.16.1 Requirement

Presentation of AIS synthetic targets may be provided. If presentation of AIS synthetic targets is provided:

- a) the user manual shall specify the processing and display capacity of AIS synthetic targets. The processing capacity shall be at least 40 AIS synthetic targets and the display capacity shall be at least 20 AIS synthetic targets;
- b) it shall be possible to add or remove AIS synthetic targets from the display as a single layer, but not as individual objects;
- c) means may be provided to filter displayed AIS synthetic targets, for example based on range, speed, course if the information is available;
- d) AIS synthetic targets shall be displayed at the predicted position. The symbol shall be as defined in Annex A;

NOTE 1 FI = 17 VTS-generated/synthetic message includes velocity information. FI = 22 or FI = 23 Area Notices do not include velocity information.

- e) an AIS synthetic target selected for the display of its alphanumeric information shall be identified by the relevant symbol given in Annex A;
- f) for each AIS synthetic target selected for the display of its alphanumeric information, the following information shall be presented:
 - 1) when FI = 17, target identifier;
 - 2) reported position;
 - 3) calculated range from own ship to AIS synthetic target;
 - 4) calculated bearing from own ship to AIS synthetic target;
 - 5) when FI = 17, reported COG (or calculated CTW if the display is sea stabilised). In sea stabilized display, the reported COG shall at least be available on demand;
 - 6) when FI = 17, reported SOG (or calculated STW if the display is sea stabilised). In sea stabilized display, the reported SOG shall at least be available on demand;
 - 7) additional information, where available, shall be provided to the user on request;

If the received AIS synthetic target information is incomplete, then the absent information shall be clearly indicated in the related data field as missing.

The information for a selected AIS synthetic target shall be displayed and continually updated, until another target, AIS data report, AIS locating device or AIS synthetic target is selected for information display or, if applicable, until the user dialogue area is closed.

NOTE 2 Information can be displayed in a separate user dialogue area.

- g) AIS synthetic targets shall be automatically removed after 18 min from the last received report;

NOTE 3 Assumed nominal reporting interval is 6 min.

- h) if applicable, AIS synthetic targets shall be automatically removed after the end date and time specified or after receiving a cancellation message;
- i) AIS synthetic targets shall not initiate any alerts;
- j) there shall be an indication, or an alert (e.g. a caution) if specified by individual equipment standards, when the processing or display capacity for AIS synthetic targets has been exceeded.

5.16.2 Methods of test and required results

Where presentation of AIS synthetic targets is provided:

- a) confirm by observation that the user manual specifies the processing and display capacity of AIS synthetic targets and that at least the minimum capacities are provided;
- b) use the AIS simulator and confirm by observation that it is possible to add or remove AIS synthetic targets from the display as a single layer, but not as individual objects;
- c) if provided, use the AIS simulator and confirm by observation that means are provided to filter displayed AIS synthetic targets, for example based on range, speed, course;
- d) use the AIS simulator and confirm by observation that an AIS synthetic target is displayed at the predicted position and that the AIS synthetic target is not capable of being processed, for example updated by dead reckoning. Confirm by observation that the symbol is as defined in Annex A;
- e) use the AIS simulator and confirm by observation that an AIS synthetic target selected for the display of its alphanumeric information is identified by the relevant symbol given in Annex A;
- f) use the AIS simulator and confirm by observation that, for each selected AIS synthetic target, the following information is presented in alphanumeric form:
 - 1) when FI = 17, target identifier;
 - 2) reported position;
 - 3) calculated range from own ship to AIS synthetic target;
 - 4) calculated bearing from own ship to AIS synthetic target;
 - 5) when FI = 17, reported COG (or calculated CTW if the display is sea stabilised). In sea stabilized display, the reported COG is at least be available on demand;
 - 6) when FI = 17, reported SOG (or calculated STW if the display is sea stabilised). In sea stabilized display, the reported SOG is at least be available on demand;
 - 7) additional information, where available on user's request;

Confirm by observation that there is a clear indication of absent information in the related data field.

Confirm by observation that information displayed for a selected AIS synthetic target is continually updated and that the information displayed for a selected AIS synthetic target remains displayed until another target, AIS data report, AIS locating device or AIS synthetic target is selected or the user dialogue is closed;

- g) use the AIS simulator and confirm by observation that an AIS synthetic target is automatically removed after 18 min from the last received report;

- h) use the AIS simulator and confirm by observation that, if applicable, an AIS synthetic target is automatically removed after the end date and time specified or after receiving a cancellation message;
- i) use the AIS simulator and confirm by observation that AIS synthetic targets do not initiate any alerts;
- j) use the AIS simulator and confirm by observation that there is an indication, or an alert (e.g. a caution) if specified by individual equipment standards, when the processing or display capacity for AIS synthetic targets has been exceeded.

5.17 Presentation of association of DSC received call with a displayed AIS object

5.17.1 Requirement

Presentation of DSC received call associations may be provided. If presentation of DSC received call associations is provided:

- a) DSC received calls shall be associated with an AIS object based on MMSI. If the equipment has no AIS object with the same MMSI, then the DSC received call shall not be presented graphically;

NOTE 1 Typical AIS objects for this association include AIS targets, AIS locating devices and AIS synthetic targets.

- b) the user manual shall specify the processing and display capacity of associations of DSC received calls. The processing capacity shall be at least 40 associations of DSC received calls and the display capacity shall be at least 20 associations of DSC received calls;
- c) it may be possible to add or remove DSC received calls from the display as a single layer, but not as individual objects;
- d) if an AIS object, for which an association of a DSC received call is available, is displayed and, where applicable, if the layer of association of DSC received calls is enabled, then the appropriate symbol 5.16 given in Annex A shall be displayed;
- e) if an AIS object, for which an association of a DSC received call is available, is selected for the display of its alphanumeric information, then the information received for the association of the DSC received call shall be readily available;

NOTE 2 The AIS object associated with the DSC received call contains itself a lot of up-to-date information which is available from the selected AIS object itself.

NOTE 3 Some examples of alphanumeric information available from DSC, DSE, ECI sentences include: type of DSC call, category of distress call, nature of distress, time of reception.

- f) it shall be possible for the user to remove an association of a DSC received call from the database;
- g) an association of a DSC received call shall be automatically removed from the database after 8 h from the last received report;

NOTE 4 The above requirement assumes reporting is just a single report.

- h) association of DSC received calls with an AIS object shall not initiate any alerts;
- i) there shall be an indication, or an alert without audible announcement (i.e. a caution) if specified by individual equipment standards, when the processing or display capacity for association of DSC received calls has been exceeded.

5.17.2 Methods of test and required results

Where presentation of association of DSC received calls is provided:

- a) use the DSC simulator and the AIS simulator to provide DSC received calls and confirm by observation that an association of DSC received call is connected to an AIS object based on MMSI. Use the simulator arrangement and confirm by observation that, if the equipment has no AIS object with same MMSI, then the association of DSC received call is ignored;
- b) confirm by observation that the user manual specifies the processing and display capacity of association of DSC received calls and that at least the minimum capacities are provided;

- c) use the DSC simulator and the AIS simulator to provide DSC received calls and confirm by observation that, if applicable, it is possible to add or remove association of DSC received calls from the display as a single layer, but not as individual objects;
- d) use the DSC simulator and the AIS simulator to provide a DSC received call and confirm by observation that if an AIS object, for which an association of DSC received call is available, is displayed and if the layer of association of DSC received call is enabled, then the symbol 5.16 given in Annex A is displayed;
- e) use the DSC simulator and the AIS simulator to provide a DSC received call and confirm by observation that, if a target for which the association of DSC received call is available, is selected for the display of its alphanumeric information, then the information received for the association of DSC received call is readily available;
- f) use the DSC simulator and the AIS simulator to provide a DSC received call and confirm by observation that user can remove the association of DSC received call from the database;
- g) use the DSC simulator and the AIS simulator to provide a DSC received call and confirm by observation that the association of DSC received call is automatically removed after 8 h from the last received report;
- h) use the DSC simulator and the AIS simulator to provide DSC received calls and confirm by observation that association of DSC received calls do not initiate any alerts;
- i) use the DSC simulator and the AIS simulator to provide DSC received calls and confirm by observation that there is an indication, or an alert without audible announcement (i.e. a caution) if specified by individual equipment standards, when the processing or display capacity for association of DSC received calls has been exceeded.

5.18 AIS ASM information extending reported AIS target information

5.18.1.1 Requirement

Presentation of AIS ASM information extending reported AIS target information may be provided. Table 8 specifies the reported AIS target information extended by AIS ASM messages and the function identifiers (FI) of AIS ASM messages which extends the reported AIS target information (see 5.5.11).

If presentation of AIS ASM information extending reported AIS target information is provided, the extended reported AIS target information of Table 8 shall be linked to the reported AIS target information (see 5.5.11) and shall be available on demand in alphanumeric form.

NOTE AIS ASM (DAC = 001, FI = 16 or FI = 24) are available to be sent by AIS equipment by internal decision or by external request. The assumed reporting rate is every 6 min.

Table 8 – Extended reported AIS target information from AIS ASM

Reported AIS target extended information (IMO SN.1/Circ.289)	AIS ASM source FI
Last Port of Call	24
Next Port of Call	24
Air Draught	24
Diesel	24
Gross tonnage	24
Heavy fuel oil	24
Ice class	24
Laden or Ballast	24
Light fuel oil	24
Lloyd's Ship type	24
Number of Persons	16, 24
Second Port of call	24
Shaft Horse power	24
SOLAS Equipment status	24
Total amount of bunker oil in tonnes	24
VHF Working channel	24

5.18.1.2 Methods of test and required results

Where presentation of AIS ASM information extending reported AIS target information is provided, use the AIS simulation to provide each item of reported AIS target information in Table 8 and confirm by observation that the information is available on demand.

5.19 Received AIS safety related messages

5.19.1 Requirements

Presentation of received AIS safety related messages may be provided. If provided, these requirements apply unless otherwise specified by an individual equipment standard.

The received AIS safety related messages consist of AIS safety related messages sent by AIS targets, AIS base stations and AIS SAR aircraft. The presentation of AIS safety related messages is independent of the graphical presentation of the AIS target, AIS base station, or AIS SAR aircraft.

The user shall be able to tag individual safety related messages for permanent retention (retained). These messages shall not be overwritten by new messages. When no longer required, or when the storage capacity available for retained messages has been reached, the user shall be able to remove the tag on these messages which may then be overwritten in normal course.

The user manual shall specify the processing capacity of received AIS safety related messages. The processing capacity shall be at least 60 AIS safety related messages sub-divided as last 20 addressed, last 20 broadcast and 20 retained by user. AIS safety related messages sent by AIS locating devices and AIS AtoNs are processed and managed separately, see 5.14 and 5.13.

Received AIS safety related messages shall be linked to a source based on MMSI.

If an AIS target, AIS base station or AIS SAR aircraft for which an unread received AIS safety related message is available or if the content of a received AIS safety related message is selected for display is displayed, then the appropriate symbol given in Annex A (symbol 5.16) shall be displayed based on user selection. It shall not be possible to remove individual symbols associated with the received AIS safety related message sources from the presentation.

In this document, there are no requirements for synchronization of this functionality between individual equipment (e.g. between AIS and Radar).

Users shall have means (for example a list of received messages) to retrieve and individually view the field "safety related text" and the UTC time, if available, of receipt by the display equipment of at least the last 20 addressed and last 20 broadcast AIS safety related messages received and at least 20 received AIS safety related messages retained by the user. Using these means, the user shall be able to select the related AIS object based on MMSI for alphanumeric presentation of information.

Users shall have means to remove any individual or all received AIS safety related messages. After changing a single or all received AIS safety related messages in the storage to "retained" or "read" or after manual or automatic removal of a single or all unread received AIS safety related messages, the related symbol 5.16 given in Annex A shall no longer be displayed.

Received AIS safety related messages having identical source and content shall replace existing messages that they duplicate and shall maintain the status of the received AIS safety related message, retained, read or unread, as it was before. The time of receipt shall be set based on the newly received AIS safety related message.

The oldest not retained received AIS safety related message shall be automatically removed when the storage capacity for the last received messages is fully occupied and a new AIS safety related message is received.

An indication that there are unread received AIS safety related messages available shall be provided.

An indication of which received AIS safety related-messages are unread or retained shall be provided.

5.19.2 Methods of test and required results

If presentation of received AIS safety related messages from AIS targets, AIS base stations and AIS SAR aircraft is provided, apply the following tests, unless otherwise specified by an individual equipment standard:

- a) confirm by observation that the user manual specifies the processing capacity of received AIS safety related messages and that at least the minimum capacities are provided;
- b) use the AIS simulator to send the storage capacity of the equipment plus one received AIS safety related message and confirm by observation that:
 - the storage capacity for AIS safety related messages is at least the last 20 addressed and the last 20 broadcast received messages plus at least 20 retained messages;
 - the oldest received message has been automatically removed;
 - each received AIS safety related message is initially in the state of "unread";
 - there is an indication that there are "unread" received AIS safety related messages available;
 - received AIS safety related messages are linked to the sources based on MMSI;
 - duplicate received AIS safety related message having identical source and content replace existing message and maintain the status, retained, read or unread, as it was before;

- when enabled by the user, AIS targets, AIS base stations and/or AIS SAR aircraft with linked and unread received AIS safety related messages are indicated by appropriate symbols in connection to the displayed AIS target, AIS base station and/or AIS SAR aircraft symbols;
 - when enabled by the user, an AIS target, AIS base station or AIS SAR aircraft for which the content of a received AIS safety related message is selected for display is indicated by an appropriate symbol in connection to the displayed symbol of AIS target, AIS base station or AIS SAR aircraft;
 - it is not possible to remove received AIS safety related message symbols from AIS targets, AIS base stations and AIS SAR aircraft based on individual received AIS safety related messages;
- c) confirm by observation that it is possible to remove any individual or all received AIS safety related messages;
- d) confirm by observation that a duplicate AIS safety related message replaces the existing message maintaining the status of the existing message retained, read or unread, as it was before and that the time of receipt is set based on the newly received AIS safety related message;
- e) confirm by observation that the alphanumeric content and the time of receipt of each received AIS safety related message is available for viewing together with the state (unread/read/retained) indication applicable for the individual received AIS safety related message;
- f) confirm by observation that, after changing all received AIS safety related messages in the storage to "read" or "retained", the indication of unread received AIS safety related messages available is no longer displayed;
- g) confirm by observation that, using the means provided, the user is able to select the related AIS object based on MMSI for alphanumeric presentation of information;
- h) confirm by observation that, after changing a single or all received AIS safety related messages in the storage to "retained" or "read" or after manual or automatic removal of a single or all unread received AIS safety related messages, the related symbols (5.16, see Annex A) are no longer displayed.

5.20 Sent AIS safety related messages

5.20.1 Requirements

Facilities to send AIS safety related messages may be provided. If provided, these requirements apply unless otherwise specified by an individual equipment standard.

It shall not be possible to send AIS addressed safety related messages to AIS targets which have reported the DTE indicator = 1 (not available).

NOTE The purpose of the data terminal equipment (DTE) indicator is to indicate to an application on the receiving side that, if set to available, the transmitting station conforms at least to the minimum keyboard and display requirements.

5.20.2 Methods of test and required results

If facilities to send AIS safety related messages are provided and unless otherwise specified by an individual equipment standard, confirm by observation that, when a safety related message is sent to an AIS target and the state of the addressed AIS target is DTE = 1, an indication is given that the sent AIS safety related message may not be displayed at the recipient. **5**

6 **INS**, radar and chart displays

6.1 General

6.1.1 Application

NOTE See IEC 62388 for equivalent tests for Clause 6 for radar equipment.

The provisions of this Clause 6 are applicable to stand-alone displays, associated with radar systems or responsible for the presentation of electronic chart information (for example, ECDIS) and multifunction display equipment when providing a radar or chart display.

6.1.2 Multifunction displays

6.1.2.1 Requirement

(MSC191/7.1.1) *If the display equipment is capable of supporting the presentation of multiple functions or operational modes, then there shall be a clear indication of the primary function supported by the presentation (for example, radar, chart, etc.). It shall be possible to select the presentation associated with the primary function, for example, the radar presentation (see 6.2) or the chart presentation (for example, ECDIS) (see 6.3), by a simple operator action.*

~~Note that if multifunction display equipment provides the primary presentation for multiple navigational systems and equipment required or allowed for carriage (for example, radar or ECDIS), then redundant display equipment should be available. The number of displays fitted on the bridge of a ship should support the simultaneous presentation of information for all navigational systems and equipment.~~ **21**

6.1.2.2 Methods of test and required results

Where display equipment is capable of supporting the presentation of multiple functions:

- a) confirm by observation that the primary function of the display equipment is clearly indicated;
- b) confirm by observation that the presentation associated with the primary function can be selected by a simple operator action.

6.1.3 Simultaneous display of radar and chart data

6.1.3.1 Requirement

(MSC191/7.1.2) *If a radar video image and electronic chart information are displayed together, the chart and the radar video image shall use the same reference system and co-ordinate criteria, including, as applicable, datum, CCRP, and stabilisation mode, and shall match in scale, projection and orientation. Any user-entered offset, in addition to installation alignment (for example, to CCRP and/or heading reference), shall be indicated. The details of the offset shall be readily available to the user.*

NOTE The Performance Standards for individual navigational systems and equipment provide functional requirements for offsets.

6.1.3.2 Methods of test and required results

Where a radar video image and electronic chart information are displayed together:

- a) confirm by observation that they use the same reference system and co-ordinate criteria;
- b) confirm by observation that they use the same stabilisation mode;
- c) confirm by observation that they match in scale, projection and orientation;
- d) confirm by observation that an indication is provided for any user-entered offset to the presentation of either the radar video image or the electronic chart information;

e) confirm by observation that the details of the user-entered offset are readily available.

6.1.4 Range scales

6.1.4.1 Requirement

(MSC191/7.1.3) If a radar video image is displayed, *range scales of 0,25, 0,5, 0,75, 1,5, 3, 6, 12 and 24 nautical miles shall be provided. Additional range scales are permitted below 0,25 NM and/or above 24 NM. The selected range scale shall be clearly and permanently or persistently indicated, as appropriate for the application.*

Metric units may also be provided. (See also 5.10.2.)

6.1.4.2 Methods of test and required results

Where a radar video image is displayed:

- confirm by observation that range scales of 0,25, 0,5, 0,75, 1,5, 3, 6, 12 and 24 NM are provided for user selection;
- where additional range scales are provided, confirm by observation that they are below 0,25 NM and/or above 24 NM;
- confirm by observation that the selected range scale is clearly indicated and remains visible while the radar video image is displayed.

6.1.5 Operational display area

6.1.5.1 Requirement

(MSC191/7.1.5) *No part of the operational display area shall be permanently used for the presentation of information that is not part of the navigational presentation (for example, pop up displays, drop down menus and information windows). Temporary, limited and relevant alphanumeric data, information and text may be displayed adjacent to a selected symbol, graphic or target within the operational display area.*

Any windows containing text, diagrams, etc. superimposed on the operational display area shall be temporary and movable (for example, to a less important part of the display, such as on land).

Note that display equipment should avoid the use of dialogue boxes using white backgrounds, or provide a means or method of automatically changing the background of dialogue boxes which appear on displays set for use in dusk or dark conditions.

6.1.5.2 Methods of test and required results

The methods of test and the required results are as follows:

- confirm by observation that any information that is not part of the navigational presentation but is superimposed on the operational display area is presented only in response to an explicit user action (for example, a menu selection, hyperlink, hot key, etc.);
- confirm by observation that any windows containing text, diagrams, etc. superimposed on the operational display area are movable within the operational display area or can be removed from the operational display area.

6.1.6 Motion display modes

6.1.6.1 Requirement

A clear indication of the motion mode in use shall be provided. (See also 4.10.1)

6.1.6.2 Methods of test and required results

Verify that a clear indication of the display mode in use is provided in accordance with 4.10.1.

6.1.7 Orientation modes

6.1.7.1 Requirement

A north up orientation mode shall be provided for radar and chart presentations.

A course up orientation mode shall be provided for radar presentations and may be provided for chart presentations.

A head up orientation mode may be provided for both radar and chart presentations.

A clear indication of the orientation mode in use shall be provided. (See also 4.10.1)

It shall always be possible to display the SENC information in a north-up orientation. Other orientations are permitted. When such orientations are displayed, the orientation shall be altered in steps large enough to avoid unstable display of the chart information.

6.1.7.2 Methods of test and required results

The methods of test and the required results are as follows:

- a) confirm by observation that a north up orientation mode is provided;
- b) for radar displays, confirm by observation that a course up orientation mode is provided;
- c) verify that a clear indication of the orientation mode in use is provided in accordance with 4.10.1;
- d) for each bearing stabilised orientation that may be provided, confirm by analytical evaluation that, for rates of turn between $0^\circ/\text{s}$ and $20^\circ/\text{s}$, the displayed chart symbols and text in the operational display area do not re-orient more often than twice per second and remain legible.

6.1.8 Off-centring

6.1.8.1 Requirement

If a radar video image is displayed, manual off-centring shall be provided to locate the selected antenna position (i.e. the centre of the radar video image) at any point within at least 50 % and not more than 75 % of the radius, measured from the centre of the operational display area. This limitation is only applicable for Radar or Radar-mode available in the equipment (for example, this limitation is not valid for radar overlay in an ECDIS).

If a radar video image is displayed, and an off-centred display is selected, the selected antenna position shall be capable of being located to any point on the display up to at least 50 %, and not more than 75 %, of the radius from the centre of the operational display area. A facility for automatically positioning own ship for the maximum view ahead may be provided. This limitation is only applicable for Radar or Radar-mode available in the equipment (for example, this limitation is not valid for radar overlay in an ECDIS).

If a radar video image is displayed, and an off-centred display and true motion display mode are selected, the selected antenna position shall automatically reset at least 50 %, and not more than 75 %, of the radius from the centre of the operational display area to a location giving the maximum view along own ship's course. Provision for an early reset of the selected antenna position shall be provided. This limitation is only applicable for Radar or Radar-mode available in the equipment (for example, this limitation is not valid for radar overlay in an ECDIS).

6.1.8.2 Methods of test and required results

Where a radar video image is displayed in a Radar or Radar-mode (not, for example, as a radar overlay on ECDIS):

- a) confirm by observation that manual off-centring is provided;
- b) confirm by observation that manual off-centring provides the capability to locate the selected radar antenna position at any point in the operational display area at least 50 % and not more than 75 % of the radius measured from the centre;
- c) where an off-centred display and 20 true motion display mode is selected,
 - 1) confirm by observation that the selected radar antenna position is automatically reset at least 50 %, and not more than 75 %, of the radius from the centre of the operational display area,
 - 2) confirm by observation that the user may manually reset the selected radar antenna position.

6.1.9 Stabilisation modes

6.1.9.1 Requirement

If electronic chart information is displayed, then a ground stabilisation mode shall be provided.

Where radar information is displayed, both ground and sea stabilisation modes shall be provided.

The stabilisation mode and stabilisation source (i.e. velocity or speed source) shall be clearly indicated. (See also 4.10.1.)

NOTE Ground stabilisation requires a ground-referenced velocity (i.e. COG/SOG) from an external sensor capable of providing own ship speed measured over the ground (for example, an EPFS). Sea stabilisation requires a water-referenced velocity (i.e. CTW/STW or HDG/SPD) from an external sensor capable of providing own ship speed measured through the water (for example, an SDME).

6.1.9.2 Methods of test and required results

The methods of test and the required results are as follows:

- a) where electronic chart information is displayed, confirm by observation that a ground stabilisation mode is provided;
- b) where a radar information is displayed, confirm by observation that both ground and sea stabilisation modes are provided;
- c) confirm by observation that a clear indication of the stabilisation mode selected and its source are provided.

6.2 Radar displays

6.2.1 Application

The provisions of 6.2 are applicable to stand-alone displays associated with radar systems and multifunction displays when providing a radar display.

NOTE The functional requirements for radar are defined in the performance standards set forth in IMO Resolution MSC.192(79) and further specified in IEC 62388. The presentation requirements for radar information are defined in the performance standards for presentation set forth in IMO Resolution MSC.191(79) and further specified in this document.

6.2.2 Radar video image

6.2.2.1 Requirement

(MSC191/7.2.1.1) The *radar video image* (i.e. echoes), *tracked radar targets* and reported AIS targets shall *not be substantially degraded, masked or obscured by other presented information*. (See also 5.4.1.)

(MSC191/7.2.1.2) *It shall be possible to temporarily suppress all graphical information from the display, retaining only the radar video image and target trails.*

6.2.2.2 Methods of test and required results

The methods of test and the required results are as follows:

- a) confirm by analytical evaluation that the presentation of the radar video image, tracked radar targets and reported AIS targets is not degraded, masked or obscured by other presented information;
- b) confirm by observation that the user can suppress the presentation of all graphical information so that only the radar video image and target trails remain.

6.2.3 Brightness of radar information

6.2.3.1 Requirement

(MSC191/7.2.1.3) *The brightness of the radar video image (i.e. echoes) and associated graphic symbols for tracked radar targets shall be variable. It shall be possible to control the brightness of all displayed radar information. There shall be independent means to adjust the brightness of groups of displayed graphics and alphanumeric data, information and text (for example, tracked radar targets, navigation tools, etc.). The brilliance (i.e. brightness) of the heading line shall not be variable to extinction.*

6.2.3.2 Methods of test and required results

The methods of test and the required results are as follows:

- a) confirm by observation that a means or method to adjust the brightness of the radar video image is provided;
- b) confirm by observation that a separate independent means or method to adjust the brightness of tracked radar target symbols is provided;
- c) confirm by observation that a separate independent means or method to adjust the brightness of groups of other displayed graphics and alphanumeric data, information and text is also provided;
- d) confirm by observation that the brightness of the heading line cannot be adjusted to the point of extinction.

6.2.4 Display of chart information on radar

6.2.4.1 Requirement

(MSC191/7.2.2.1) *Vector format electronic chart information may be presented on a radar display. This shall be accomplished using layers (i.e. of charted objects or elements) selected from an electronic chart database. As a minimum, the elements of the ECDIS Standard Display (see IEC 61174) shall be available for individual selection by IMO display category or layer (for example, by IHO suggested viewing group, see IHO S-52), but not as individual objects. As far as practical, electronic chart information shall be presented in accordance with this document (see 4.5.1, 4.6.2 and 5.5.1) and with the ECDIS Performance Standards (IEC 61174). Raster navigational charts are not permitted for chart radar applications.*

NOTE IEC 62388 requires a subset of the ECDIS standard display, called the primary chart information set, to be made available by a primary control function.

(MSC191/7.2.2.3) If electronic *chart information is displayed* on a radar presentation, then *there shall be a permanent or persistent indication of its status* (for example, on/off, official/unofficial data, overscale/underscale, etc.), as appropriate for the application. *The source and update information shall also be available* to the user on demand.

Note that the overscale area pattern addressed in the relevant IHO standards, for example IHO S-52 and ~~provided in the~~ IHO ECDIS Presentation Library 15, may obscure or degrade the presentation of the radar video image. An alternative means or method of overscale indication (for example, the display of an overscale factor) is an acceptable alternative.

If electronic chart information is presented on a radar display, it shall be possible to temporarily remove it by a single operator action and also to switch charts on and off.

6.2.4.2 Methods of test and required results

When vector format electronic chart information is presented on a radar display:

- a) confirm by observation that the content of the electronic chart database includes all of the elements specified by the IMO for the ECDIS standard display (see IEC 61174);
- b) confirm by observation that elements of the standard display are available for selection (i.e. for display) by IMO display category and/or by layer, but not as individual chart objects;
- c) verify the presentation of vector format electronic chart information in accordance with 4.5.1, 4.6.2 and 5.5.1;
- d) confirm by observation that raster format electronic chart information cannot be presented when the radar is displayed;
- e) where electronic chart information is presented in shades of grey, confirm that they are distinguishable between respective chart features;
- f) confirm by observation that a permanent indication of the status (official/unofficial data and overscale/underscale) of the electronic chart information is provided;
- g) confirm by observation that the source of the electronic chart information and its update information are available to the user on demand;
- h) confirm by observation that the user may temporarily remove electronic chart information from the display by a single operator action and that there is a facility to switch charts on and off. The temporarily removed function may be combined with other functions;
- i) confirm by document inspection that the user manual describes all available chart functionalities;
- j) confirm by document inspection that the EUT has no functionality to use raster navigational charts;
- k) verify the testing of colours and intensity in accordance with the test methods and required results of the Annex G.

6.2.5 Priority of radar information

6.2.5.1 Requirement

(MSC191/7.2.2.2) If electronic *chart information is presented within the operational display area*, the presentation of *radar information* (for example, the radar video image, target trails, etc.) shall *have priority*. The electronic chart information shall *be clearly perceptible as such*. The electronic chart information shall *not substantially degrade, mask or obscure the radar video image, tracked radar targets or reported AIS targets*.

6.2.5.2 Methods of test and required results

When electronic chart information is presented on a radar display:

- a) confirm by observation that the radar video image and target trails have display priority over the electronic chart information;

- b) confirm by analytical evaluation that the presentation of electronic chart information cannot be confused with the display of any other information (for example radar information or AIS information);
- c) confirm by analytical evaluation that the presentation of the electronic chart information does not substantially degrade, mask or obscure the presentation of radar information in accordance with 6.2.2.

6.2.6 Display of map graphics

6.2.6.1 Requirement

(MSC191/7.2.3) User generated radar *map graphics* including monitored and/or additional planned routes *may be* presented on a radar display, *but shall not substantially degrade, mask or obscure the radar video image, target trails, tracked radar targets, reported AIS targets, or electronic chart information.*

~~Note that~~ Where a radar system provides map graphics for monitored and/or planned routes, it ~~should~~ **shall** comply with the relevant clauses of IEC 61174.

Map graphics may be referenced to own ship or to a geographical position. It shall be possible to remove the display of map graphics by a simple operator action.

Map graphics may consist of lines, symbols and reference points.

The appearance and colours of map graphic lines and symbols are set forth in Annex A.

6.2.6.2 Methods of test and required results

When user generated map graphics are displayed on a radar presentation:

- a) confirm by analytical evaluation that map graphics do not substantially degrade, mask or obscure the radar video image, target trails, tracked radar targets, reported AIS targets or electronic chart information;
- b) confirm by observation that map graphics can be referenced to own ship or to a geographic position;
- c) confirm by observation that the user may remove the display of map graphics by a simple operator action;
- d) confirm by observation that the appearance and colour of the map graphics lines, symbols and reference points are in accordance with Annex A;
- e) **where a radar system provides map graphics for monitored and/or planned routes, confirm by documented evidence that it complies with the relevant clauses of IEC 61174.** 22

6.3 Chart displays

6.3.1 Application

The provisions of 6.3 are applicable to stand-alone displays responsible for the presentation of electronic chart information and multifunction displays when providing a chart display.

NOTE The functional requirements for ECDIS are defined in the performance standards set forth in IMO Resolution MSC.232(82) and further specified in IEC 61174. The presentation requirements for electronic chart information are defined in the performance standards for presentation, set forth in IMO Resolution MSC.191(79) and further specified in this document.

6.3.2 Display of chart information

6.3.2.1 Requirement

(MSC191/7.3.1.1) Electronic chart information *and all updates to it shall be presented without any degradation of information content.*

(MSC191/7.3.1.2) Electronic *chart information* shall *not be substantially degraded, masked or obscured by other presented information* (for example, a radar video image, tracked and/or reported targets, etc.).

6.3.2.2 Methods of test and required results

The methods of test and the required results are as follows:

- a) verify the presentation of electronic chart information in accordance with 4.5.1, 4.6.2 and 5.5.1;
- b) confirm by analytical evaluation that the electronic chart information is not substantially degraded, masked or obscured by other presented information.

6.3.3 IMO ECDIS display categories

6.3.3.1 Requirement

(MSC191/7.3.1.3) *It shall be possible to temporarily suppress all supplemental (e.g. radar, AIS and other overlays) information from the chart display, retaining only chart related information contained in the ECDIS Display Base.* This function is not required to be of single or simple operator action.

It shall be possible to remove radar information, AIS information and other navigational information including all non-charted information from the chart display by a single operator action. Chart display consists of chart itself and all automatic and manual updates for it. This removal may be permanent or momentary.

ENC and other vector format electronic chart information available for presentation on a chart display during route planning and route monitoring shall be subdivided into the following three IMO display categories:

- ECDIS display base;
- ECDIS standard display; and
- all other information.

It shall be possible to present the ECDIS standard display at any time by a single operator action. This single operator action shall not change any non-chart related user settings for the display.

When a chart display is switched on following a switch off or power failure, it shall return to the most recent settings for the display.

6.3.3.2 Methods of test and required results

The methods of test and the required results are as follows:

- a) confirm by observation that the user can suppress the presentation of all graphical information so that only the electronic chart information in the ECDIS Display Base remains;
- b) confirm by observation that, by a single operator action, the user can permanently or momentarily remove the presentation of all additional information so that only the chart display including automatic and manual updates remains;
- c) verify the subdivision of vector format electronic chart information into IMO display categories in accordance with IEC 61174;
- d) verify that the user can select the ECDIS standard display at any time by a single operator action. Confirm by observation that this single operator action does not change any other display setting than the displayed layers of the electronic charts;
- e) confirm by observation that, when the chart display is switched on, the electronic chart information is presented with the most recent display settings.

6.3.4 Adding or removing information from the display

6.3.4.1 Requirement

(MSC191/7.3.1.4) *It shall be possible to add or remove information from the chart display by layer (IHO viewing group, see for example IHO S-52 23), but not as individual objects. It shall not be possible to remove information contained in the ECDIS Display Base (see IEC 61174) from the display. (See also 6.3.2.)*

6.3.4.2 Methods of test and required results

The methods of test and the required results are as follows:

- a) confirm by observation that the user can add and remove information from the presentation by layer but not as individual objects;
- b) confirm by observation that the user cannot remove information contained in the ECDIS display base;
- c) confirm by observation that IHO viewing groups can be individually selected for display.

6.3.5 Safety contour

6.3.5.1 Requirement

(MSC191/7.3.1.5) *It shall be possible to select a safety contour from the depth contours provided by vector format electronic chart information. The safety contour shall be emphasized over other contours on the display in accordance with the relevant IHO standards, for example IHO S-52. 15*

6.3.5.2 Methods of test and required results

The methods of test and the required results are as follows:

- a) confirm by observation that the user can select a safety contour from the depth contours provided in vector format electronic chart information;
- b) confirm by observation that the presentation of the safety contour is emphasised over other depth contours.

6.3.6 Safety depth

6.3.6.1 Requirement

(MSC191/7.3.1.6) *It shall be possible to specify a safety depth. Soundings equal to or less than the safety depth shall be emphasized whenever spot soundings are selected for display.*

6.3.6.2 Methods of test and required results

The methods of test and the required results are as follows:

- a) confirm by observation that the user can specify a safety depth;
- b) confirm by observation that the presentation of spot soundings less than or equal to the safety depth are emphasized over other spot soundings.

6.3.7 Chart scale

6.3.7.1 Requirement

(MSC191/7.3.1.7) *An indication shall be provided if chart information is displayed at a larger scale than contained in the electronic chart database, or if own ship's position is covered by electronic chart information at a larger scale than the presentation.*

(MSC191/7.3.1.8) *Overscaled areas presented on the chart display shall be identified as defined in the relevant IHO standards, for example IHO ECDIS Presentation Library in IHO S-52 and its Appendices.* **15**

6.3.7.2 Methods of test and required results

The methods of test and the required results are as follows:

- a) confirm by observation that an indication is provided when chart information is presented at a larger scale than in the electronic chart database;
- b) confirm by observation that an indication is provided when own ship's position is covered by electronic chart information at a larger scale than the presentation;
- c) confirm by observation that overscaled areas presented on the display are identified.

6.3.8 Display of radar and target information

6.3.8.1 Requirement

(MSC191/7.3.2.1) *A radar video image, tracked radar and reported AIS target information may be presented on a chart display but shall not substantially degrade, mask or obscure the presentation of electronic chart information. As far as practical, the radar video image and target information shall be presented in accordance with the radar Performance Standards (see IEC 62388) and with the presentation standards set forth in this document.*

(MSC191/7.3.2.2) *A radar video image, tracked radar and reported AIS target information shall be clearly distinguishable from the electronic chart information. It shall be possible to remove radar and target information by a simple operator action.*

6.3.8.2 Methods of test and required results

The methods of test and the required results are as follows:

- a) verify that the radar video image is presented in accordance with 5.4.1 and 5.4.2, as applicable;
- b) verify that targets are presented in accordance with 5.5.8;
- c) verify that radar and target information are clearly distinguishable from chart information in accordance with 6.3.2;
- d) confirm by observation that radar and target information can be removed from the presentation by a simple operator action.

6.3.9 Display of additional information

6.3.9.1 Requirement

(MSC191/7.3.3.1) *Information from additional sources may be displayed on ECDIS but shall not substantially degrade, mask or obscure the chart information.*

(MSC191/7.3.3.2) *Additional information (including information for route planning, route monitoring, information overlays and supplementary navigation tasks) shall be clearly distinguishable from the electronic chart information. It shall be possible to remove additional information by a simple operator action.*

6.3.9.2 Methods of test and required results

The methods of test and the required results are as follows:

- a) verify the presentation of additional information in accordance with 4.6.2;
- b) verify that the presentation of electronic chart information is not degraded, masked or obscured by the presentation of additional information in accordance with 6.3.2;

- c) verify that additional navigation-related information is clearly distinguishable from chart information in accordance with 6.3.3;
- d) confirm by observation that additional navigation-related information can be removed from the presentation by a simple operator action.

6.4 Composite task-oriented presentations

6.4.1 User-configured presentations

6.4.1.1 Requirement

(MSC191/7.4.1) *The user may configure a presentation for a specific task-at-hand. The presentation may include radar and/or electronic chart information, in combination with other navigation or ship related data or information. When not fully compliant with the relevant Performance Standards, such a presentation shall be identified as an auxiliary presentation.*

6.4.1.2 Methods of test and required results

The methods of test and the required results are as follows:

- a) if the user can configure presentations for the task-at-hand, confirm by inspection of documented evidence that all tasks configurable are noted in the manual;
- b) confirm by analytical evaluation that, for all tasks listed in the user documentation, the relevant related data and information are displayed;
- c) confirm that the display is fully compliant with the relevant performance standards either by analytical evaluation or inspection of the relevant test reports related to the task-at-hand for which test standards exists.

If the display is not fully compliant with the relevant performance standards, confirm by observation that a clear indication as an auxiliary presentation is provided.

6.4.2 Information associated with the task-at-hand

6.4.2.1 Requirement

(MSC191/7.4.2) *As far as practical, the presentation of any radar and/or chart related functions shall be compliant with the requirements of the relevant Performance Standards and of the presentation standards set forth in this document, with the exception of size requirements for the operational display area. Windows of chart or radar information may be presented along with other information associated with the task-at-hand.*

6.4.2.2 Methods of test and required results

The methods of test and the required results are as follows:

- a) confirm by inspection of test reports that the Radar and/or chart related functions are compliant with the relevant Performance Standards;
- b) confirm by analytical evaluation or inspection of the relevant test reports that the content and the physical display are compliant with the relevant parts of the presentation standards. Document the size of the operational display in use;
- c) confirm by analytical evaluation that the presentation of chart and radar information along with other information associated with the task-at-hand, if available, is in line with this document.

6.5 Single and simple operator actions

6.5.1 Applicability

The requirements of this Subclause 6.5 are from a recommendatory source for ECDIS, radar and INS. The implementation of this recommendation is optional. Manufacturers shall declare

if these requirements have been implemented. The following requirements are applicable, if the manufacturer has declared implementation of Appendix 4 of MSC.1/Circ.1609.

6.5.2 Requirement

(MSC.1/Circ.1609/Appendix 4/3) *The inclusion of non-mandatory functions in the tables of Annex H does not make such functions 'mandatory' to provide. Where the functions in the tables of Annex H are included within navigation equipment, such functions shall comply with the criteria listed in the tables of Annex H.*

(MSC.1/Circ.1609/Appendix 4/1) *Where the equipment provides the functions listed in the tables of Annex H, access shall be as defined as in the tables of Annex H except where conformance is mandated by individual equipment standards. A requirement for information to be presented on single operator action may alternatively be met by a permanent indication.*

(MSC.1/Circ.1609/Appendix 4/2) *Care will need to be taken when adding single and simple operator action buttons to displays. The manufacturer/operator shall consider keeping the display area for the main function of the equipment as much as possible for user operability. It may be more useful to contain shortcut buttons under one setting menu rather than add many icons to the desktop.*

NOTE Single operator action functions available from physical controls outside of the display area are not part of the above requirements.

Manufacturers shall declare all functions available in the display area for single operator action and not listed as such in Annex H. The manufacturer's declaration shall include reasons why such functions are available as single operator action.

6.5.3 Methods of test and required results

The methods of test and the required results are as follows:

- a) confirm by observation that, if provided, functions listed in Annex H have been implemented as single or simple operator action according to Annex H;
- b) refer to manufacturer's declaration and confirm by analytical evaluation that any additional single operator action function, if available in the display area, is appropriate for being available in the highest level of the user interface.

6.6 User and default settings

6.6.1 General

The requirements of this Subclause 6.6 are from a recommendatory source for ECDIS, radar and INS. The implementation of these recommendations is optional. Manufacturers shall declare if these requirements have been implemented.

6.6.2 User-settings

6.6.2.1 Requirement

(MSC.1/Circ.1609/Appendix 5/1) *A facility shall be provided to store and recall user-specific settings to suit the conditions at hand. At least two such configurations shall be available to be stored for recall. Selection for recalling a stored configuration shall be followed by an action to confirm the selection.*

User specific settings shall include at least all settings specified for default settings, see Annex I. Manufacturers may include additional settings into the user specific settings. All settings shall be documented in the user manual.

6.6.2.2 Methods of test and required results

The methods of test and the required results are as follows:

- a) confirm by observation that user specific settings include at least all default settings, see Annex I;
- b) confirm by inspection of the user manual that all settings included into user specific settings are part of the documentation;
- c) confirm by observation that it is possible to store and recall at least two user specific settings;
- d) confirm by observation that the recall of user specific settings requires the user to confirm the selection before application of the settings.

6.6.3 Default settings

6.6.3.1 Requirement

(MSC.1/Circ.1609/Appendix 5/2) *A facility shall be provided to apply a set of default settings to return the equipment to a known default state, see Annex I. The default settings are intended to provide a basic and minimal mode of operation for the system or equipment that can be built upon by the user.*

(MSC.1/Circ.1609/Appendix 5/3) *Default settings are not intended to provide a redundant setting in the event of an equipment failure or loss of input.*

6.6.3.2 Methods of test and required results

Confirm by observation that the default settings include all settings specified in Annex I. **11**

7 Physical requirements

7.1 General

The provisions of this Clause 7 are applicable to the physical displays associated with all navigational systems and equipment on the bridge of a ship. The equipment manufacturer may provide documented evidence to show compliance with the requirements specified in Clause 7.

Display equipment shall comply with the applicable requirements of IEC 60945. (See 4.2.2.1.)

7.2 Display adjustment

7.2.1 Contrast and brightness

7.2.1.1 Requirement

(MSC191/8.1.1) *It shall be possible to adjust the contrast and brightness of the display, as applicable to the display technology. It shall be possible to dim the display. The range of control shall permit the display to be legible under all ambient light conditions likely to be experienced on the bridge of a ship (for example, day, dusk and night). The range of adjustment shall be sufficient to maintain the user's dark adaptation at night. (See also 4.4.1.)*

(MSC191/8.1.2) *It shall be possible for the user to reset the values of contrast and/or brightness to a preset or default condition. The manufacturer's documentation shall identify the default conditions.*

If the brightness adjustment is set for night, then means shall be provided to return to such a brightness level that it is possible to continue control under daylight.

If display equipment is intended to present electronic chart information (see 4.6.2), then it shall

- provide the user with the capability to reset the values of brightness and/or contrast to a calibrated colour performance reference setting for each of the ambient light conditions defined in Table 1, and
- prevent inadvertent adjustments by the user by restricting access to controls that may cause degradation of colour performance, such as gamma and colour temperature adjustments.

7.2.1.2 Methods of test and required results

The setup for measurements of contrast, luminance and colour shall be conducted in accordance with the guidelines of IEC 61966-4 or the VESA Flat Panel Display Measurement (FPDM) standard (see VESA-2001-6). Before measurements are taken, display equipment shall be powered up and allowed to stabilize for a period identified by the manufacturer. (See also Annex G.)

The following verifications are required:

- a) confirm by observation that a manual contrast control is provided, if applicable (for example, for CRT technology);
- b) confirm by observation that a manual brightness control is provided;
- c) confirm by observation that, after dimming the equipment for use at night, when daylight ambient conditions are applied, there are means to readjust for operation under daylight;
- d) verify the adjustment of contrast and brightness in accordance with 4.4.1: (See 4.4.1.2)
 - 1) confirm by observation that the contrast and brightness controls can be reset to their default values;
 - 2) where display equipment is intended to display chart information, confirm by measurement of luminance that a means or method is provided to return the contrast and brightness controls to their calibrated setting for each ambient light condition in accordance with Table 1. (See 4.4.1)
- e) confirm by inspection of documented evidence that the default conditions for contrast and brightness controls are identified.

7.2.2 Magnetic interference

7.2.2.1 Requirement

(MSC191/8.1.3) *If magnetic fields degrade the presentation of navigation-related information, then a means or method to neutralise the effects of magnetic fields shall be provided.*

7.2.2.2 Methods of test and required results

Confirm by inspection of documented evidence that a means or method to neutralise the effects of magnetic fields is provided if magnetic fields degrade the presentation of navigation-related information.

7.2.3 Temporal stability

7.2.3.1 Requirement

Display equipment shall be perceptually "flicker" free in direct and peripheral vision at the nominal viewing distance identified in the manufacturer's documentation in accordance with the perception thresholds, as defined in Clause G.2.

NOTE The perception threshold of "flicker" is known to vary for observers, depending on such factors as age, fatigue, ambient lighting conditions, frequencies, the displayed image size, image brightness and image content.

7.2.3.2 Methods of test and required results

Establish by inspection of documented evidence whether the luminance persistence (response time) of the display equipment is less than or more than 1 ms. The test methods are then as follows:

- a) for display equipment with a luminance persistence of 1 ms or more (for example, CRT, LCDs, etc.), confirm by analytical evaluation or measurement that the display equipment emits less energy in the temporal frequencies than an observer will detect as "flicker" (i.e. the predicted "flicker" threshold) according to G.2.3.1 under each ambient light condition specified in Table 1;
- b) for display equipment based on technologies which have a luminance persistence much less than 1 ms (for example, EL (electro luminescent), plasma, light emitting diodes (LED), etc.), confirm by analytical evaluation or measurement that the display equipment emits less energy in the temporal frequencies than an observer will detect as "flicker" according to G.2.3.2 under each ambient light test condition specified in Table 1.

7.2.4 Physical controls and status indicators

7.2.4.1 General

Physical controls for display equipment shall be locatable by visual or tactile means. If the display equipment has more than three adjacent controls (for example, knobs or switches), then labels with adjustable illumination shall be provided for identification of these controls. Labels shall comply with the legibility/readability requirements contained in 4.4.2 and 4.4.3 ~~and 4.4.4~~.

Any illuminated status indicators separate from the main display (for example, built-in to the front panel of the monitor) shall be locatable by visual means. Adjustable illumination provided for labels and status indicators shall be suitable for all ambient light conditions likely to be experienced on the bridge of a ship (day, dusk and night) and with due consideration to the night vision of the officer of the watch.

Illumination shall be dimmable to produce a maximum brightness of not more than 1 cd/m² and may be extinguishable below that point.

7.2.4.2 Method of test and required results

The methods of test and the required results are as follows:

- a) confirm by observation that physical controls for display equipment, if available, are locatable by visual or tactile means;
- b) where more than three adjacent control knobs or switches exist, confirm by observation that they have labels with adjustable illumination and that the illuminated labels comply with the legibility/readability requirements contained in 4.4.2 and 4.4.3 ~~and 4.4.4~~;
- c) where illuminated status indicators exist separate from the main display, confirm by observation that they are locatable by visual means;
- d) where adjustable illumination is provided, confirm by observation that illumination is dimmable to not more than 1 cd/m² and may be extinguishable below that point;
- e) confirm by observation that a visual indication of the presence of power to the display equipment is provided;
- f) confirm by observation that a visual indication of the presence of video signals to the display equipment is provided.

7.3 Screen size

7.3.1 Requirement

(MSC191/8.2.1) *Display equipment shall be of sufficient size to support the requirements of the relevant IMO Performance Standards.*

(MSC191/8.2.2) *For ECDIS, the operational display area of the chart presentation for route monitoring shall be at least 270 mm × 270 mm.*

For ECDIS back-up arrangements, the effective size of the chart presentation shall be not less than 250 mm × 250 mm or 250 mm diameter.

(MSC191/8.2.3) *For radar display equipment, the operational display area of the radar presentation shall be at least a circle of diameter of:*

- 180 mm for ships smaller than 500 gross tonnage;
- 250 mm for ships larger than 500 gross tonnage and HSC less than 10 000 gross tonnage;
- 320 mm for ships larger than 10 000 gross tonnage.

The manufacturer's documentation shall identify the intended size of the operational display area.

7.3.2 Method of test and required results

The methods of test and the required results are as follows:

- a) for ECDIS, confirm by measurement that the dimensions of the operational display area are at least 270 mm × 270 mm;
- b) for ECDIS back-up arrangements, confirm by measurement that the dimensions of the operational display area are at least 250 mm × 250 mm, or 250 mm in diameter;
- c) for radar display equipment, confirm by measurement that the diameter of the operational display area is at least a circle of diameter of the intended size specified in the manufacturer's documentation.

7.4 Multicoloured display equipment

7.4.1 Requirement

(MSC191/8.3.1) *Multicoloured display equipment shall be used except where monochrome displays are permitted within individual IMO Performance Standards.*

(MSC191/8.3.2) *Multicoloured operational displays including multifunction displays (for example, conning displays) shall provide a minimum of 64 colours except where permitted or not required by the IMO, or when used for a single specific purpose (for example, speed log, echo-sounder).*

Monochrome displays may be provided when used for a single specific purpose (for example, speed log, echo-sounder) except where multicoloured displays are required by IMO performance standards or Code on Alerts and Indicators.

7.4.2 Method of test and required results

For multicoloured display, verify the result in accordance with Clause 4.

For monochrome display, verify the result in accordance with Clause 4 except the colour-related requirements specified in 4.5.1, 4.7.1, 4.7.2, 4.7.3 and 4.8.2.

For monochrome display, confirm by inspection of documented evidence that the manufacturer has noted the limitation of usage of the display to a single specific purpose or noted relevant IMO Performance Standard permitting use of monochrome display.

7.5 Screen resolution

7.5.1 Requirement

(MSC191/8.4) *Operational display equipment including multifunction displays* (for example, *conning displays*) shall provide a minimum screen resolution of 1 280 pixels × 1 024 pixels, or equivalent for a different aspect ratio, except where permitted or not required by the IMO, or when used for a single specific purpose (for example, speed log, echo-sounder) or 180 mm diameter radar. For 180 mm diameter radar, a minimum screen resolution of 1 024 pixels × 768 pixels, or equivalent for a different aspect ratio, shall be provided.

Display equipment intended to support the presentation of electronic chart information shall provide a maximum pixel pitch of 0,29 mm/m of nominal viewing distance (1 min of arc), for example, 0,36 mm at 1 237 mm viewing distance.

The manufacturer's documentation shall describe the screen resolution, pixel format and viewing distance (i.e. for measurement of pixel pitch).

7.5.2 Method of test and required results

The methods of test and the required results are as follows:

- a) confirm by inspection of documented evidence that for radar displays larger than 180 mm diameter the display equipment supports a screen resolution of at least 1 280 × 1 024 or equivalent resolution if the equipment uses a different aspect ratio. For radar displays of 180 mm or smaller diameter the requirement is at least 1 024 × 768 or equivalent resolution if the equipment uses a different aspect ratio;
alternatively, confirm by inspection of documented evidence that the display equipment supports the minimum screen resolution permitted by the applicable Performance Standards;
alternatively, if the display equipment is used for a single specific purpose (for example, speed log, echo-sounder, etc.), confirm by inspection of documented evidence that it is not required to support a minimum screen resolution;
- b) confirm by inspection of documented evidence that the display equipment provides a maximum pixel pitch of not more than 1 min of arc;
alternatively, if the display equipment is used for a single specific purpose (for example, speed log, echo-sounder, etc.), confirm by inspection of documented evidence that it is not required to support a maximum pixel pitch;
- c) confirm by inspection of documented evidence that the screen resolution, pixel format and the viewing distance used for the measurement of pixel pitch are identified.

7.6 Screen viewing angle

7.6.1 Requirement

(MSC191/8.5) *The display equipment shall support the reading of information under all ambient light conditions, simultaneously, by at least two users, from standing and sitting user positions likely to be found on the bridge of a ship.*

7.6.2 Methods of test and required results

Verify in accordance with 4.4.1.2 a) that readability requirements are satisfied from a position at the side of the operator.

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Annex A (normative)

Presentation colours and symbols

A.1 Overview

Annex A specifies the harmonised symbols to be used for the presentation of navigation related information on all shipborne navigational systems and equipment in conformance with guidelines published by the IMO and provided in SN/Circ.243.

All text in Annex A whose wording is identical to text contained in IMO SN/Circ.243 is printed in *italics*. The IMO reference is made up of two parts; a prefix representing the IMO instrument, followed by the paragraph number, displayed as, for example: (SN243/1).

A.2 Purpose

(SN243/1/1) *The purpose of Annex A is to provide guidance on the appropriate use of navigation-related symbols and the use of colour to achieve a harmonized and consistent presentation on all shipborne navigational systems and equipment.*

A.3 Scope Use

(SN243/1/2) *The use of these guidelines will ~~insure~~ ensure that the symbols used for the display of navigation-related information on all shipborne navigational systems and equipment are presented in a consistent and uniform manner.*

A.4 Application

(SN243/1/3) *The symbols listed in Table A.1 through Table A.5 shall replace symbols which are currently in existing Performance Standards for navigational systems and equipment. Where a standard symbol is not available, another symbol may be used, but this symbol shall not conflict with the symbols listed in Annex A.*

A.5 Navigation-related symbols

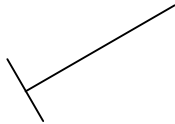
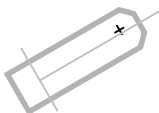
For the application of the symbols in Table A.1 through Table A.5, the following shall be considered:

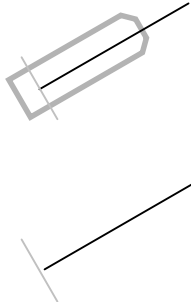
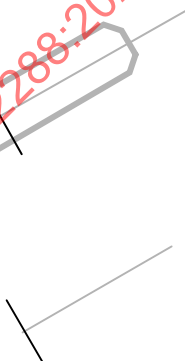
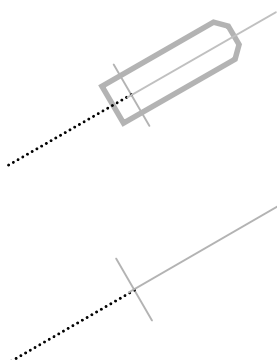
- ~~no colours are recommended for symbols except where IMO has specified the use of the colour red for dangerous targets;~~
- colours are not standardised except where explicitly stated;
- colours used for the presentation of tracked radar targets and reported AIS targets (symbols from 2.1 a to symbol 2.9) shall be ~~consistent the same~~; 24
- colours used for the presentation of own ship symbols shall be identifiable from colours used for the presentation of targets;
- colours used for the presentation of operational information shall be discriminated from the colours used for the presentation of the radar image, target trails, additional processed radar information and electronic chart information;
- colours recommended for symbols assume that the presentation provides for lighter foreground information against a dark background;

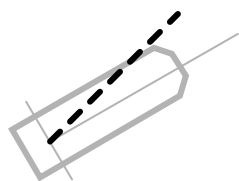
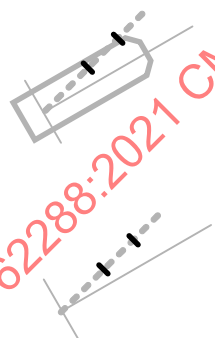
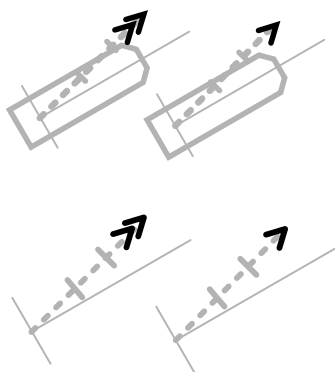
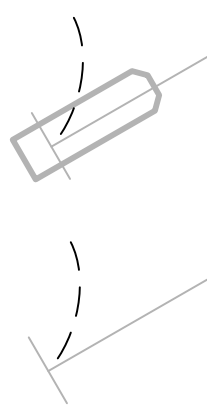
- sizes specified for symbols assume a nominal viewing distance of 1 m (see 4.6.1.1 for requirements with viewing distances other than 1 m); 16
- weights specified for line styles assume that the "thick" line style is at least twice the thickness of the "thin" line style.

An example of a possible colour scheme that may be used is given in Table A.6.

Table A.1 – Own ship symbols

	Symbol name and description	Symbol graphic(s)
1.1 a	Own ship – True scaled outline The user may select to present own ship as a true scaled outline oriented in the direction of heading relative to CCRP and drawn using a thick solid line style with the same basic colour used for own ship symbols. A more detailed true scaled outline symbol, representing the physical shape of the own ship, is permitted as an alternative to the standardized symbol specified in this document. 11 Automatic selection of the true scaled outline is permitted (see 5.2.1). The true scaled outline shall not be used when heading is unknown in a gyro/THD-stabilised mode, or when the beam of the outline is less than 3 mm. Note that a loss of heading will force the radar into head-up mode (see IEC 62388); in this case, the true scaled outline is still permitted.	 (SN243)
1.1 b	Own ship – Simplified symbol If a navigation display presents the chart mode (with or without the radar image), a simplified symbol may be used for own ship. The simplified symbol may be combined with the minimised symbol (see symbol 1.1 c). A simplified symbol shall be used when a chart is displayed in north-up presentation, without a radar image and in the absence of heading information. The outer circle shall be 6 mm in diameter. The inner circle shall be 3 mm in diameter. The circles shall be drawn using a thick solid line style, with the same basic colour used for own ship symbols. Note that for a radar mode, the simplified symbol should not be used as the symbol does not permit the minimum range requirements in IEC 62388.	 (SN243)
1.1 c	Own ship – Minimised symbol If a navigation display presents the radar mode, own ship shall be presented as a minimised symbol. The minimised symbol is comprised of the heading line (see symbol 1.3) and the beam line (see symbol 1.4). Where appropriate, the minimised symbol shall be combined with the true scaled outline of own ship. Note that a loss of heading will force the radar into head-up mode (see IEC 62388) whereby the minimised symbol should be used.	 (SN243)
1.2	Radar antenna position If a radar image is displayed and own ship is displayed as a true scaled outline, the user may select to present the radar antenna position as crossed lines centred at the physical location of the radar antenna (the source of the displayed radar image). The total extent of the crossed lines shall be at least 1 mm but not more than 2 mm in length. They shall be drawn using a thin solid line style with the same basic colour used for own ship symbols.	 (SN243)

	Symbol name and description	Symbol graphic(s)
1.3	Own ship heading line The heading line shall always be indicated (except when temporarily suppressed by the user), originating at CCRP and extending in the direction of own ship heading to the bearing scale. The line shall be drawn using a thin solid line style with the same basic colour used for own ship symbols. The heading line shall always be shown together with the beam line (see symbol 1.4).	 (SN243)
1.4	Beam line The beam line forms part of the own ship minimised symbol. Own ship beam line shall be presented as a single line, perpendicular to the heading line, passing through the CCRP and extending a minimum of 5 mm each side of the CCRP. The line shall be drawn as a thin solid line style with the same basic colour used for own ship symbols.	 (SN243)
1.5	Stern line Optionally, the user may select a stern line that shall originate at CCRP and shall extend, in the direction 180° from the heading, to the bearing scale. The line shall be drawn using a thin dotted line style with the same basic colour used for own ship symbols.	

	Symbol name and description	Symbol graphic(s)
1.6 a	Velocity vector Optionally, the user may also select to present a velocity vector originating at CCRP and extending in the direction of COG or CTW, as appropriate, for a length representing the distance own ship will travel in a user-selected time interval. The vector shall be drawn using a thick short-dashed line style with the same basic colour as used for own ship symbols. An option to select other colours may be provided, but these colours shall conform to the rules given in Clause A.5.	 (SN243)
1.6 b	Velocity vector – Time increments Optionally, the user may also select to present time increments along the velocity vector perpendicular to the vector with their midpoint on it and extending not more than 1,5 mm on either side. They shall be spaced along the vector to represent the distance own ship will travel in a user-selected increment of the time interval used for the velocity vector. The increments shall be drawn using a thick solid line style with the same basic colour used for own ship velocity vector.	 (SN243)
1.6 c	Velocity vector – Stabilisation indicator Optionally, the user may select to present a stabilisation indicator, positioned at the end of the velocity vector. The ground stabilisation indicator shall be presented as a double arrowhead. The water stabilisation indicator shall be presented as a single arrowhead. The arrowheads shall extend at least 1 mm but not more than 1,5 mm on either side of the vector (i.e. measured perpendicular to it). The arrowhead(s) shall be drawn using a thick solid line style with the same basic colour used for own ship velocity vector.	 (SN243)
1.6 d	Path predictor Optionally, the user may select to present a path predictor, either in place of a velocity vector or independently, as a curved line originating at CCRP and extending along the predicted path over ground that own ship will travel in the time interval used for the velocity vector. The path shall be drawn using a thin long-dashed line style with the same basic colour as used for own ship symbols. An option to select other colours may be provided, but these colours shall conform to the rules given in Clause A.5.	 (SN243)

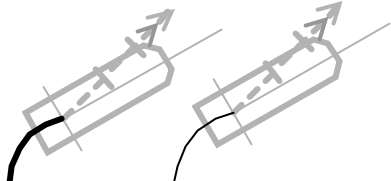
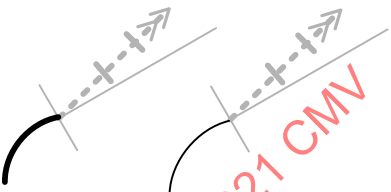
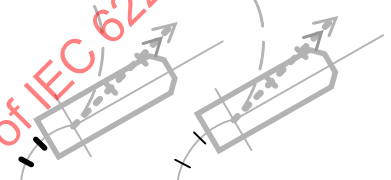
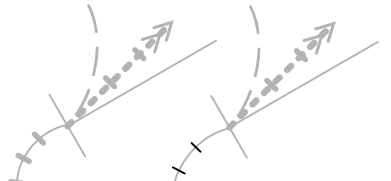
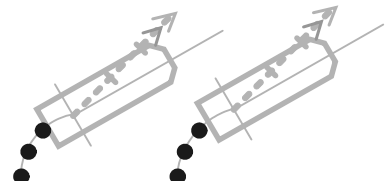
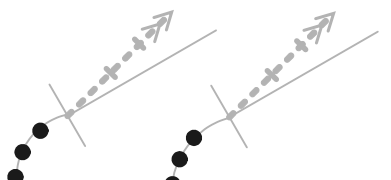
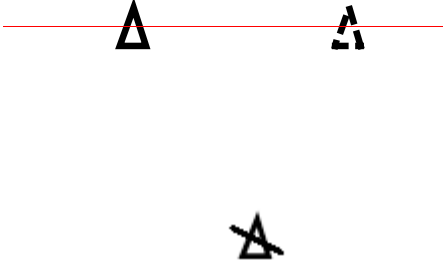
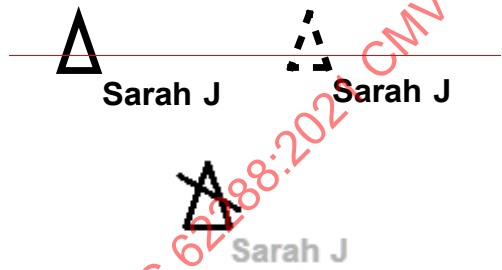
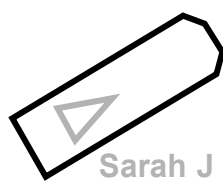
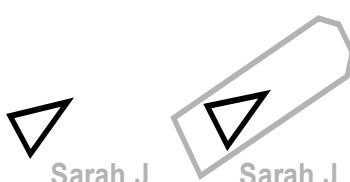
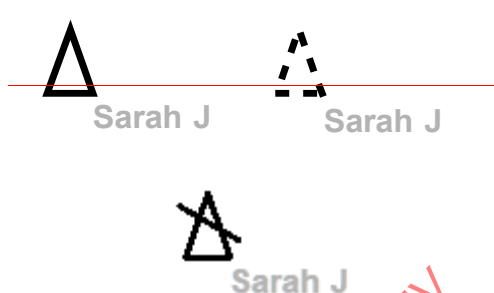
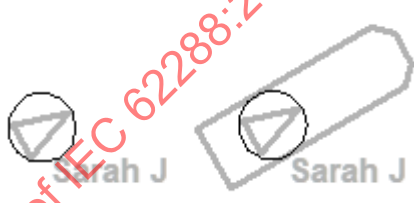
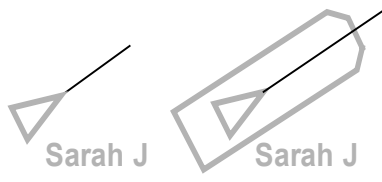
	Symbol name and description	Symbol graphic(s)
1.7 a	Past track The user may select to present a past track for the primary and/or secondary positioning sources. The past track shall be presented as line connecting own ship current and past positions. The primary past track shall be drawn using a thick solid line style with the same basic colour used for own ship symbol. The secondary past track shall be drawn using a thin solid line style with the same basic colour used for own ship symbols.	  (SN243)
1.7 b	Past track – Time increments Optionally, time increments along the past track may be shown. The time increments shall be presented as single lines perpendicular to the past track with their midpoint on it and extending at least 1 mm but not more than 1,5 mm on either side. They shall be spaced along the past track to represent the distance own ship travelled in the user-selected increment of the time interval used for the velocity vector. The time increments for the primary past track shall be drawn using a solid line style.	  (SN243)
1.7 c	Past track – Past positions Alternatively, the user may select to present past positions along the past track in place of time increments. Past positions shall be drawn as small filled circular symbols with a diameter of not more than 1,5 mm, with the same basic colour used for own ship symbols.	 
The simplified symbol (1.1 b) may be used with all examples showing the minimised symbol (1.1 c) in this table.		

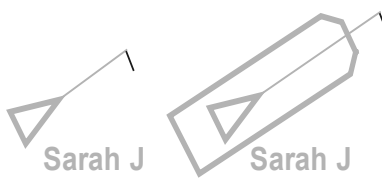
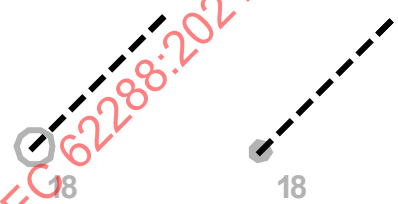
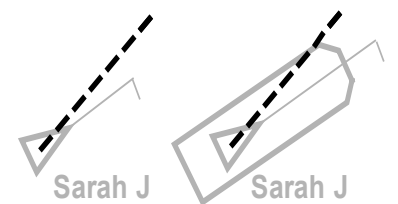
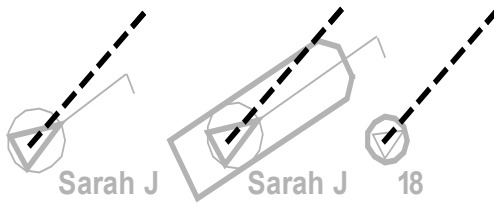
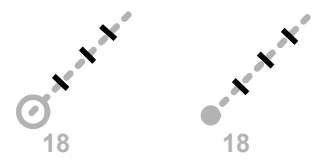
Table A.2 – Radar and AIS symbols

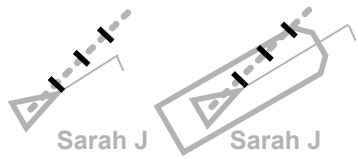
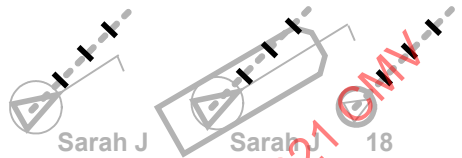
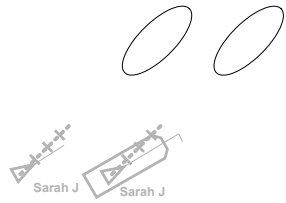
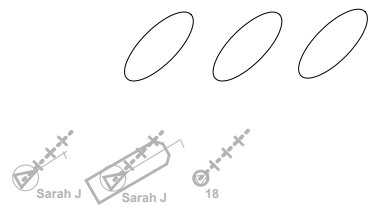
	Symbol name and description	Symbol graphic(s)
2.1 a	Radar targets in acquisition state A symbol drawn around radar targets in acquisition state shall be presented as a broken circle centred at the position of target acquisition. The circles shall be a ~~nominal~~ 5 mm in diameter and shall be drawn using a thin dashed line style with the same basic colour used for target symbols.	 (SN243)
2.1 b	Radar targets in acquisition state – Automatically detected A symbol drawn around radar targets in acquisition state that are automatically detected inside an acquisition area, shall be a ~~nominal~~ 5 mm in diameter and using a thick dashed line style, with the required colour red. The symbols shall flash until acknowledged by the user. Once acknowledged, the symbols shall cease flashing (even when they remain inside the acquisition area) and unless considered as dangerous, shall be drawn as a normal radar target in an acquisition state (i.e. detected outside an acquisition area) with the basic colour of other non-dangerous target symbols.	 (SN243)
2.2 a	Tracked radar targets Tracked radar targets shall be presented as circles centred at the targets' tracked position. The circles shall be 3 mm in diameter and shall be drawn using a thick solid line style. Tracked radar targets generated from a target automatically detected in an acquisition area that have not been acknowledged shall be the required red basic colour and shall continue to flash until acknowledged by the user (even when they move outside the acquisition area). Once acknowledged, the symbols shall cease flashing and unless considered as dangerous, shall be drawn as a normal radar target in an acquisition state (i.e. detected outside an acquisition area) with the basic colour of other non-dangerous target symbols. Tracked radar targets may be ~~numbered~~ labelled. Alphanumeric text used to ~~number~~ label 25 radar targets shall be drawn with the same basic colour used for target symbols.	 18 (SN243)
2.2 b	Tracked radar targets – Alternative Alternatively, tracked radar targets may be presented as filled circles of not more than 2 mm in diameter.	 18 (SN243)

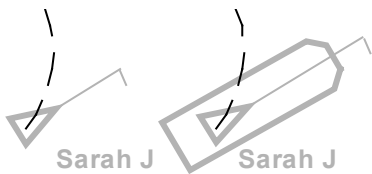
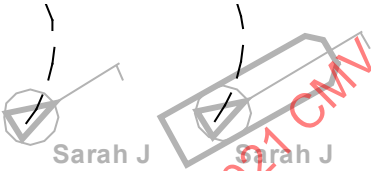
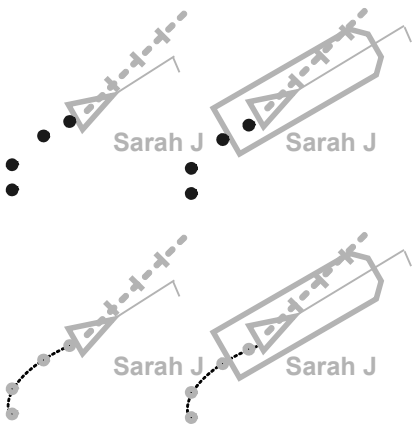
	Symbol name and description	
2.2 c	Tracked radar targets – Dangerous targets Tracked radar targets designated as dangerous targets may be presented using 5 mm diameter circles, and shall flash until acknowledged by the user. The required colour shall be red. Once acknowledged, the symbols shall cease flashing, but shall still be drawn with the required ~~basic~~ colour red until the target(s) cease to be a danger.	 (SN243)
2.3	Reference targets Tracked radar targets designated as reference targets shall be labelled with the letter "R" adjacent to the symbol. <i>Multiple reference targets shall be numbered as "R1", "R2", "R3", etc.</i> The reference target labels shall be drawn with the same basic colour used for target symbols.	 (SN243)
2.4	Sleeping AIS targets Sleeping AIS targets shall be presented as acute isosceles triangles oriented to the targets' reported heading (or COG if heading is not reported) and centred at the targets' ~~reported~~ ~~predicted~~ position. The base of the triangles shall be 3 mm and the height shall be 4,5 mm. The triangles shall be drawn using a thick solid line style ~~(or a broken line if a collision avoidance computation cannot be done)~~ with the same basic colour used for target symbols. A sleeping AIS target with <i>neither a reported heading nor COG</i> shall be <i>oriented toward the top of the operational display area</i> and shall include <i>one diagonal line crossed through the symbol</i>. The line shall be drawn using a thick solid line style with the basic colour used for target symbols.	 (SN243) Sleeping AIS target with neither reported heading nor COG:  (SN243)

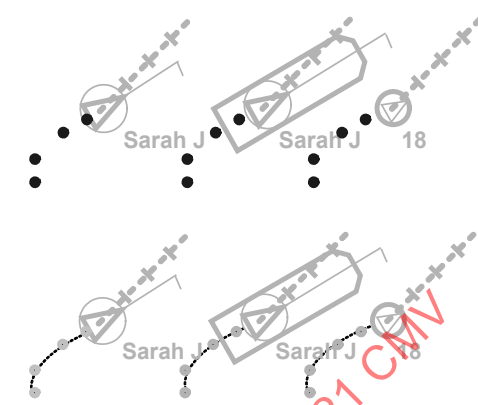
	Symbol name and description	Symbol graphic(s)
	Activated AIS targets Activated AIS targets shall be presented as acute isosceles triangles oriented to the targets' reported heading (or COG if heading is not reported) and centred at the targets' ~~reported~~ predicted position. The base of the triangles shall be 4 mm and the height shall be 6 mm. The triangles shall be drawn using a thick solid line style ~~(or a broken line if a collision avoidance computation cannot be done)~~ with the basic colour used for target symbols. An <i>activated AIS target with neither a reported heading nor COG</i> shall be <i>oriented toward the top of the operational display area and shall include one diagonal line crossed through the symbol</i>. The line shall be drawn using a thick solid line style with the basic colour used for target symbols. 11 Activated AIS targets may be labelled. Alphanumeric text used to label AIS targets shall be drawn with the same basic colour as used for target symbols.	 (SN243) Activated AIS target with neither reported heading nor COG:  (SN243)
2.5 b	Activated AIS targets – True scaled outlines Alternatively, when own ship is presented as a true scaled outline, the user may select to add true scaled outlines to activated AIS target symbols. True scaled outlines for activated AIS targets shall be drawn around the AIS target symbol triangles relative to the targets' ~~reported~~ predicted position according to the offsets, beam and length. The outline shall be drawn using a thick solid line style. True scaled outlines for activated AIS targets shall be drawn with the same basic colour used for target symbols. True scaled outlines for individual activated AIS targets shall not be used when a target's heading is not reported, or when the beam of the outline is less than 3 mm.	 (SN243)
2.5 c	Activated AIS targets – Dangerous targets Activated AIS targets designated as dangerous targets may be presented with larger triangles, with a base of 5 mm and a height of 7,5 mm, shall be the required ~~basic~~ colour red, drawn with a thick solid line and shall flash until acknowledged by the user. Activated AIS targets designated as dangerous targets with neither a reported heading nor COG shall be oriented toward the top of the operational display area and shall include one diagonal line crossed through the	 (SN243)

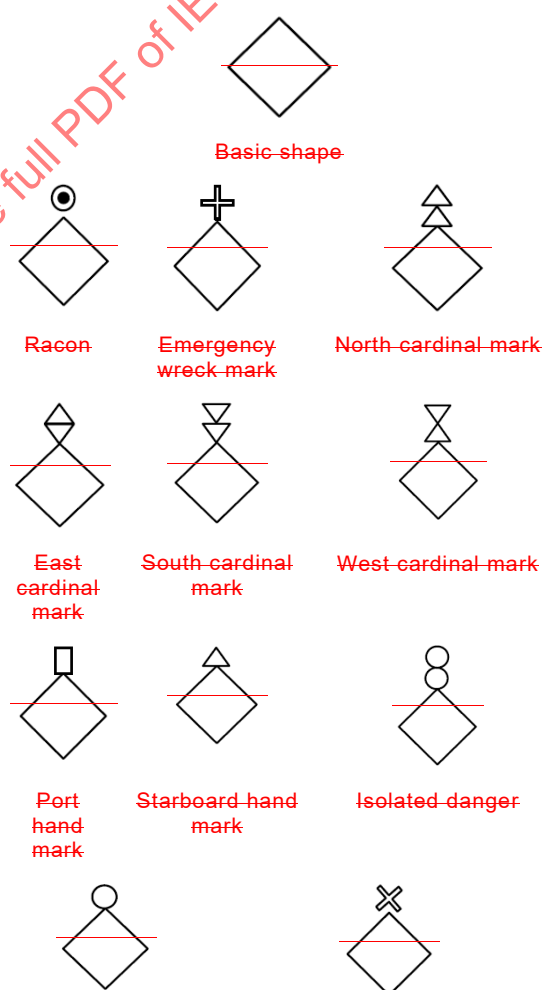
	Symbol name and description	Symbol graphic(s)
	symbol. The line shall be drawn using a thick solid line style with the colour red. Once acknowledged, the symbols shall cease flashing but shall still be presented using the required ~~basic~~ colour red until no longer considered to be a dangerous target. Activated AIS targets designated as dangerous targets may be labelled. Alphanumeric text used to label AIS targets shall be drawn with the colour red, as used for target symbols. The label shall not flash – see IEC 60945:2002, 6.1.5 t). 11	Activated ~~dangerous~~ AIS target with neither a reported heading nor COG: 
2.6	Associated targets – Alternative The user may select to present associated targets (i.e. activated AIS targets associated with tracked radar targets) as either activated AIS target symbols (see symbol 2.5) or tracked radar target symbols (see symbol 2.2). Alternatively, activated AIS target symbols representing associated targets may be modified by circumscribing a circle around the symbols' isosceles triangle. Tracked radar target symbols representing associated targets may be presented with larger diameter circles (up to 5 mm), modified by inscribing an isosceles triangle inside the symbols' circle. The circumscribed circle and inscribed triangle shall be drawn using a thin solid line style with the same basic colour used for target symbols. Associated targets may be labelled ~~or numbered, as appropriate~~. Alphanumeric text used to label ~~number~~ 25 associated targets shall be drawn with the same basic colour as used for target symbols.	Associated targets represented by AIS target symbols:  (SN243) Associated targets represented by radar target symbols:  (SN243)
2.7 a	Heading lines Heading lines shall be selected for display for activated AIS targets and associated targets, represented by AIS target symbols. Heading lines shall originate at the apex of the AIS triangle and shall extend not less than 4 mm and at least 4 mm beyond the bow of the true scaled outline when it is used. They shall be drawn using a ~~thin~~ solid line style with the same basic colour as used for target symbols. Heading lines for dangerous AIS targets shall flash with their base symbol until acknowledged by the user. An activated target without a reported heading shall be orientated to the top of the operational display area (see 2.5 a) and when AIS heading is enabled shall not include a heading line.	 (SN243)

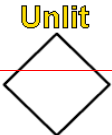
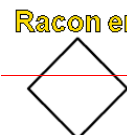
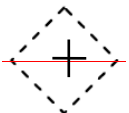
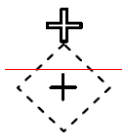
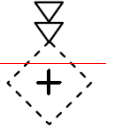
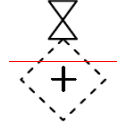
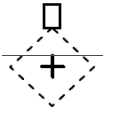
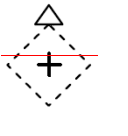
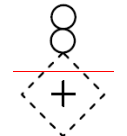
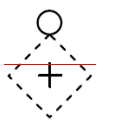
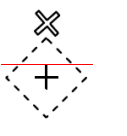
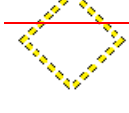
	Symbol name and description	Symbol graphic(s)
2.7 b	Heading lines – Turn indicators The user shall select to display turn indicators for activated AIS targets and associated targets represented by AIS target symbols. Turn indicators shall be presented as a single line extending at least 1 mm but not more than 2 mm perpendicular to the heading line in the direction of turn. The indicator shall be drawn using a thin solid line style with the same basic colour as used for their target symbols. Turn indicators for dangerous targets shall be the required colour red (until no longer dangerous) and shall flash with their symbol until acknowledged by the user.	 (SN243)
2.8 a	Velocity vectors Velocity vectors for targets shall be selected for display. Velocity vectors shall be presented as single lines originating at the targets' tracked/<del>reported</del>~~predicted~~ position and extending in the direction of course CTW or COG, as appropriate, for a length representing the distance the target will travel in the time interval used for own ship's velocity vector. Vectors shall be drawn using a thick short-dashed line style with the same basic colour used for target symbols. Velocity vectors for dangerous targets shall be the required red ~~basic~~ colour and shall flash with their base target symbols until acknowledged by the user. Once acknowledged, the symbols shall cease flashing and unless considered as dangerous, shall assume the basic colour of other non-dangerous target symbols.	Radar target velocity vectors:  (SN243) AIS target velocity vectors:  (SN243) Associated target velocity vectors:  (SN243)
2.8 b	Velocity vectors – Time increments Time increments may be shown drawn across target velocity vectors. Time increments shall be presented as single lines perpendicular to the vectors with their midpoint on them and extending not more than 1,5 mm on either side. They shall be spaced along the vectors to represent the distance the target will travel in the time	Radar target time increments: 

	Symbol name and description	Symbol graphic(s)
	increment of the time interval used for own ship's velocity vector. The increments shall be drawn using a thick solid line style with the same basic colour as for target symbols. Time increments for dangerous targets shall be the required red ~~basic~~ colour and shall flash with their base target symbols until acknowledged by the user. Once acknowledged, the symbols shall cease flashing and unless considered as dangerous, shall use the basic colour of other non-dangerous target symbols.	AIS target time increments:  Associated target time increments: 
2.8 c	Predicted area of dangers Optionally, predicted area of dangers (PADs) may be shown along the path of target velocity vectors. PADs shall be presented as an outline area geographically representing a target's predicted CPA/TCPA violations. (The PAD's shape may be modified by knowledge of own ship manoeuvring characteristics, safety contour limits, etc). PADs shall be oriented in the direction of their velocity vectors. The PADs shall be drawn using a thick solid line style with the same basic colour as their target symbols. PADs for dangerous targets shall flash with their base symbols until acknowledged by the user. When a target is selected, the associated PAD may be highlighted for identification. Note that PADs are shown as an elliptical area which is typical. Presentation of more accurate shapes is not excluded.	Radar target PADs:  Not to scale AIS target PADs:  Not to scale Associated target PADs:  Not to scale

	Symbol name and description	Symbol graphic(s)
2.8 d	Path predictor Optionally, the user may select to display a path predictor in place of a velocity vector. The <i>path predictor</i> shall be represented as a <i>curved vector</i> originating at the targets' tracked/~~reported~~ ~~predicted~~ position and extending along the predicted path over the ground that the target will travel, in the time interval used for the target vector. The path shall be drawn using a thin long-dashed line style with the same basic colour used for target symbols.	AIS target path predictor:  Associated target path predictor: 
2.9	Target past positions Optionally, target past positions may be shown. Past positions shall be presented as a series of small circular symbols of 1 mm diameter. They may be connected by a line drawn from the current tracked or ~~reported~~ ~~predicted~~ position of the target. The line shall be drawn using a thin short-dashed line style with the same basic colour as their target symbols.	Radar target past positions:  (SN243)
		AIS target past positions:  (SN243)

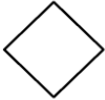
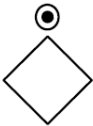
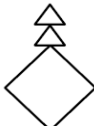
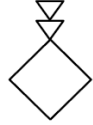
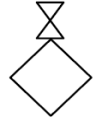
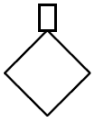
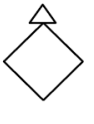
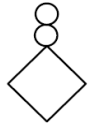
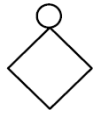
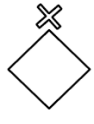
Symbol name and description	Symbol graphic(s)
	Associated target past positions:  (SN243)

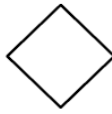
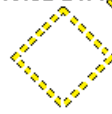
2.10 a AIS aids to navigation – Physical Physical AIS aids to navigation (AtoN) shall be presented as an open diamond. The sides of the diamond shall be not more than 6 mm in length. The diamond shall be drawn using a thin solid line style. The basic colour for an “on position” AIS AtoN is defined as the normal colour for AIS AtoN symbols. The basic colour for the diamond of an “off position” AIS AtoN is yellow, it shall be drawn using thick solid line style and when used against light background it shall include a black one pixel outline to improve readability. If available, on radar display AIS AtoN shall be drawn indicating the purpose of the AIS AtoN. On display containing an underlying chart AIS AtoN shall be drawn without indication of purpose unless the object is selected in which case, if available, the symbol is drawn indicating the purpose of the AIS AtoN. Purpose symbol shall be drawn using a thin solid line style and shall be the same basic colour as the AIS AtoN symbol. The height of the purpose symbol shall be not more than 5 mm in length. AIS AtoN shall indicate off position of floating aid with yellow text “Off Posn”. AIS AtoN shall indicate failure of light with yellow text “Unlit”. AIS AtoN shall indicate failure of Racon with yellow text “Racon err”. When used against light background the yellow text may include a black one pixel outline to improve readability. AIS AtoN may be labelled. Alphanumeric text used to label an AIS AtoN shall be the same basic colour as the AIS AtoN symbol. Other information from AIS AtoN, if available (for example from Message 14 for the same MMSI), shall be available on demand.	Physical AIS AtoN:  Basic shape Racon Emergency wreck mark North cardinal mark East cardinal mark South cardinal mark West cardinal mark Port hand mark Starboard hand mark Isolated danger Safe water Special mark (IALA dictionary, topmarks)

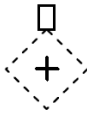
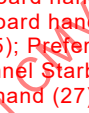
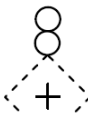
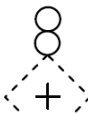
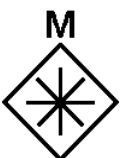
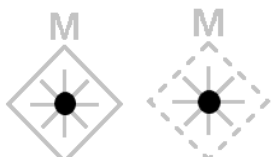
	All physical AtoNs shall be in their own layer which shall have own display on/off selection.	 Off Posn  Unlit  Racon err Off position Lights-failure Racon-failure
2.10 b	AIS aids to navigation – Virtual Virtual AIS aids to navigation (AtoN) shall be presented as an open diamond with crosshair centred at reported position. The sides of the diamond shall be not more than 6 mm in length. The diamond shall be drawn using a thin dashed line style. The basic colour for a Virtual AIS AtoN is as used for the physical AIS AtoN symbols. If available, AIS AtoN shall be drawn indicating the purpose of the AtoN. Purpose symbol shall be drawn using a thin solid line style and shall be the same basic colour as the AIS AtoN symbol. The height of the purpose symbol shall be not more than 5 mm in length. The absence of a charted physical AtoN is communicated as a combined state of 'virtual' and 'off position'. This shall be indicated with yellow text "Missing" above the dotted outline diamond using colour yellow. This symbol shall have no crosshair at the position centre. When used against light background the yellow text may include a black one pixel outline to improve readability. AIS AtoN may be labelled. Alphanumeric text used to label an AIS AtoN shall be the same basic colour as the AIS AtoN symbol. Other information from AIS AtoN, if available (for example from Message 14 for the same MMSI), shall be available on demand. All virtual AtoNs shall be in their own layer which shall have own display on/off selection. When selected off a permanent indication shall be provided.	Virtual AIS AtoN:  Basic shape  Emergency wreck mark  North cardinal mark  East cardinal mark  South cardinal mark  West cardinal mark  Port hand mark  Starboard hand mark  Isolated danger  Safe water  Special mark (IALA dictionary, topmarks) Missing  Intended location of missing AtoN

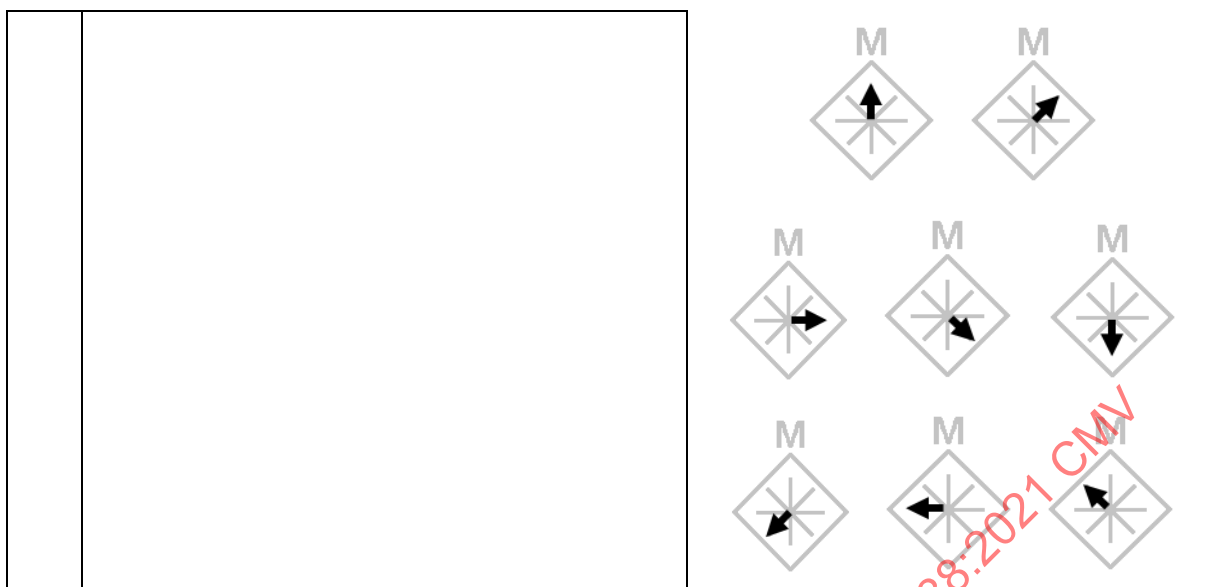
2 4 1	AIS search and rescue transmitter and other devices using AIS burst transmission technology An AIS search and rescue transmitter (AIS-SART) shall be as a 6 mm diameter circle with a cross inside drawn with a solid line. A test and active version of the AIS-SART shall use the same basic colour as the AIS-ATON symbols. AIS-SART symbol has no associated speed or course vector. If selected the operational mode is indicated as received from AIS Message 14 (e.g. SART ACTIVE, SART TEST, MOB ACTIVE, MOB TEST, EPIRB ACTIVE, EPIRB TEST) in the associated AIS object dialog. Note that • AIS-SART use identity range 970-00-0000 to 970-99-9999, • AIS-MOB use identity range 972-00-0000 to 972-99-9999, • EPIRB-AIS use identity range 974-00-0000 to 974-99-9999.	(SN243)/Add.1

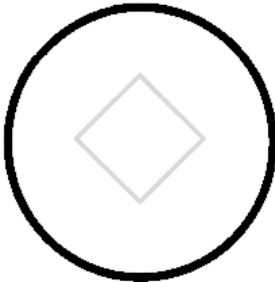
IECNORM.COM : Click to view the full PDF of IEC 62288:2021 CMV

	Symbol name and description	Symbol graphic(s)
2.10 a	AIS aids to navigation – Physical Source of physical AIS AtoN is: AIS Message 21, Virtual AtoN Flag = 0, except for case "Missing" MMSI identity range: 99 MID 0000 to 99 MID 9999 Physical AIS aids to navigation (AtoN) shall be presented as an open diamond centred at reported position. The sides of the diamond shall be not more than 6 mm in length. The diamond shall be drawn using a thin solid line style. The basic colour for an "on position" AIS AtoN shall not be yellow or red but may be same as for reported targets. The colour for the diamond of an "off position" AIS AtoN shall be yellow, it shall be drawn using thick solid line style and when used against light background it shall include a black one-pixel outline to improve readability. If available, on radar displays the AIS AtoN shall be drawn indicating the purpose of the AIS AtoN using the "type of aids-to navigation" from AIS Message 21. On displays containing an underlying chart, AIS AtoNs shall be drawn without indication of purpose unless the object is selected in which case, if available, the symbol shall be drawn indicating the purpose of the AIS AtoN. The purpose symbol shall be drawn using same line style and colour as the basic shape of AIS AtoN symbol. The height of the purpose symbol shall be not more than 5 mm in length. When a floating AIS AtoN is off position, this shall be indicated with the yellow text "Off Posn" (AIS AtoN Off-Position Indicator = 1) and the lights off, racon error and light error indications shall not be presented. AIS AtoNs shall indicate an extinguished light with yellow text "Unlit". AIS AtoNs shall indicate failure of Racon with yellow text "Racon err". AIS AtoNs shall indicate light error or combination of light error/off with racon error with yellow text "Error". When used against light background, the yellow text shall include a black one-pixel outline to improve readability. In case there is an indication of purpose, the error text shall be above the indication of purpose. A Synthetic AtoN physically exists, but AIS data information for it is provided remotely. An AtoN is a Synthetic AtoN when "virtual AtoN flag = 0" and "repeat indicator > 0". The absence of a physical AtoN, a state known as "Missing", may be communicated as a combined state of "virtual AtoN flag = 1" and "off position indicator = 1". This shall be indicated with yellow text "Missing" above the diamond using colour yellow. This symbol shall have no crosshair at the position centre. When used against light background the yellow text shall include a black one-pixel outline to improve readability. AIS AtoNs may be labelled with the AtoN name. Alphanumeric text used to label an AIS AtoN shall be the same basic colour as the AIS AtoN symbol. It may be user selectable for the label to include full textual content of the AtoN name or truncated version of the AtoN name, for example only last 3 characters of the AtoN name.	Physical AIS AtoN and related AIS Type of aids-to navigation code and AIS Status bits in parenthesis, where applicable:  Default, type not specified (0); Reference point (1); Fixed structure offshore/obstruction (3); Light, without sectors (5); Light, with sectors (6); Leading light front (7); Leading light rear (8); Light vessel/LANBY/Rigs (31)    Racon (2)    Beacon, Cardinal E (10); Floating, Cardinal Mark E (21) Beacon, Cardinal S (11); Floating, Cardinal Mark S (22) Beacon, Cardinal W (12); Floating, Cardinal Mark W (23)   Beacon, Port hand (13); Beacon, Preferred Channel Port hand (15); Port hand mark (24); Preferred channel port hand (26) Beacon, Starboard hand (14); Beacon, Preferred Channel Starboard hand (16); Starboard hand mark (25); Preferred channel Starboard hand (27)    Beacon, Isolated danger (17); Isolated danger (28) Beacon, Safe water (18); Safe water (29) Beacon, Special mark (19); Special mark (30)

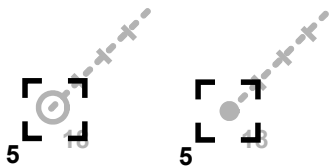
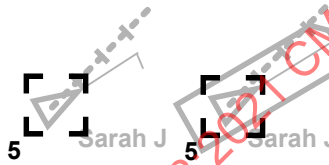
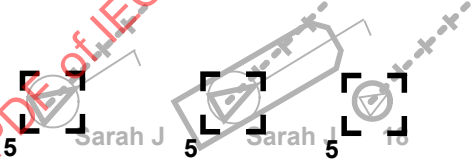
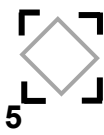
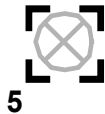
		Off Posn  including any combinations with Lights off/error and/or Racon error Unlit  Light off (bits 11100101 or 11101101 or 11110101) Racon err  Racon error (bits 11111001 or 11111011 or 11111111) Error  Light error or combination of light error/off with racon error (bits 11100110 or 11101110 or 11110110 or 11111101) Missing  Charted AtoN is missing (off position indicator = 1)

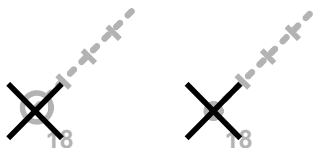
		Beacon, Cardinal E (10); Floating, Cardinal Mark E (21)  Beacon, Cardinal S (11); Floating, Cardinal Mark S (22)  Beacon, Cardinal W (12); Floating, Cardinal Mark W (23)  Beacon, Port hand (13); Beacon, Preferred Channel Port hand (15); Port hand mark (24); Preferred channel port hand (26)  Beacon, Starboard hand (14); Beacon, Preferred Channel Starboard hand (16); Starboard hand mark (25); Preferred channel Starboard hand (27)  Beacon, Isolated danger (17); Isolated danger (28)  Beacon, Safe water (18); Safe water (29)  Beacon, Special mark (19); Special mark (30) 
2.10 c	AIS aids to navigation – Mobile Source of mobile AIS AtoN is: AIS Message 21 AtoN Status = Page ID = 101 MMSI identity range: 99 MID 8000 to 99 MID 9999 Mobile AIS aids to navigation (AtoN) shall be presented as an open diamond topped by letter "M" of not more than 2 mm in length of height and a compass rose inside centred at reported/predicted position. The sides of the diamond shall be not more than 6 mm in length. The diamond and the compass rose shall be drawn using a thin solid line style (Virtual AtoN Flag = 0) or a thin dashed line (Virtual AtoN flag = 1). The basic colour for a mobile AIS AtoN is as used for the physical AIS AtoN symbols. Mobile AIS AtoN with known direction of movement shall include an arrow originating from the compass rose centre oriented towards the reported COG of the mobile AIS AtoN (see AIS AtoN Status bits when Page ID bits = 101 in Table L.1) adjusted to the orientation mode in use. The result from "adjusted to the orientation mode" shall be presented aligned with the closest line of the compass rose. Mobile AIS AtoNs may be labelled with the AtoN name. Alphanumeric text used to label a mobile AIS AtoN shall be the same basic colour as the mobile AIS AtoN symbol. It may be user selectable for the label to include full textual content of the AtoN name or truncated version of the AtoN name, for example only last 3 characters of the AtoN name.	Basic shapes:  Default  Virtual Virtual AtoN Flag = 0 Virtual AtoN Flag = 1 Basic shapes shall use the additional qualifiers below to denote how the AtoN as propelled. Self-propelled, but direction not reported or unavailable (AtoN Status bits 1010111x):  Tethered (AtoN Status bits 1010101x):  If COG information is provided, it shall be presented with an arrow pointed in coarse direction of COG within $\pm 22,5^\circ$ sectors as defined by AtoN Status bits (see Table L.1):

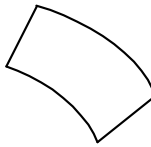
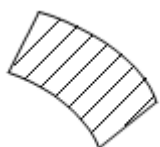


	Symbol name and description	Symbol graphic(s)
2.10 d	AIS AtoN dimensions – True scaled outline The user may select to present dimensions of physical AIS AtoN type = 3 (Fixed structure offshore/obstruction) and type = 31 (Light vessel/LANBY/Rigs) as a true scaled outline drawn using a thick solid line style with the same basic colour used for AtoN symbols, with the A axis of the ABCD values of the AIS AtoN oriented to True North. Automatic selection of the true scaled outline is permitted (see 5.13.4). The true scaled outline shall only be presented when the largest of the ABCD values is at least 9 mm.	 Outline drawn as a circle when $A = B = C = D > 1$  Outline drawn as a rectangle when $A \neq B$ and $C \neq D$  Outline drawn as a rectangle when $A \neq B$, $C \neq 0$ and $D = 0$

	Symbol name and description	Symbol graphic(s)
2.11	AIS search and rescue transmitter and other devices using AIS burst transmission technology NOTE Also known collectively as "AIS locating devices". Sources of AIS locating devices are: • AIS-SART use MMSI identity range 970 00 0000 to 970 99 9999, • AIS MOB use MMSI identity range 972 00 0000 to 972 99 9999, • EPIRB-AIS use MMSI identity range 974 00 0000 to 974 99 9999. Valid MMSI for AIS locating devices are defined in ITU-R 585. Care should be taken to ensure that possible future expansions of the MMSI identity ranges do not affect the correct presentation, if such decision is taken by ITU. Such MMSI identity range expansion might be AIS-SART up to 971 99 9999, AIS MOB up to 973 99 9999, EPIRB-AIS up to 975 99 9999. Active AIS locating devices shall be presented as a 8 mm diameter circle with a cross inside drawn with a solid line. The symbol shall use the same basic colour as the AIS AtoN symbols. Test versions of AIS locating devices shall include label "TEST" in lower right-hand side of the symbol. The symbol and labels shall be drawn using a solid line style and shall use the same basic colour as the AIS AtoN symbols. AIS locating device symbol has no associated speed or course vector. 5	Active AIS locating device  (SN243) AIS locating device under test 

	Symbol name and description	Symbol graphic(s)
2.12	Selected ~~target~~s object <i>Selected ~~target~~ object symbols shall be presented as broken squares indicated by their corners, centred on the selected ~~target~~ object symbol by the user and clearly extending beyond it. The squares shall be drawn using a dashed line.</i> <i>If the selected symbol is presented with the addition of symbol 5.16, symbol 2.12 shall be sized to encompass both the selected symbol and symbol 5.16.</i> Alphanumeric text used to label a selected ~~target~~ object shall be the same basic colour as the selected ~~target~~ object symbol. The selected object symbol can be used, for example, for selected radar targets, selected AIS targets, selected associated targets, selected AIS ATON, selected AIS locating device, selected AIS SAR aircraft, selected AIS SAR vessel, selected waypoint, etc. This selected object symbol can be used for objects based on point geometry. 5	Selected radar targets:  (SN243) Selected AIS targets:  (SN243) Selected associated targets:  (SN243) Selected AIS ATON:  (SN243) Selected AIS-SART locating device:  (SN243)

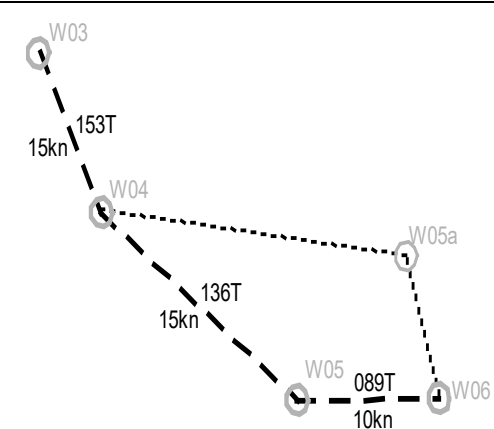
	Symbol name and description	Symbol graphic(s)
2.13	Lost targets, AIS SAR vessels, AIS ATONs and AIS locating devices Once acknowledged, the lost target, AIS SAR vessel, AIS AtoN or AIS locating device symbol and its target, AIS SAR vessel, AIS AtoN or AIS locating device symbol shall be removed from the display. 5	Lost radar targets:  (SN243)
		Lost AIS targets:  (SN243)
		Lost associated targets:  (SN243)
		Lost AIS ATON:  (SN243)
		Lost AIS-SART locating device:  (SN243)

	Symbol name and description	Symbol graphic(s)
2.14	Radar Target acquisition area/zone The user may select to display radar target acquisition areas and/or AIS target activation areas. Target acquisition areas shall be presented as a series of lines bounding a geographic area designated for radar target acquisition and/or AIS target activation. The lines shall be drawn using a thin solid line style with the same basic colour used for target symbols. Another colour may be used when in edit mode. 5 The area may be filled providing the colour of the fill does not degrade the visibility of the radar image and target symbols. Area fill shall be transparent and shall be the same basic colour as the area boundary.	 (SN243)
2.15 a	AIS SAR aircraft – fixed wing Source of AIS SAR aircraft – fixed wing is: AIS Message 9 MMSI identity range: 111 MID 100 to 111 MID 499 <i>An AIS SAR aircraft – fixed wing shall be drawn with a thin solid outline with the same basic colour as used for target symbols. The symbol shall be oriented in the direction of the COG. The length of the symbol shall be 6 mm.</i>	 (SN243)
2.15 b	AIS SAR aircraft – helicopter Source of AIS SAR aircraft – helicopter is: AIS Message 9 MMSI identity range: 111 MID 500 to 111 MID 999 <i>An AIS SAR aircraft – helicopter shall be drawn with a thin solid outline with the same basic colour as used for target symbols. The symbol shall be oriented in the direction of the COG. The length of the symbol shall be 6 mm.</i>	
2.16	AIS SAR vessel Source of AIS SAR vessel is: Message 5 and Message 24B contains ship type 51 is SAR. <i>If provided, a search and rescue vessel shall be presented by having a circle with cross drawn with a solid line inside the standard activated AIS vessel symbol (see 2.5 a and 2.5 b)</i>	 (SN243)
2.17	Target exclusion zone The user may select to display radar target acquisition exclusion zone and/or AIS target exclusion zone. Target exclusion zones shall be presented as a series of lines bounding a geographic area designated for radar target acquisition exclusion and/or AIS target activation exclusion. The lines shall be drawn using a solid line style with the same basic colour used for target symbols. The area shall include solid thin diagonal lines. Another colour may be used when in edit mode.	

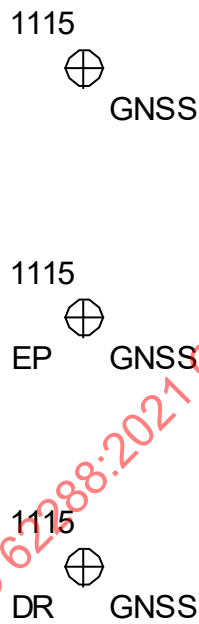
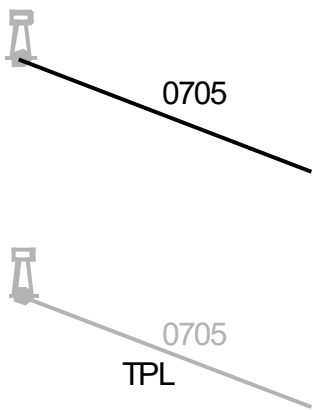
	Symbol name and description	Symbol graphic(s)
2.18	Autonomous Marine Radio (Group B) Device (AMRD B) Source of AMRD B device is: AIS message as specified in ITU-R M.2135 on Ch. 2006. NOTE Details of AIS messages related to AMRD B and MMSI Identity range for AMRD B are under discussion in ITU (see newest edition of ITU-R M.2135). An AMRD B shall be drawn as hexagon with a thin solid outline with the same basic colour as used for target symbols. The height of the symbol shall be 4 mm. 5	

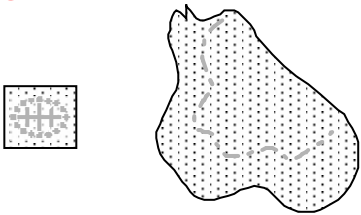
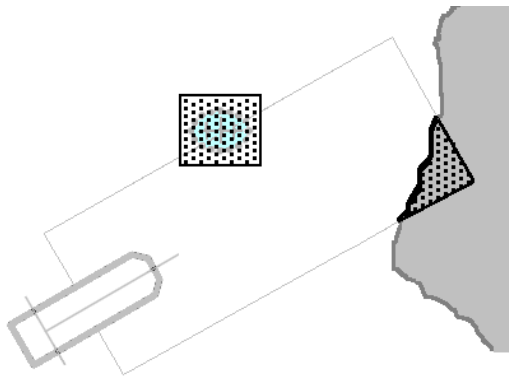
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Table A.3 – Navigation symbols

	Description	Symbol
3.1 a	Waypoint Waypoints shall be presented as circles centred at the position of the waypoint. The circles shall be at least 4 mm but not more than 6 mm in diameter. Circles representing waypoints on the monitored route shall be drawn using a thick solid line style with the same basic colour used for the route. Alternatively, the next waypoint on the monitored route may be presented as a set of two concentric circles. The outer circle shall be ~~nominally~~ 6 mm in diameter. The inner circle shall be ~~nominally~~ 4 mm in diameter. Circles representing waypoints on the alternate planned route shall be drawn using a thin solid line style. Optionally, waypoints may be labelled adjacent to their symbol. The label shall be offset by at least 2 mm from the symbol and shall not interfere with text used to label the track leg. Alphanumeric text used to label a waypoint shall be the same basic colour as the waypoint symbol.	 (SN243)
3.1 b	Routes A route is as a series of waypoints connected by one or more legs. Leg lines on the monitored route shall be drawn using a thick bold long-dashed line style. Leg lines on an alternate ~~or~~ a planned route shall be drawn using a thin dotted line style. ~~Note that the IHO recommends a dotted line style for a leg line on the monitored route.~~ The IHO's specified colour for leg lines on the monitored route is red. 26 Leg lines on the monitored route may be labelled adjacent to their line with their course and planned speed, ideally on opposite sides. The label shall be offset by at least 2 mm from the line and shall not interfere with text used to label the waypoint. Note that the IHO recommends drawing a box around the planned speed. Alphanumeric text used to label a leg line shall be the same colour as the leg line. The alternate planned route shall be presented as a series of track legs connecting a series of waypoints.	 Not to scale (SN243)

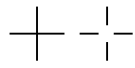
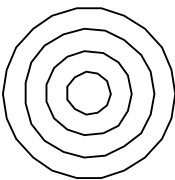
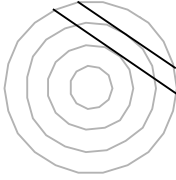
	Description	
3.1 c	Distance to run Leg lines on the monitored route may be marked with distance to run. These marks shall be presented as single lines perpendicular to the leg line with their midpoint on it and extending at least 2 mm but not more than 3 mm on either side. They shall be located along the leg line to represent the distance to the next waypoint. The marks shall be drawn using a thin solid line style with the same colour as the leg line. Distance to run may be labelled adjacent to the marks. The label shall be offset by at least 2 mm from the mark and shall not interfere with other text used to label the leg line or waypoints. Alphanumeric text used to label distance to run shall be the same colour as the mark.	
3.1 d	Planned position Optionally, track legs may be marked with a planned position. These marks shall be presented as single lines perpendicular to the track leg with their midpoint on the line and extending at least 2 mm but not more than 3 mm on either side. They shall be located along the track leg to represent the distance from the previous waypoint. The marks shall be drawn using a thin solid line style. Planned position may be labelled adjacent to the mark with the date and time of planned arrival. The label shall be offset by at least 2 mm from the mark and shall not interfere with other labels. Alphanumeric text used to label planned position shall be the same basic colour as the mark.	
3.1 e	Visual limit of lights Leg lines on the monitored route may be marked with the visual limits of lights (i.e. rising/dipping range). The visual limit shall be presented as an arc centred on the light and extending across the track leg at least 10 mm on either side. The arc shall be drawn using a thin solid line with the same basic colour as the leg line. Alphanumeric text used to label visual limits shall be the same basic colour as the arc.	
3.1 f	Wheel-over line Track leg lines on the monitored route may be marked with a wheel-overline. The wheel-over line shall be presented as single line centred on the current leg line, parallel to the next leg line and extending at least 5 mm on either side of the current leg line. The line shall be drawn using a thin solid line with the same colour as the leg line. A second perpendicular line to the current leg line may be presented. This second line shall not extend more than 5 mm on either side of the current leg line. The second line shall be drawn using a thin solid line with the same colour as the leg line. The wheel-over line may be labelled adjacent to the line with the planned rudder angle and time of wheel-over. Alphanumeric text used to label wheel-over position shall be the same basic colour as the wheel-over line.	

	Description	
3.2	Plotted position <i>A plotted position (Fix, EP, and DR) shall be presented as a circle with crossed lines centred at the position. The circle shall be 5 mm in diameter. The length of the crossed lines shall be the diameter of the circle.</i> The circle and crossed lines shall be drawn using a thin solid line style. <i>The position shall be labelled with time and an indication of its source for example GNSS, L (Loran), R (Radar range), V (Visual bearing), VR (Visual bearing and Radar range). If the position is an estimated position, it shall also be labelled with the letters "EP". If the position is a dead reckoned position, it shall also be labelled with the letters "DR".</i> <i>Alphanumeric text used to label the position shall be the same basic colour as the symbol.</i>	 (SN243)
3.3	Line of position <i>A line of position (LOP) shall be presented as a single line originating from a charted object and extending towards own ship. The bearing of the LOP shall be referenced to the CCRP.</i> <i>The LOP shall be drawn using a thin solid line style.</i> <i>The LOP shall be labelled with time. If the LOP is transferred, it may also be labelled with the letters "TPL" for transferred position line.</i> <i>Alphanumeric text used to label LOP shall be the same basic colour as the line.</i> <i>A LOP range observation will be an arc.</i>	 Examples show the default symbol for a water tower. (SN243)

	Description	Symbol
3.4	Tidal stream A tidal stream shall be presented as a single line with three arrowheads. The line shall originate from the charted position for which a tidal stream table (or tidal stream data) is available and shall extend no more than 15 mm in length. The triple arrowhead shall extend no more than 2 mm on either side (perpendicular to the line). The line for an actual tidal stream shall be drawn using a thin solid line style. The line for a predicted tidal stream shall be drawn using a thin long dashed line style. The arrowheads for a tidal stream shall be drawn using a thin solid line style. The tidal stream shall be labelled adjacent to the line with the effective strength and time, ideally on opposite sides. The label shall be offset by at least 2 mm from the line. Alphanumeric text used to label the tidal stream shall be the same basic colour as the line. Note that the IMO recommends drawing a box around the strength- 11	 Examples show the default symbol for a point or area for which a tidal stream table is available. (SN243)
3.5 a	Mariner entered danger-highlight A danger highlighted by a mariner 20 shall be presented as a polygon bounding a geographic area designated as dangerous to navigation, or as a poly-line creating a boundary around such an area. The boundary of the polygon, or poly-line, shall be drawn using a thick solid line style. Recommended colour red. The polygon, or bounded area shall be filled with a transparent fill using the same colour as the polygon or poly-line.	 Examples show the default symbol for a mariner entered danger highlight of a dangerous wreck at an unknown depth bounded by a rectangular danger highlight and an outcropping of land bounded by a user-entered danger highlight. (SN243)
3.5 b	Look-ahead alarm highlight 20 The graphical indication in the chart area of an alarm condition (see MSC.232(82)/A 11.4.4 and 11.4.6) shall be presented as a polygon or poly-line on the boundary of the area or point object causing the condition. The polygon or poly-line shall be drawn using a thick solid line style with recommended colour red. The bounded area shall have a transparent fill of the same colour.	 The example shows a depth area shallower than safety contour and a dangerous wreck within the look-ahead safety check area. (SN243)

	Description	Symbol
3.5 c	Caution Look-ahead indication highlight 20 The graphical indication in the chart area of warning or caution conditions (see MSC.232(82)/A 11.4.4 and 11.4.6) shall be presented as a polygon or poly-line on the boundary of the area or point object causing the condition. The polygon or poly-line shall be drawn using a thick solid line style with recommended colour yellow and adjacent thin lines of black on either side for visibility against a white (Day) background. The bounded area shall not be filled.	Examples show point (wreck), restricted area and line (fish stakes). (SN243)
3.6	Danger bearing A danger bearing or clearing line shall be presented as a single line with an arrowhead directed at the base of a charted object. The line shall extend at least 20 mm in length and ideally through or across the monitored route. The line shall be drawn using a thin solid line style with the required colour red. A danger bearing shall be labelled with its bearing. The letters "NMT" shall be used to indicate "not more than". The letters "NLT" to indicate "not less than". Alphanumeric text used to label the danger bearing shall be the same basic colour as the line.	The drawing is not to scale. The example shows the default symbols for a light and a dangerous wreck at an unknown depth. (SN243)
3.7	Event marker An event marker shall be presented as a 5 mm square x 8 mm rectangle with a diagonal line inscribed. The symbol shall be drawn using a thin solid line style. Optionally, An event marker may shall be labelled. 26 Multiple event markers may be numbered. Alphanumeric text used to label an event marker shall be the same basic colour as the symbol.	(SN243)

Table A.2 – Navigation tools

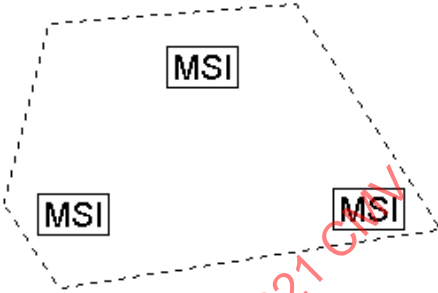
	Description	Symbol(s)
4.1	User cursor The user cursor shall be presented as crossed lines perpendicular to each other extending at least 3 mm from the centre on all sides. The cursor shall be drawn in a thick solid line style. Optionally, the centre of the cursor may be open. Either symbol may be used.	 (SN243)
4.2	Electronic bearing line (EBL) Electronic bearing lines (EBL) shall be presented as a single line originating from CCRP, from a position offset from CCRP, or from a geographically fixed position. An EBL shall be drawn as a <i>dashed line</i> style. Each <i>additional EBL</i> shall be distinguished by different styles of dashed lines and/or colours. If an EBL is offset, the EBL may be combined with a VRM to form an ERBL (electronic range and bearing line). The range shall be presented as a small arc across the EBL and referenced from the origin of the EBL. The arc shall use the same colour as the EBL.	 (SN243)
4.3	Variable range marker (VRM) Variable range markers (VRM) shall be presented as a <i>circle</i>. The VRM shall be drawn as a dashed line style. Each <i>additional VRM</i> shall be distinguished by different styles of dashed lines and/or colours.	 (SN243)
4.4	Range rings If selected, a set of fixed range rings shall be presented as an appropriate number of equally spaced concentric circles centred at the CCRP. Spacing between range rings is dependent on the range scale (i.e. range rings represent logical subdivisions of the range scale). The circles shall be drawn as a thin solid line style.	 (SN243)
4.5	(parallel) Index lines Parallel index lines shall be presented as a series of lines aligned to a set bearing, and spaced at a series of beam ranges (for example at the range ring spacing). No line style is specified for (parallel) index lines, however, they shall be distinguishable from each other and from EBLs. Index lines set at other bearings may be used. A series of index lines at other positions may be used.	

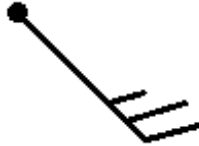
For the application of the symbols in Table A.5, the following shall be considered:

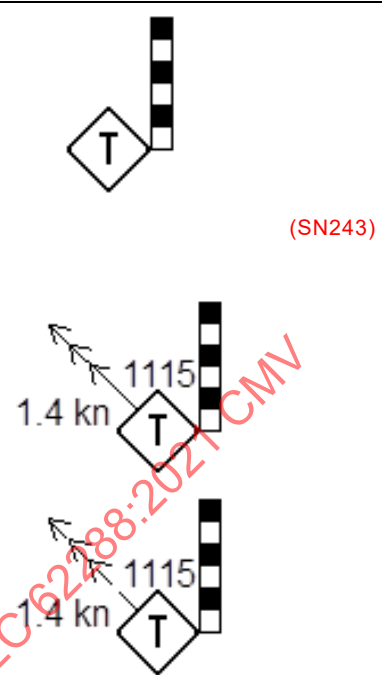
- multiple symbols may be co-located;
- a minimum means shall be provided to prevent co-located symbols from obscuring each other, for example by user selection, by type of information.

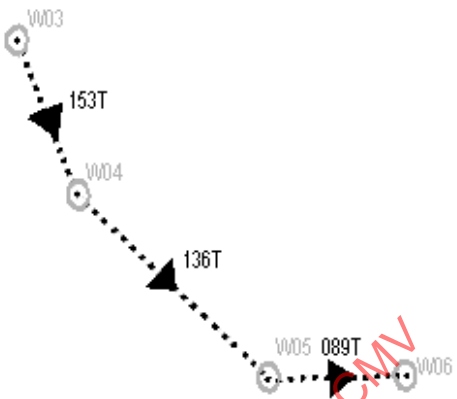
Table A.3 – Other symbols

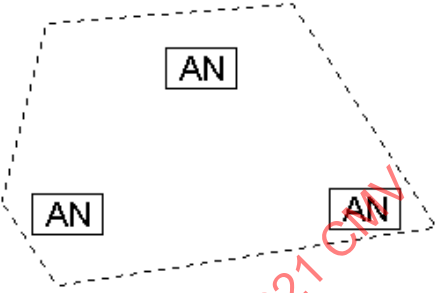
	Description	Symbol(s)
5.1	Trial manoeuvre When a trial manoeuvre function is enabled, it shall be indicated by the presentation of a large letter "T" in a conspicuous location in the operational display area.	T (SN243)
5.2	Simulation mode When a simulation mode is enabled, it shall be indicated by the presentation of a large letter "S" in a conspicuous location in the operational display area.	S (SN243)
5.3	Radar test target When an internally generated test target is enabled, it shall be indicated by the presentation of the large letter "X" adjacent to the target with the basic colour used for the target symbol. In addition, a bold "X" shall be shown in a conspicuous location in the operational display area.	X (SN243)

	Description	Symbol(s)
5.4	Maritime Safety Information, MSI <i>MSI point symbol shall be presented as box with the "MSI" inscribed inside it. The box shall be centred at the position derived from MSI message. The box shall not be more than 6 mm in height, drawn using a thick solid line style.</i> <i>MSI area symbol shall be presented as a series of lines bounding a geographic area designated as "caution" to navigation. Connecting lines shall be drawn using thin dashed line style and using same basic colour as the symbol itself. The area shall be filled with a sparse pattern of MSI point symbols separated by 50 mm.</i> MSI symbols shall be in a separate user selectable layer or group, removable by single operator action. The removal may be connected to generic removal functionality of non-chart object layers. The user dialog area shall have an indication if MSI notices are available in the area currently displayed, but the MSI layer is not automatically selected for display. MSI symbols may be connected to a date range and in such case each MSI notice symbol shall be displayed only when user selected date is within data range. It shall be possible to cursor pick an MSI symbol for further details. When presentation of MSI point and area symbols are provided as overlay on chart or radar, then means shall be provided for cursor pick of the symbol to provide further information in the user dialog area of the display. <i>Note that the source of MSI may be NAVTEX, EGC, AIS ASM function identifier 22 or 23 (SN.1/Circ.289), etc.</i> <i>Note that sub-components of MSI, for example Navigational Warnings (S-124) may have their own symbology.</i> 9	Example of point symbol  Example of area symbol 

	Description	Symbol(s)
5.5	Meteorological information <i>Meteorological information symbols consist of two parts:</i> – the weather station symbol or reference point; and – the wind shaft. <i>The weather station symbol shall be presented as a circle with "W" inscribed inside it. The circle shall be centred at the position derived from the site location report binary message. The circle shall not be more than 6 mm in diameter, drawn using a thin solid line style and using the same basic colour as AIS AtoN.</i> <i>The reference point symbol shall be presented as a dot. The dot shall not be more than 1 mm in diameter, drawn using a thin solid line style fill and using the same basic colour as AIS AtoN.</i> <i>Alphanumeric text may be used to label the weather station.</i> <i>The optional wind shaft shall be used to represent actual wind (i.e. not forecast) force and direction as defined by WMO No.485, Appendix II-4, the surface plotting model. If actual wind force and direction is not available then there shall be no environmental symbol wind shaft.</i> 5 <i>The wind shaft shall be not more than 3 times the diameter of the weather station symbol. The length of barbs and pennants shall not exceed the diameter of the weather station symbol. The wind shaft shall be drawn using a thick solid line style and using the same basic colour as AIS AtoN.</i> <i>The wind shaft is directed along the axis of the wind towards the centre of the station circle and stops at its circumference. Wind is represented by barbs and solid pennants. The full barbs representing 5 m s^{-1} or 10 kn, the half barbs representing $2,5 \text{ m s}^{-1}$ or 5 kn and the solid pennant representing 25 m s^{-1} or 50 kn. All pennants and barbs lie to the left (clockwise) of the wind shaft in the northern hemisphere and to the right (counter clockwise) of the wind shaft in the southern hemisphere. Barbs are at an angle of 110° to 130° from the wind shaft. Pennants are triangles with their bases on the wind shaft. A calm shall be indicated by a circle drawn around the weather station circle: Missing wind speed shall be indicated by placing an "x" at the end of the wind shaft in lieu of the wind barbs.</i> <i>Other meteorological or hydrographic information such as visibility, temperature, salinity, etc., if available, shall be available on demand.</i> <i>Note that the source of meteorological information may be AIS ASM function identifier 26 or 31 (SN.1/Circ.289), etc.</i>	Dover  (WMO) (SN243) Example of weather station Dover  (WMO) (SN243) Example of weather station with optional wind shaft in southern hemisphere  (SN243) Example of reference point with optional wind shaft in southern hemisphere

	Description	Symbol(s)
5.6	Tidal and water level information <i>Tidal and water level information symbol consist of ~~three~~ two parts: the tidal symbol, ~~tidal flow symbol~~ and the tidal gauge symbol.</i> <i>The tidal symbol shall be presented as a diamond with "T" inscribed inside it. The diamond shall be centred at the position derived from the site location report binary message. The ~~sides of the~~ diamond shall not be more than 6 mm in ~~diameter~~ length, drawn using a thin solid line style and using the same basic colour as AIS AtoN.</i> <i>The optional tidal flow part of the symbol shall be used to represent tidal speed and direction. If tidal speed and direction is not available then there shall be no tidal flow symbol. The tidal flow symbol (see symbol 3.4) shall ~~not be more than 10 mm in length~~, drawn to the direction of the tidal current and using the same basic colour as AIS AtoN.</i> ~~If selected, the details of tidal flow shall be presented in the associated AIS object dialog using one decimal.~~ <i>The optional tidal gauge part of the symbol shall be used to represent availability of water level information. If water level is not available then there shall be no tidal gauge symbol. The tidal gauge symbol shall not be more than 10 mm in length, drawn using a thick solid line style, transparent fill and using the same basic colour as AIS AtoN.</i> <del>If selected, the details of water level shall be presented in the associated AIS object dialog ~~relative to vertical datum of ENC using one decimal~~.</del> ~~If both the tidal gauge and the tidal flow symbol are presented, the tidal gauge symbol shall be presented to the right-hand or left-hand side of the tidal symbol such that overlapping of the tidal flow vector and the tidal gauge symbols does not occur. 5~~ <i>Note that the source of tidal information may be AIS ASM function identifier 31 (SN.1/Circ.289), etc.</i>	 (SN243) Examples of combinations of symbols 5.6 and 3.4
5.7	Signal station <i>Signal station shall be presented as a diamond centred at the reported position of the signal station. The sides of the diamond shall be not more than 6 mm in length, drawn using a thin solid line style 5 and shall be the same basic colour as the AIS AtoN symbol.</i> <i>The symbol shall be labelled with text "SS" centred in the diamond and the colour of the label shall be the same colour as the symbol.</i> <i>Other information from signal station, if available, shall be available on demand.</i> <i>Note that a signal station is a station capable of transmitting marine traffic signals. The source of signal station may be AIS ASM function identifier 19 (SN.1/Circ.289), etc.</i>	 (SN243)

	Description	Symbol(s)
5.8	Route information broadcast received 5 Route information is as a series of waypoints connected by one or more legs. Leg lines on the route information shall be drawn using a thin dotted line style. They shall have a centred solid triangle with equal length of each side of not more than 4 mm and shall be the same basic colour as the AIS AtoN symbol. Solid triangle is centred on visible part of each leg. Leg lines on the route information may be labelled adjacent to their line with their course. The label shall be offset by at least 2 mm from the line and shall not interfere with text used to label the waypoint. Alphanumeric text used to label a leg line shall be the same colour as the leg line. The colour of route type "mandatory route" shall be different from other route types and symbol 3.1 b. Note that the source of route information may be AIS ASM function identifier 27 or 28 (SN.1/Circ.289), etc.	 NOTE Not to scale (SN243)
5.9	Berthing data Berthing assignment shall be presented as a box with the "BERTH" inscribed inside it. The box shall be centred at the position derived from the berthing data message. The box shall not be more than 6 mm in height, drawn using a thick solid line style and shall be the same basic colour as the AIS AtoN symbol. Other information from berthing data, if available, shall be available on demand. Note that the source of berthing data may be AIS ASM function identifier 20 (SN.1/Circ.289), etc.	 (SN243)
5.10	Clearance time to enter port Clearance time to enter port shall be presented as a box with the "CTE" inscribed inside it. The box shall be centred at the position derived from clearance time to enter port data message. The box shall not be more than 6 mm in height, drawn using a thick solid line style and shall be the same basic colour as the AIS AtoN symbol. Other information from clearance time to enter, if available, shall be available on demand. Note that the source of clearance to enter port may be AIS ASM function identifier 18, 22 or 23 (SN.1/Circ.289), etc. 5	 (SN243)

	Description	Symbol(s)
5.11	Area notice <i>Area notice point symbol shall be presented as box with the "AN" inscribed inside it. The box shall be centred at the position derived from Area notice message. The box shall not be more than 6 mm in height, drawn using a thick solid line style and shall be the same basic colour as the AIS AtoN symbol.</i> <i>Area notice area symbol shall be presented as a series of lines bounding a geographic area. Connecting lines shall be drawn using the thin dashed line style and using the same basic colour as the symbol itself. The area shall be filled with a sparse pattern of Area notice point symbols separated by 50 mm.</i> <i>Drawing priority of Area notice symbol is below Maritime Safety Information MSI, see symbol 5.4.</i> Area notice symbols shall be in a separate user selectable layer, which is removable by single operator action. The removal may be connected to generic removal functionality of non-chart object layers. The user dialog area shall have an indication if area notices are available in the area currently displayed, but the area notice layer is not selected for display. Area notice symbols may be connected to a date range and in such case each area notice symbol shall be displayed only when user selected date is within data range. It shall be possible to cursor pick an Area notice symbol for further details. <i>Note that the source of the area notice may be AIS ASM function identifier 22 or 23 (SN.1/Circ.289), etc.</i>	Example of point symbol  Example of area symbol  (SN243)
5.12	Air gap <i>Air gap symbols consist of two parts: the air gap symbol and the air gap gauge symbol.</i> <i>The air gap symbol shall be presented as a diamond with "A" inscribed inside it. The diamond shall be centred at the position derived from the site location report binary message. The sides of the diamond shall not be more than 6 mm in diameter 5, drawn using a thin solid line style and using the same basic colour as AIS AtoN.</i> <i>The air gap gauge part of the symbol shall be used to represent availability of air gap information. If air gap is not available then there shall be no air gap gauge symbol. The air gap gauge symbol shall not be more than 10 mm in length, drawn using a thick solid line style, transparent fill and using the same basic colour as AIS AtoN.</i> Air gap relative to the water surface in metres with one decimal and other air gap information, if available, shall be available on demand. <i>Note that the source of the air gap/air draught information may be AIS ASM function identifier 26 (SN.1/Circ.289), etc.</i>	 (SN243)

	Description	Symbol(s)
5.13	Environmental report <i>The environmental report symbol shall be presented as a diamond with "ENV" inscribed inside it. The diamond shall be centred at the position derived from the site location report binary message. The sides of the diamond shall not be more than 6 mm in diameter, drawn using a thin solid line style and using the same basic colour as AIS AtoN.</i> All available details of environmental information shall be displayable on demand. The tidal flow/current may optionally be represented by symbol 3.4 (tidal stream). If tidal/current speed and direction is not available then there shall be no tidal flow symbol. The tidal flow symbol shall use the same basic colour as AIS AtoN. If selected, the details of tidal flow/current shall be presented in the associated AIS object dialog using one decimal. 5 <i>Note that the source of environmental information may be AIS ASM function identifier 26 or 31 (SN.1/Circ.289), etc.</i>	 (SN243)
5.14	Fairway closure The fairway closure symbol shall be presented as crossed lines centred on a fairway symbol (two converging dashed lines) plus a box around the symbol, drawn using a thin solid line style and using the same basic colour as AIS AtoN. All available details of fairway closure shall be displayable on demand.	
5.15 a	AIS synthetic target – Distress AIS synthetic targets for which the source is AIS ASM when FI = 22 or FI = 23 Area Notice with "Sub-areas" set to "0" circle or point and "Area shape" set to "0" and "Radius" set to "0" and "Notice Description" set to a value range from 64 to 74 shall be presented as a quadrilateral and centred at the predicted position and oriented to the top of the operational display area and shall include a diagonal line across the quadrilateral. The shorter sides of the quadrilateral shall be 4 mm and the longer sides shall be 6 mm. The symbol shall be drawn using a thick solid line style with yellow colour and when used against a light background it shall include a black one-pixel outline to improve readability. Quadrilaterals may be labelled. Alphanumeric text used to label quadrilaterals shall be drawn with the same basic colour as used for AIS AtoN.	 Sarah J
5.15 b	AIS synthetic target AIS synthetic targets for which the source is AIS ASM when FI = 17 VTS generated/synthetic target shall be presented as quadrilaterals oriented to the reported COG and centred at the targets' predicted position. The shorter sides of the quadrilateral shall be 4 mm and the longer sides shall be 6 mm. The quadrilaterals shall be drawn using a thick solid line style and using the same basic colour as AIS AtoN. An AIS synthetic target without a reported COG shall be oriented toward the top of the operational display area and shall include a diagonal line across the quadrilateral. Quadrilaterals may be labelled. Alphanumeric text used to label quadrilaterals shall be drawn with the same basic colour as used for AIS AtoN	 Sarah J AIS synthetic target without COG  Sarah J

	Description	Symbol(s)
5.16	Source of a received call or unread message Received call or unread message shall be presented by having two increasing centred 1/8 arcs drawn using a thin solid line at upper right-hand side of the AIS target symbol. The received call or unread message symbol may be presented to the upper left-hand side of the AIS symbol, centred on the symbol position, if required to avoid overlapping.	Some examples of the use of symbol 5.16 together with other symbols With AIS target  With AIS AtoN physical  With Base station 
5.17	AIS base station AIS base station shall be presented as a diamond at the reported position of the base station. The sides of the diamond shall be not more than 6 mm in length, drawn using a thin solid line style and shall be the same basic colour as the AIS AtoN symbol. The symbol shall be labelled with text "BS" centred in the diamond and the colour of the label shall be the same colour as the symbol The AIS base station has no associated velocity vector.	 Basic shape
5.18	Co-located AIS ASM objects Co-located AIS ASM objects shall be presented as a diamond at the reported position of the AIS ASM objects. The sides of the diamond shall be not more than 6 mm in length, drawn using a thin solid line style and shall be the same basic colour as the AIS AtoN symbol. The symbol shall be labelled with text "INFO" centred in the diamond and the colour of the label shall be the same colour as the symbol.	
5.19	Weather observation report from ship The weather observation report from ship symbol shall be presented as a diamond with "WX" inscribed inside it. The diamond shall be centred at the position derived from the reported position of observation. The sides of the diamond shall not be more than 6 mm, drawn using a thin solid line style and using the same basic colour as AIS AtoN. Note that the source of ship weather information may be AIS ASM function identifier 21 when type of weather report = 0 (SN.1/Circ.289). 5	

Table A.4 – Example of possible colour scheme

Symbol	Colour white background/ dark background	Colour token (IHO S-52)
1.1 a, 1.1 b	Black/White	SHIPS
1.7 a	Black/White	PSTRK
2.1 a, 2.4, 2.5 a, 2.15, 2.16	Blue-green	ARPAT
2.10, 2.11, 5.5, 5.6, 5.7	Blue	RESBL
2.12, 4.1, 4.2, 4.3, 4.4, 4.5	Orange	CURSR
2.14, 3.7, 5.4	Orange	NINFO
3.1 a	Red	PLRTE
3.1 a	Orange	APLRT

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Annex B (normative)

Guidelines for the presentation of navigation-related terminology and abbreviations

B.1 Overview

Annex B specifies the terminology and abbreviations to be used for the presentation of navigation related information in conformance with guidelines published by IMO and provided in SN/Circ.243. All text in this document whose wording is identical to that in the IMO guidelines is printed in *italics*, and the referenced paragraph number is indicated in brackets with the abbreviated prefix, for example (SN243/2).

B.2 Purpose

(SN243/2/1) *The purpose of Annex B is to provide guidelines on the use of appropriate navigation-related terminology and abbreviations intended for presentation on all shipborne navigational systems and equipment. These are based on terminology and abbreviations used in existing navigation references.*

B.3 ~~Scope~~ Use of these guidelines

(SN243/2/2) *These guidelines will ensure that the terminology and abbreviations used for the presentation of navigation-related information on all shipborne navigational systems and equipment are presented in a consistent and uniform manner.*

B.4 Application

(SN243/2/3) *These guidelines apply to all shipborne navigational systems and equipment when navigation-related information is presented as text, the standard terminology or abbreviations listed in Table B.1 and Table B.2 shall be used in place of terminology and abbreviations which are currently contained in existing Performance Standards for navigational systems and equipment. Where standard terminology or a standard abbreviation is not available, another may be used. This shall provide a clear meaning and shall not conflict with the standard terminology or abbreviations listed in Table B.1 and Table B.2. Standard marine terminology shall be used for this purpose. When the meaning is not clear from its context, it shall not be abbreviated. When another terminology or abbreviation is used, it shall be explained in the operating manual.*

(SN243/2/3) *Unless otherwise specified, standard terms shall be presented in lower case while abbreviations shall be presented in upper case.*

B.5 Navigation related terminology and abbreviations

For the application of the standard terminology and abbreviations listed in Table B.1 and the standard units of measurement and abbreviations listed in Table B.2, the following shall be considered:

- *terms and abbreviations used in nautical charts are published in relevant IHO publications and are not listed here;*
- *in general, terms should be presented using lower case text with upper case first character for each separate word and abbreviations should be presented using upper case text. Those abbreviations that may be presented using lower case text are identified in Table B.2;*

- abbreviations may be combined, for example, "CPA LIM" or "T CRS". When the abbreviation for the standard terminology "Relative" is combined with another abbreviation, the abbreviation "R" should be used instead of "REL", for example, "R CRS" (see footnote b to Table B.1);
- the use of the abbreviations "SIM" and "TRIAL" are not intended to replace the appropriate symbols listed in Table A.5 (see footnote c to Table B.1);
- The term "Course Made Good" has been used in the past to describe "Track Made Good". This is a misnomer in that "courses" are directions steered or intended to be steered with respect to a reference meridian. "Track Made Good" is preferred over the use of "Course Made Good", where applicable (see footnote d to Table B.1);
- Where other information is presented using SI units, the respective abbreviations shall be used (see Table B.2). **11**

Table B.1 – List of standard terms and abbreviations

Term	Abbreviation	Term	Abbreviation
Acknowledge	ACK	Bearing	BRG
Acquire, Acquisition	ACQ	Bearing Waypoint To Waypoint	BWW
Acquisition Zone	AZ	Bow Crossing Range	BCR
Additional Military Layer	AML	Bow Crossing Time	BCT
Adjust, Adjustment	ADJ	Brilliance	BRILL
Aft	AFT	Built in Test Equipment	BITE
Alarm	ALARM	Calibrate	CAL
Alert Setting	ALERT SET	Cancel	CNCL
Altitude	ALT	Cancel All	CNCL ALL
Amplitude Modulation	AM	Carried (for example, carried EBL origin)	C
Anchor Watch	ANCH	Central Processing Unit	CPU
Antenna	ANT	Centre	CENT
Anti Clutter Rain	RAIN	Change	CHG
Anti Clutter Sea	SEA	Chart Display Settings	CHT DISP SET
April	APR	Chart Management	CHT MGMT
Audible	AUD	Chart Safety Settings	CHT SF SET
August	AUG	Circularly Polarised	CP
Automatic	AUTO	Clear	CLR
Automatic Frequency Control	AFC	Closest Point of Approach	CPA
Automatic Gain Control	AGC	Compact Disk Read Only Memory	CDROM
Automatic Identification System	AIS	Conning	CONN
Automatic Identification System – Search and Rescue Transmitter	AIS-SART	Consistent Common Reference Point	CCRP
Automatic Radar Plotting Aid	ARPA	Consistent Common Reference System	CCRS
Autopilot	AP	Contrast	CONT
Auxiliary System/Function	AUX	Coordinated Universal Time	UTC
Available	AVAIL	Correction	CORR
Azimuth Indicator	AZI	Course	CRS
Background	BKGND	Course Over the Ground	COG
BeiDou Navigation Satellite System	BDS	Course Through the Water	CTW

Term	Abbreviation
Course To Steer	CTS
Course Up	C UP ^a
Cross Track Distance	XTD
Cross Track Limit	XTL
Cursor	CURS
Dangerous Goods	DG
Date	DATE
Dated Objects	Dated Objects
Day	DAY
Day/Night	DAY/NT
Dead Reckoning, Dead Reckoned Position	DR
December	DEC
Decrease	DECR
Default Settings	DFLT SET
Delay	DELAY
Delete	DEL
Departure	DEP
Depth	DPTH
Destination	DEST
Deviation	DEV
Differential BDS	DBDS
Differential Galileo	DGAL ^a
Differential GLONASS	DGLONASS ^a
Differential GNSS	DGNSS ^a
Differential GPS	DGPS ^a
Digital Selective Calling	DSC
Display	DISP
Display Brilliance	BRILL
Distance	DIST
Distance Root Mean Square	DRMS ^a
Distance To Go	DTG
Down	DN
Drift	DRIFT
Dropped (for example, dropped EBL origin)	D
East	E
Echo Reference	REF
Electronic Bearing Line	EBL
Electronic Chart Display and Information System	ECDIS
Electronic Chart System	ECS
Electronic Navigational Chart	ENC

Term	Abbreviation
Electronic Position Fixing System	EPFS
Electronic Range and Bearing Line	ERBL
Emergency Position Indicating Radio Beacon	EPIRB
Emergency Position Indicating Radio Beacon – AIS	EPIRB-AIS
ENC Management Report	ENC MGMT REP
ENC Update Status Report	ENC UPD STATUS
Enhance	ENH
Enter	ENT
Equipment	EQUIP
Error	ERR
Estimated Position	EP
Estimated Time of Arrival	ETA
Estimated Time of Departure	ETD
European Geo-Stationary Navigational Overlay System	EGNOS
Event	EVENT
Exclusion Zone	EZ
Export Route	ROUTE EXP
External	EXT
F-Band (applies to radar)	F-Band
February	FEB
Foreword	FWD
Fishing Vessel	FISH
Fix	FIX
Forward	FWD
Frequency	FREQ
Frequency Modulation	FM
Full	FULL
Gain	GAIN
Geographics	GEOG
Geometric Dilution Of Precision	GDOP
Global Maritime Distress and Safety System	GMDSS
Global Navigation Satellite System	GNSS
Global Orbiting Navigation Satellite System	GLONASS
Global Positioning System	GPS
Great Circle	GC
Grid	GRID
Ground	GND

Term	Abbreviation
Grounding Avoidance System	GAS
Group Repetition Interval	GRI
Guard Zone	GZ
Gyro	GYRO
Harmful Substances (applies to AIS)	HS
Head Up	H UP ^a
Heading	HDG
Heading Control System	HCS
Heading Line	HL
Heading Line Off	HL OFF
High Frequency	HF
High Speed Craft	HSC
Horizontal Dilution Of Precision	HDOP
Identification	ID
Import Chart	IMPORT CHT
Import Route	ROUTE IMP
In	IN
Increase	INCR
Indication	IND
Information	INFO
Information Report	INFO REPORT
Infrared	INF RED
Initialisation	INIT
Input	INP
Input/Output	I/O
Integrated Navigation System	INS
Integrated Radio Communication System	IRCS
Interference Rejection	IR
Interswitch	ISW
Interval	INT
January	JAN
July	JUL
June	JUN
Label	LBL
Latitude	LAT
Latitude/Longitude	L/L
Leeway	LWY
Limit	LIM
Line Of Position	LOP
Log	LOG
Long Pulse	LP

Term	Abbreviation
Long Range	LR
Longitude	LON
Loran	LORAN
Lost Target	LOST TGT
Low Frequency	LF
Magnetic	MAG
Man Overboard	MOB
Manoeuvre	MVR
Manual	MAN
Manual Update	MAN UPD
Map(s)	MAP
March	MAR
Maritime Mobile Services Identity number	MMSI
Maritime Pollutant (applies to AIS)	MP
Maritime Safety Information	MSI
Marker	MKR
Master	MSTR
Maximum	MAX
May	MAY
Medium Frequency	MF
Medium Pulse	MP
Menu	MENU
Minimum	MIN
Missing	MISSING
Mute	MUTE
Navigation	NAV
Night	NT
Normal	NORM
North	N
North Up	N UP ^a
Not Less Than	NLT
Not More Than	NMT
Not Under Command	NUC
November	NOV
October	OCT
Off	OFF
Off centred	OFF CENT
Officer-On of the Watch	OOW
Offset	OFFSET
On	ON
Out/Output	OUT
Own Ship	OS
Own Ship Look-Ahead	LOOK AHEAD

Term	Abbreviation
Panel Illumination	PANEL
Parallel Index Line	PI
Past Positions	PAST POSN
Passenger Vessel (applies to AIS)	PASSV
Performance Monitor	MON
Permanent	PERM
Person Overboard	POB
Personal Identification Number	PIN
Pilot Vessel	PILOT
Port/Portside	PORT
Position	POSN
Positional Dilution Of Precision	PDOP
Power	PWR
Predicted	PRED
Predicted Area of Danger	PAD
Predicted Point of Collision	PPC
Pulse Length	PL
Pulse Modulation	PM
Pulse Repetition Frequency	PRF
Pulse Repetition Rate	PRR
Pulses Per Revolution	PPR
Racon	RACON
Radar	RADAR
Radar Overlay	RADAR OVR
Radar Settings	RADAR SET
Radar Plotting	RP
Radar Transponder	TPR
Radius	RAD
Rain	RAIN
Range	RNG
Range Rings	RR
Raster Chart Display System	RCDS
Raster Navigational Chart	RNC
Rate Of Turn	ROT
Real-time Kinematic	RTK
Receive	~~RX~~ ^a
Receiver	RCDR RX ^a
Receiver Autonomous Integrity Monitoring	RAIM
Reference	REF
Relative	REL ^b
Relative Motion	RM

Term	Abbreviation
Revolutions per Minute	RPM
Rhumb Line	RL
Roll On/Roll Off Vessel (applies to AIS)	RoRo
Root Mean Square	RMS
Route	ROUTE
Route Monitoring	ROUTE MON
Route Plan	ROUTE PLAN
Safety Contour	SF CNT
Sailing Vessel	SAIL
Satellite	SAT
Satellite Based Augmentation System	SBAS
Save User Settings	SAVE USR
S-Band (applies to Radar)	S-BAND
Scan to Scan	SC/SC
Search And Rescue	SAR
Search And Rescue Transponder	SART
Search And Rescue Vessel	SARV
Select	SEL
Select User Settings	USR SEL
September	SEP
Sequence	SEQ
Set (i.e., set and drift, or setting a value)	SET
Ship's Time	TIME
Short Pulse	SP
Signal to Noise Ratio	SNR
Silence	SLNC
Simulation	SIM ^c
Slave	SLAVE
South	S
Speed	SPD
Speed and Distance Measuring Equipment	SDME
Speed Over the Ground	SOG
Speed Through the Water	STW
Stabilized	STAB
Standard Display	STND DISP
Standby	STBY
Starboard/Starboard Side	STBD
Station	STN
Status and Data	STAT DISP
Symbol(s)	SYM

Term	Abbreviation
~~Synchronised/ Synchronous Synchronization~~	SYNC
System Electronic Navigational Chart	SENC
Target	TGT
Target Tracking	TT
Test	TEST
Time	TIME
Time Difference	TD
Time Dilution Of Precision	TDOP
Time Of Arrival	TOA
Time Of Departure	TOD
Time to CPA	TCPA
Time To Go	TTG
Time to Wheel Over Line	TWOL
Track	TRK
Track Control System	TCS
Tracking	TRKG
Track Made Good	TMG ^d
Trail(s)	TRAIL
~~Transmit and Receive~~	~~TXRX^a~~
Transceiver	~~TCVR TXRX^a~~
Transferred Line Of Position	TPL
Transmit	TX
Transmitter	~~TMTR TX^a~~
Transmitting Heading Device	THD
Trial	TRIAL ^c
~~Trial Settings~~	~~TRIAL SET~~
Trigger Pulse	TRIG
True	T
True Motion	TM
Tune	TUNE
Ultrahigh Frequency	UHF
Uninterruptible Power Supply	UPS
Universal Time, Coordinated	UTC
Universal Transverse Mercator	UTM
Unstabilised	UNSTAB

Term	Abbreviation
Update Log	UPD LOG
Update Review	UPD REV
User Chart	USR CHT
Variable Range Marker	VRM
Variation	VAR
Vector	VECT
Very High Frequency	VHF
Very Low Frequency	VLF
Vessel Aground (<i>applies to AIS</i>)	GRND
Vessel at Anchor (<i>applies to AIS</i>)	ANCH
Vessel Constrained by Draught (<i>applies to AIS</i>)	VCD
Vessel Engaged in Diving Operations	DIVE
Vessel Engaged in Dredging or Underwater Operations (<i>applies to AIS</i>)	DRG
Vessel Engaged in Towing Operations (<i>applies to AIS</i>)	TOW
Vessel Not Under Command (<i>applies to AIS</i>)	NUC
Vessel Restricted in Manoeuvrability (<i>applies to AIS</i>)	RIM
Vessel Traffic Service	VTs
Vessel Underway Using Engine (<i>applies to AIS</i>)	UWE
Video	VID
Visual Display Unit	VDU
Voyage	VOY
Voyage Data Recorder	VDR
Warning	WARNING
Water	WAT
Waypoint	WPT
Waypoint Closure Velocity	WCV
West	W
Wheel Over Line	WOL
Wheel Over Point	WOP
Wheel Over Time	WOT
World Geodetic System	WGS
X-Band (<i>applies to Radar</i>)	X-BAND

- ^a In general, terms should be presented using lower case text and abbreviations should be presented using upper case text. Those abbreviations that may be presented using lower case text are identified in the table, for example, "dGNSS", "Rx".
- ^b Abbreviations may be combined, e.g. "CPA LIM" or "T CRS". When the abbreviation for "Relative" is combined with another abbreviation, the abbreviation "R" should be used instead of "REL", for example "R CRS".
- ^c The use of abbreviations "SIM" and "TRIAL" are not intended to replace the appropriate symbols listed in Table A.5.
- ^d The term "Course Made Good" has been used in the past to describe "Track Made Good". This is a misnomer in that "courses" are directions steered or intended to be steered with respect to a reference meridian. "Track Made Good" is preferred over the use of "Course Made Good", where applicable.

Table B.2 – List of standard units of measurement and abbreviations

Unit	Abbreviation
<i>cable length</i>	<i>cbl</i>
centimetre	cm
<i>cycles per second</i>	<i>cps</i>
<i>degree(s)</i>	<i>deg or °</i>
<i>fathom(s)</i>	<i>fm</i>
<i>feet/foot</i>	<i>ft</i>
<i>gigahertz</i>	<i>GHz</i>
<i>hectopascal</i>	<i>hPa</i>
<i>hertz</i>	<i>Hz</i>
<i>hour(s)</i>	<i>hr(s)</i>
inch	in
<i>kilohertz</i>	<i>kHz</i>
<i>kilometre</i>	<i>km</i>
<i>kilopascal</i>	<i>kPa</i>
<i>knot(s)</i>	<i>kn</i>
<i>megahertz</i>	<i>MHz</i>
metre	m
<i>minute(s)</i>	<i>min or ' </i>
<i>Nautical Mile(s)</i>	<i>NM</i>
second(s)	s or "

Annex C (informative)

Guidance on display and dialogue design in **IMO MSC/Circ.982**

C.1 Overview

Annex C lists the guidelines in **IMO MSC/Circ.982** that are related to presentation, and their association with the presentation-related requirements provided in IEC 60945 and this document.

C.2 General

IMO MSC/Circ.982 provides guidelines on ergonomic criteria for bridge equipment and layout with the objective of improving the reliability and efficiency of navigation. These guidelines contain additional, relevant and useful information that may be applied to the design of computer-based displays for navigational systems and equipment.

C.3 Requirements in **IMO MSC/Circ.982** related to the display design

Some of the paragraphs in **IMO MSC/Circ.982** can be associated with the general requirements for shipborne navigational systems and equipment in IEC 60945:2002, particularly those related to display equipment or displays. Others are wholly or partially related to display design. Table C.1 through Table C.3 list those paragraphs.

Table C.1 – Paragraphs in MSC/Circ.982 associated with IEC 60945 requirements

IEC 60945:2002 Subclause		MSC/Circ.982 Paragraph	
4.2.1	Ergonomics and HMI		
4.2.1.3	Operation	5.3.2.6	Control/indicator discernability
		5.5	Input devices
		5.7	General user input guidelines
4.2.1.4	Identification	5.3.2.4	Control and display location
		5.2.2.5	Simultaneous use
4.2.1.5	Screen displays and indications	5.3.5.1	Function labelling
		5.3.5.2	Label terminology
		5.6.3.3	Background colour (Conflicts with Paragraph 7)
		5.7	General user input guidelines (Paragraph g))
4.2.2	Hardware		
4.2.2.2	Alarms and indicators	5.4.1.1	Alarm acknowledgement

Table C.2 – Other paragraphs in MSC/Circ.982 related to display design

MSC/Circ.982 Paragraph	
5.3.2.7	High priority displays
5.3.3.5	Spacing between controls
5.4.1.4	Sensor input failure
5.4.1.8	Alarm Minimization
5.4.1.12	Presentation of Alarms
5.4.2	Visual Alarms (all 6 sub-criteria)
5.6.1.1	Lack of ambiguity
5.6.1.2	Use of digital displays
5.6.1.3	Digital readout
5.6.1.10	Display fields for the display of important information
5.6.2.3	Demarcation of Groups
5.6.3.8	Flicker
5.6.3.9	Image continuity
5.6.3.10	CRT image linearity
5.6.5.2	Meaningful abbreviations
5.6.5.3	Units of measurement
5.6.5.7	Highlighting
5.6.5.8	Scaling in standards intervals
5.6.5.10	Unobtrusive grids

Table C.3 – Other paragraphs in MSC/Circ.982 partially related to display design

MSC/Circ.982 Paragraph	
5.3.2.4	Control and display location
5.3.2.5	Simultaneous use
5.3.3.4	Consistent arrangement
5.3.3.5	Simultaneous use
5.4.1.3	Failure or reduction of power supply
5.4.1.13	Modes of alarms
5.4.3	Audible alarms (all 6 sub-criteria)

Annex D (informative)

Guidance on testing

D.1 Methods of test ~~derived from ISO 9241-12~~

D.1.1 General

~~The methods of test in this standard are derived from ISO 9241-12.~~ The methods of test in this document do not identify specific processes, approaches or facilities. Rather, they are intended to provide guidance to accredited testing laboratories for the development of test plans and test procedures that evaluate compliance with the requirements specified.

D.1.2 Observation

The test method "observation" refers to simple examination of the presentation of information to confirm that a particular observable condition has been met. The phrase "confirm by observation" is used.

Observations may be made by any person with the necessary skill to understand the presentation of information to determine if a statement concerning an observable property has been correctly applied. It is used when suitably trained individuals with a broad range of education and/or experience can be confidently expected to reach the same conclusion about a property of presented information or the performance of display equipment.

Compliance is determined by comparing the observed property to the requirement. Some observations may be made directly from the presentation. Other observations may require simulation of input from sensors or other sources. Typical confirmations by observation include:

- existence of functions or features;
- use of symbols or a defined range of words;
- a system output in response to a defined input.

D.1.3 Inspection of documented evidence

The test method "inspection of documented evidence" refers to examination of relevant documents to confirm that a particular presentation or display requirement has been met. The phrase "confirm by inspection of documented evidence" is used.

Documented evidence may include manuals, system requirements, design justification, industry conventions, etc. Inspections may be made by a suitably qualified person who has the necessary education, skill and/or experience to apply the documentation to the system's presentation or display equipment. It is used when performance of a system's presentation or display equipment is not directly observable or measurable. It may also be used when observation would be excessively repetitious, time consuming, or expensive.

Compliance is determined by comparing the documented property to the requirement. Typical confirmations by inspection of documented evidence include:

- conformance to a standard or other documented evidence;
- existence of optional features or functions;
- design and/or operation of algorithms.

D.1.4 Measurement

The test method "measurement" refers to measuring or calculating a value or variable for comparison to a specified value to determine that a particular presentation or display requirement has been met. The phrase "confirm by measurement" is used.

Measurements may require the use of test facilities and equipment. Measurements may be made by any person with the necessary skill to measure and/or calculate the value and compare it against a requirement, standard or other documented evidence.

Compliance is determined by comparing the measured or calculated value or variable to the requirement. Typical confirmations by measurement include:

- assessing whether the end users of a display will be able to read characters from the intended viewing distance;
- differences between displayed colours or absolute levels of display brightness;
- achievement of a level of availability or dependability.

D.1.5 Analytical evaluation

The test method "analytical evaluation" refers to detailed examination of the presentation of information to confirm that a particular condition has been met. The phrase "confirm by analytical evaluation" is used.

Analytical evaluations may be made by a relevant expert with the necessary education, skills and/or experience to make an informed and reliable judgement concerning the presentation of information, its appropriateness and usability. It is used for the evaluation of properties which can be judged only in the context of other information or knowledge which requires the tester to make an informed assessment of the likely performance of a typical user of the presentation.

Compliance is determined by comparing the observed property to the requirement. Typical confirmations by analytical evaluation include:

- the largest amount of information that can be presented to a user on a single display;
- the smallest difference in size, colour or line thickness that will be distinguished by a user on a particular display;
- consistency and clarity in presentation of information.

D.2 Application of IEC 60945

D.2.1 Display equipment category

The manufacturer should categorize their display equipment according to IEC 60945:2002, 4.4.

D.2.2 Technical performance

A performance test should be used to confirm compliance with the requirements specifying parameters.

A performance check should be used to confirm that the equipment operates.

The testing laboratory should use the appropriate measure of technical performance (i.e. performance test or performance check) for each test in the test plan.

The equipment should operate in accordance with this document during each performance test or performance check.

D.2.3 Pre-conditioning for environmental tests

The manufacturer should specify any mechanical or electrical preconditioning required for environmental tests. The testing laboratory should inspect the display equipment and perform any preconditioning specified by the manufacturer.

The testing laboratory should carry out environmental tests with display equipment in its normal operational configuration, including mounting and supports, and with all mechanical arrangements secure.

D.2.4 Methods of test ~~derived from ISO 9241-12~~ applied for IEC 60945

Many requirements for the presentation of information are of a nature that may be tested by simple observation. Other requirements are, however, of a more complex nature and may require informed judgement in the context of other information or knowledge by an expert with the necessary education, skills and/or experience. This is particularly the case in assessing conditions of appropriateness, usability or the likely performance of a typical user.

These considerations are reflected in the guidance on test methods provided by Clause D.1, and in the structure of this document in general, where the test method to be applied is specified test by test.

IEC 60945:2002 simply specifies that each requirement should be "checked", without further guidance. Table D.1 gives appropriate test methods.

Table D.1 – Methods of test applied for IEC 60945

IEC 60945:2002 subclause	Original test method	Appropriate test method
6.1.2 a)	Check	Analytical evaluation
6.1.2 b)	Check	Analytical evaluation
6.1.2 c)	Check	Measurement
6.1.2 d)	Check	Analytical evaluation
6.1.2 e)	Check	Observation
6.1.2 f)	Check	Observation
6.1.2 g)	Check	Observation
6.1.2 h)	Check	Analytical evaluation
6.1.3 a)	Check	Analytical evaluation
6.1.3 b)	Check	Analytical evaluation
6.1.3 c)	Check	Observation
6.1.3 d)	Check	Analytical evaluation
6.1.4 a)	Check	Observation
6.1.4 b)	Check	Observation
6.1.4 c)	Check	Observation
6.1.4 d)	Check	Analytical evaluation
6.1.5 a)	Check	Analytical evaluation
6.1.5 b)	Check	Observation
6.1.5 c)	Check	Analytical evaluation
6.1.5 d)	Check	Observation
6.1.5 e)	Check	Analytical evaluation
6.1.5 f)	Check	Analytical evaluation
6.1.5 g)	Check	Inspection of documented evidence
6.1.5 h)	Check	Analytical evaluation
6.1.5 i)	Check	Analytical evaluation
6.1.5 j)	Check	Analytical evaluation

IEC 60945:2002 subclause	Original test method	Appropriate test method
6.1.5 k)	Check	Analytical evaluation
6.1.5 l)	Check	Analytical evaluation
6.1.5 m)	Check	Observation
6.1.5 n)	Check	Observation
6.1.5 o)	Check	Analytical evaluation
6.1.5 p)	Check	Observation
6.1.5 q)	Check	Observation
6.1.5 r)	Check	Observation
6.1.5 s)	Check	Observation
6.1.5 t)	Check	Observation
6.1.6 a)	Check	Analytical evaluation
6.1.6 b)	Check	Observation
6.1.6 c)	Check	Observation
6.1.6 d)	Check	Observation
6.1.7 a)	Check	Analytical evaluation
6.1.7 b)	Check	Analytical evaluation
6.1.7 c)	Check	Analytical evaluation
6.1.7 d)	Check	Analytical evaluation
6.1.7 e)	Check	Analytical evaluation
6.1.8 a)	Check	Analytical evaluation
6.1.8 b)	Check	Observation
6.1.8 c)	Check	Observation
6.1.8 d)	Check	Observation
6.1.8 e)	Check	Observation
6.1.8 f)	Check	Analytical evaluation
6.2.1 a)	Check	Observation
6.2.1 b)	Check	Analytical evaluation
6.2.1 c)	Check	Analytical evaluation
6.2.1 d)	Check	Observation
6.2.2 a)	Check	Observation
6.2.2 b)	Check	Observation
6.2.2 c)	Check	Observation
6.2.3 a)	Check	Observation
6.2.3 b)	Check	Observation
6.2.3 c)	Check	Inspection of documented evidence
6.2.3 d)	Check	Observation
6.2.3 e)	Check	Observation
6.2.3 f)	Check	Analytical evaluation
6.2.3 g)	Check	Observation
6.2.3 h)	Check	Observation
6.2.3 i)	Check	Observation

D.3 Compliance with requirements

Compliance with a requirement can be established by verifying that it is implemented in accordance with another standard or with another clause or subclause within this document; or by confirming that it is implemented in accordance with the requirement(s) specified in the ~~current~~ requirement clause/subclause.

D.4 Simulation

Some test methods require simulation. A simulator arrangement should provide the capabilities to replicate own ship navigational sensors, radar video images including individual radar echoes for the tracking of targets, reported radar targets (for example, in accordance with the IEC 61162 series), ~~and reported AIS targets~~, AIS data reports, AIS locating devices, AIS synthetic targets, AIS safety related messages and AIS ASMs. **5**

IEC 62388 describes a Target Scenario Simulator (TSS), a Reported Target Simulator (RTS) and a combined TSS/RTS.

D.5 Electronic chart data

Some test methods require electronic chart data or an electronic chart test data set.

IEC 61174 describes ~~the use of~~ a test data set for ENC. ~~For example~~, IHO S-64 contains the IHO test data sets for ECDIS ~~using IHO S-57 ENC~~. The ECDIS test data sets are comprised of an ENC test data set and an RNC test data set.

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Annex E (normative)

Operational controls and logical grouping

E.1 Overview

Operational controls for navigational systems and equipment shall be easy to identify and simple to use. Controls may be implemented through dedicated hardware, screen-accessed soft keys, or a combination of both. The primary controls for each navigational system or equipment shall be identified and provided with an associated status indication in accordance with the function it is serving.

E.2 Logical grouping of data and control functions

Data and control functions shall be divided into logical groups for the function or the task-at-hand, in accordance with 4.3.1.

Table E.1 provides logical grouping that shall be applied to radar, ECDIS and INS; and may be applied to other electronic navigation equipment and navigation sensors, where applicable.

~~Table E.1 and~~ Table E.2 provides examples of voluntary to implement top-level logical groupings of data and controls for radar and charting functionality. Specific requirements for logical grouping of data and control functions, when contained in the individual standards for navigational systems and equipment, shall also be followed. Examples of major groups: 11

- alerts and indications;
- own ship information;
- track monitoring data (as specified in IEC 62065);
- trial manoeuvre;
- navigational tools and readouts;
- target information;
- range/scale and mode readout;
- radar system information;
- radar signal information;
- chart database information;
- system settings.

Table E.1 – Top-level grouping of data and control functions for radar applications

Own ship information	Navigation tools
Position Heading/speed (or course/speed)	Cursor readout VRM/EBL/ERBL readout Parallel index lines readout
Range and mode information	Radar system information
Range scale Orientation mode Stabilization mode Motion mode	Standby/run Pulse length Frequency band Master/slave designation Tune
Target information	Radar signal information
Target association Target vector properties Target trails Collision avoidance parameters AIS status AIS filter	Gain Rain Sea Processing (for example, target enhancement or correlation)

Table E.2 – Top-level grouping of data and control functions for charting

Own ship information	Navigation tools
Position Course/speed	Cursor readout VRM/EBL/ERBL readout
Scale and mode information	Chart database information
Chart scale Chart datum Orientation mode Motion mode Symbol set	ENC cell Cell edition/date Corrected through date

**Table E.1 – Logical grouping for radar, ECDIS and INS applications
(based on MSC.1/Circ.1609) 11**

Own ship information
<i>HDG: <value> <unit> <sensor source/ status></i> <i>COG: <value> <unit> <sensor source/ status></i> <i>SOG: <value> <unit> <sensor source/ status></i> <i>STW: <value> <unit> <sensor source/ status></i> <i>Position (Optional) <LAT value> <LON value> <Sensor source and status></i>
Date and Time
<i><Date> <Time> <time reference></i> <i><Date> <Time> <UTC></i>
Target information
<i>Target Number/ Identifier <1234></i> <i>Target Name <Alphanumeric></i> <i>COG: <value> <unit></i> <i>SOG: <value> <unit></i> <i>STW: <value> <unit> ></i> <i>Closest Point of Approach (CPA): <value> <unit></i> <i>Time to Closest Point of Approach (TCPA): <value> <unit></i> <i>Bearing from Ownship: <value> <unit></i> <i>Range from Ownship: <value> <unit></i>
Measurement info
<i>EBL bearing: <value><unit></i> <i>VRM range: <value><unit></i>
Cursor location
<i>Position <LAT value> <LON value></i> <i>Bearing from Ownship: <value> <unit></i> <i>Range from Ownship: <value> <unit></i>
Route
<i>Route Name: <RTE Name></i> <i>Next Waypoint Number/ Name: <WPT name></i> <i>Distance to "TO-WPT": <value> <unit></i> <i>Bearing to "TO-WPT": <value> <unit></i> <i>Time to go to "TO-WPT": <value> <unit></i> <i>Estimate time of arrival: <value> <unit> <time reference></i> <i>Next course: <value> <unit></i> <i>Current Cross Track Distance: PORT <value> <unit> Or STBD <value> <unit></i> <i>Cross track Limit Current Leg: PORT <value> <unit> STBD <value> <unit></i>

Table E.2 – Examples of logical grouping for voluntary implementation 11

Scale and mode information	Chart database information
Chart scale Chart datum Orientation mode Motion mode Symbol set	ENC cell Cell edition/date Corrected through date
Radar signal information	Radar system information
Gain Rain Sea Processing (for example, target enhancement or correlation)	Standby/run Pulse length Frequency band Master/slave designation Tune
Range and mode information	
Range scale Orientation mode Stabilization mode Motion mode	

E.3 Navigation related terminology and icons for common function controls (hot keys and shortcuts)

When any of the following controls listed in Clause E.3 are used, they shall be identified in English by the relevant name or abbreviation as listed by the appropriate table. In addition, they may be identified by standard icons, described below.

General equipment controls apply to all equipment and are defined in Table E.3. ~~Task-oriented measurement~~ Navigation controls are defined in Table E.4. Radar specific controls are defined in Table E.5. Chart display controls are defined in Table E.6. Some chart related functions are in Table E.7. Chart database controls are defined in Table E.8. Route plan and monitoring controls are defined in Table E.9. Miscellaneous controls are defined in Table E.10.

Icons in Table E.6 shall be implemented using the specified colours based on IHO colour scheme or similar. For all other icons, the manufacturer shall select appropriate colours within the requirements of this document.

All icons in the tables are examples of the shape and to be adjusted for space available for an icon in the target equipment. 11

The following code of practice shall be used when marking equipment controls with optional icons:

- the minimum dimension of a symbol shall be not less than 9 mm;
- the distance between the centres of two adjacent symbols shall be not less than ~~1,4~~ 1,1 times the size of the larger symbol;
- switch function symbols shall be linked by a line. A linked line infers controlled action;
- variable control function symbols shall be linked by a line, preferably an arc. The direction of increase shall be indicated;
- icons shall be presented with a high contrast against their background;
- the various elements of a symbol shall have a fixed ratio one to another;
- multiple functions of controls and switch positions may be indicated by a combined symbol;
- where concentric controls or switches are fitted, the outer of the symbols should refer to the larger diameter control.

Table E.3 — General control icons

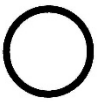
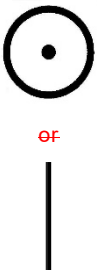
Standard names	Standard abbreviations	Symbol	Explanation
OFF	OFF		To identify the “off” position of the control or switch
ON	ON		To identify the “Radar-on” position of the switch or alternatively To identify the “on” position of the control or switch
ON/OFF	ON/OFF		To identify the “on/off” alternate control or switch
STANDBY	STANDBY		To identify the standby alternate control or switch and To identify the combined “on/off” plus standby alternate control or switch
PANEL ILLUMINATION	PANEL		To identify the maximum position of the “scale illumination” control or switch
DISPLAY BRILLIANCE	BRILL		To identify the maximum position of the “display brilliance” control
NOTE—The circles around the PANEL ILLUMINATION and DISPLAY BRILLIANCE icons are optional.			

Table E.4 — Task-oriented measurement control icons

Standard names	Standard abbreviations	Symbol	Explanation
RANGE RINGS	RR		To identify the maximum position of the “range rings-brilliance” control
VARIABLE RANGE MARKER	VRM		To identify the “variable range marker” control
ELECTRONIC BEARING LINE	EBL		To identify the “electronic bearing line” control

Table E.5 — Radar-specific control icons

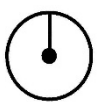
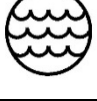
Standard names	Standard abbreviations	Symbol	Explanation
STAND-BY	STBY		To identify the “Radar stand-by” position of the switch
NORTH-UP	N-UP		To identify the “north-up” position of the mode-of presentation-switch
HEAD-UP	H-UP		To identify the “ship's head-up” position of the mode-of presentation switch
HEADING LINE OFF	HL OFF		To identify the “heading line” off position
RANGE	RANGE		To identify the range selection-switch
SHORT-PULSE	SP		To identify the “short” pulse position of the pulse-length-selection control
LONG-PULSE	LP		To identify the “long” pulse position of the pulse-length-selection control
TUNE	TUNE		To identify the “tuning control”
GAIN	GAIN		To identify the “gain” control
RAIN	RAIN		To identify the minimum position of the “rain” control or switch
SEA	SEA		To identify the minimum position of the “anti-clutter-sea” control
PERFORMANCE MONITOR	PM		To identify the position of the performance monitor switch
NOTE—The circles around the SHORT PULSE, LONG PULSE, and PERFORMANCE MONITOR icons are optional.			

Table E.3 – General controls 11

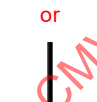
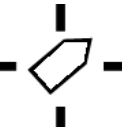
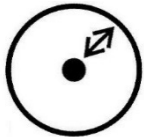
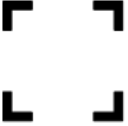
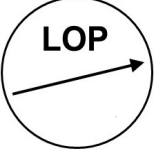
Explanation	Term	Abbreviation	Icon (hot key)
To identify the "off" position of the control or switch	OFF	OFF	
To identify the "Radar on" position of the switch or alternatively To identify the "on" position of the control or switch The relative size of the dot with respect to the circle may vary as long as it is easily distinguishable.	ON	ON	 or 
To identify the "on/off" alternate control or switch	ON/OFF	ON/OFF	
To identify the standby alternate control or switch and To identify the combined "on/off" plus standby alternate control or switch Table E.5 specifies this symbol for Radar. A radar may use this symbol or the symbol specified in Table E.5.	STANDBY	STBY	
To activate system menu	Menu	MENU	
To perform Undo	Undo	UNDO	
To perform Redo	Redo	REDO	
To return to Colour calibrated display	Colour calibrated	COLCAL	
To perform Print screen	Print screen	PRT SC	

Table E.4 – General navigation functions (based on MSC.1/Circ.1609) 11

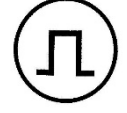
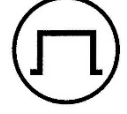
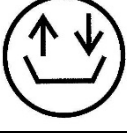
Explanation	Term	Abbreviation	Icon (hot key)
To set panel illumination	Panel illumination	PANEL	
To set display brilliance	Display brilliance	BRILL	
To select ECDIS mode (for multifunction displays)	ECDIS	ECDIS	
To select Radar mode (for multifunction displays)	Radar	RADAR	
To select Conning display or to select 'navigation control data' task of the INS (for multifunction displays)	Conning	CONN NAV CTRL	
To select CAM-HMI as defined in Bridge Alert Management (BAM) (for example as required by INS)	CAM-HMI	CAM	
To select North Up display	North Up	N UP	N UP
To select Head Up display	Head Up	H UP	H UP
To select Course Up display	Course Up	C UP	C UP
To select True Motion mode	True Motion	TM	TM
To select Relative Motion mode	Relative Motion	RM	RM
To select ship centred Mode	Centred	CENT	
To select ship off centred Mode	Off centred	OFF CENT	
To perform True Motion reset	TM reset	TM RESET	TM RESET

Explanation	Term	Abbreviation	Icon (hot key)
To select range	Range	RANGE	
To perform Range up (for example, from 3 nm to 6 nm)	Up	+	
To perform Range down (for example, from 6 nm to 3 nm)	Down	-	
To identify the "heading line" off position	Heading Line Off	HL OFF	
To toggle Range Rings on and off	Range Rings	RR	
To set Variable Range Marker	Variable Range Marker	VRM	VRM
To set Electronic Bearing Line	Electronic Bearing Line	EBL	EBL
To control simultaneous measurement of range and bearing	Electronic Range and Bearing Line	ERBL	ERBL
To perform Target Acquire	Acquire	ACQ	ACQ
To perform selection (for example, target or chart object)	Select	SEL	
To call up the information associated with an object by cursor selection on its symbol	Info report	INFO REPORT	
To perform target cancellation	Cancel	CNCL	
To perform cancellation of all targets	Cancel all	CNCL ALL	
To acknowledge an alert	Acknowledge	ACK	ACK

Explanation	Term	Abbreviation	Icon (hot key)
To temporarily silence alerts	Silence	SLNC	
To record or log an event or occurrence	Record Event	REC EVENT	
To select default settings	Default settings	DFLT SET	
To select user settings	Select user settings	USR SET	
To save user settings	Save user settings	SAVE USR	
To select standard display for chart symbol	Standard display	STND DISP	STND DISP
To execute Trial Manoeuvre	Trial manoeuvre	TRIAL	TRIAL
To toggle Day/Night/Dusk mode	Day / Night	DAY / NT	
To plot own ship position manually	Line of Position	LOP	
To toggle True/Relative Vector mode	True/Relative Vector	T/R VECT	
To toggle On/Off AIS	Automatic Identification System contacts on/off	AIS	AIS
To toggle On/Off Automatic Identification System Application Specific Messages	AIS ASM on/off	AIS ASM	AIS ASM

Explanation	Term	Abbreviation	Icon (hot key)
To "status and data display" tasks of the INS	Status and Data	STAT DISP	STAT DISP
To activate anchor watch	Anchor watch	ANCHOR	

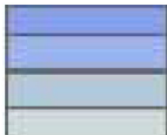
Table E.5 – Radar specific controls 11

Explanation	Term	Abbreviations	Symbol
To identify the "Radar stand-by" position of the switch Table E.3 specifies this case for general use. A radar may use this symbol or the symbol specified in Table E.3.	STANDBY	STBY	
To identify the "short" pulse position of the pulse length selection control	SHORT PULSE	SP	
To identify the "long" pulse position of the pulse length selection control	LONG PULSE	LP	
To identify the "tuning control"	TUNE	TUNE	
To identify the "gain" control	GAIN	GAIN	
To identify the minimum position of the "rain" control or switch	RAIN	RAIN	
To identify the minimum position of the "anti-clutter sea" control	SEA	SEA	
To identify the position of the performance monitor switch	PERFORMANCE MONITOR	PM	

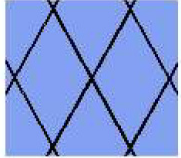
Explanation	Term	Abbreviations	Symbol
To select target association priority for radar target The circle is drawn using a thick line and triangle is drawn using a thin line			
To select target association priority for AIS target The circle is drawn using a thin line and triangle is drawn using a thick line			
NOTE The circles around the SHORT PULSE, LONG PULSE, and PERFORMANCE MONITOR icons are optional.			

Table E.6 – Control of chart display functions (based on MSC.1/Circ.1609) 11

Explanation	Term	Abbreviation	Icon (hot key)
To show accuracy related symbols	Accuracy	CATZOC	
Selector for viewing group layer	All isolated dangers	ISODNG	
	Archipelagic sea lanes	ALS	
	Boundaries and limits	BNDLIM	
	Buoys, beacons, aids to navigation	ATON	
	Cautionary notes	CNTNTE	
Chart boundary shown	Chart boundary	CHTBND	

Explanation	Term	Abbreviation	Icon (hot key)
Selector for viewing group layer	Chart scale boundaries	CHTSCA	
To show contour labels	Contour label	CNTLBL	
Deep contour	Deep contour	DEEPCNT	
Selector for viewing group layer	Display base	DISPBASE	
Use four shades	Four shades	4SHADES	
Selector for full light sector lines	Full light lines	FULLSEC	
Show date dependent object	Highlight date dependent	DATEDEP	
Show symbol for INFORM and NINFOM	Highlight info	INFHLT	
Show symbol for TXTDSC, NTXDS and PICREP	Highlight document	DOCHLT	

<i>Explanation</i>	<i>Term</i>	<i>Abbreviation</i>	<i>Icon (hot key)</i>
<i>Selector for viewing group layer</i>	<i>Important text</i>	<i>IMPTXT</i>	IMP TXT
	<i>Other text</i>	<i>OTHTXT</i>	OTH TXT
	<i>Magnetic variation</i>	<i>MAGVAR</i>	
	<i>Miscellaneous</i>	<i>MISC</i>	MISC
<i>Show national language NOBJNM, text group 2</i>	<i>National language</i>	<i>NATLANG</i>	
<i>Selection for point object style</i>	<i>Paper chart symbols</i>	<i>PAPERSYM</i>	
	<i>Simplified symbols</i>	<i>SIMPSYM</i>	
<i>Selection for line style</i>	<i>Plain boundaries</i>	<i>PLNBND</i>	
	<i>Symbolized boundaries</i>	<i>SYMBND</i>	

Explanation	Term	Abbreviation	Icon (hot key)
Selector for viewing group layer	Prohibited and restricted areas	PRBAREA	
	Drying line	DRYLNE	DRY LNE
To select safety contour	Safety contour	SF CNT	SAFE CNT
Shallow contour	Shallow contour	SHAL CNT	SHAL CNT
Depths in safety area shown, soundings in safe area shown	Safe depths shown	SF DPTH SHOW	DPTH SHWN
To select safety depth	Safety depth	SF DPTH	SAFE DPTH
To turn SCAMIN off	Scale min	SCAMIN	SCA MIN
Selector for viewing group layer	Seabed	SEABED	SEA BED
To show shallow pattern	Shallow pattern	SHALPAT	
To show isolated dangers in shallow waters	Shallow water dangers	SHALDNG	

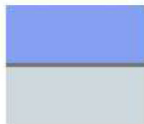
Explanation	Term	Abbreviation	Icon (hot key)
<i>Selector for viewing group layer</i>	<i>Ships' routeing systems and ferry routes</i>	<i>ROUTEING</i>	
	<i>Spot soundings</i>	<i>SPOTSND</i>	
	<i>Submarine cables and pipelines</i>	<i>SUBCAB</i>	
	<i>Tidal</i>	<i>TIDAL</i>	
	<i>Two shades</i>	<i>2SHADE</i>	
<i>Selector for displaying unknown objects</i>	<i>Unknown</i>	<i>UNKNOWN</i>	
<i>To highlight objects which have undergone modification</i>	<i>Update review</i>	<i>UPD REV</i>	
NOTE The icons can be modified in a consistent manner to provide an indication of current state (i.e. on or off).			

Table E.7 – Control of chart functionality (based on MSC.1/Circ.1609) 11

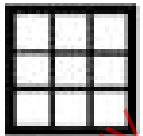
Explanation	Term	Abbreviation	Icon (hot key)
To select a date or date range for displaying all chart objects active at that date and time	Dated objects	DATE OBJ	
To toggle latitude/longitude grid	Grid	GRID	
To perform manual update	Manual update	MAN UPD	
To toggle radar overlay	Radar overlay	RADAR OVR	
To select original compilation scale of the chart or To select 1:1 chart pixel to display pixel in RCDS mode	Original scale	ORIG SCALE	1:1

Table E.8 – Database functions (based on MSC.1/Circ.1609) 11

Explanation	Term	Abbreviation	Icon (hot key)
To import ENC	Import Chart	IMPORT CHT	Not applicable
To review ENC updates	Update review	UPD REV	Not applicable
To view ENC update summary report	Update summary	UPD SUM	Not applicable
To view graphical index of ENC charts	Graphical index	GRAPH INDX	Not applicable
To view ENC update log	Update log	UPD LOG	Not applicable
To view ENC Update Status Report	ENC Update Status Report	ENC UPD STATUS	Not applicable
To view ENC Management Report	ENC Management Report	ENC MGMT REP	Not applicable
NOTE Some of these functions may also apply to RNC.			

Table E.9 – Route plan and monitoring functions (based on MSC.1/Circ.1609) 11

Explanation	Term	Abbreviation	Icon (hot key)
To export route plan	Export Route	RTE EXPORT	
To import route plan	Import Route	RTE IMPORT	
To set own-ship look ahead	Own ship look-ahead	LOOK AHEAD	Not applicable
To add WPT	Add waypoint	ADD WPT	
To edit WPT	Edit waypoint	EDIT WPT	
To delete WPT	Delete waypoint	DEL WPT	

Table E.10 – Groups of functions (based on MSC.1/Circ.1609) 11

Explanation	Term	Abbreviation	Icon (hot key)
To set collision avoidance limits and other target-related parameters (including CPA, TCPA, etc.)	Target settings	TGT SET	 TGT
To set radar controls (including tunings, anti-clutter, etc.)	Radar settings	RADAR SET	 RADAR
To set chart related limits and other chart-related parameters (including safety contour, safety depth, areas with special conditions, own ship check area, etc.)	Chart safety settings	CHART SET	 CHART
To set trial manoeuvre parameters	Trial Settings	TRIAL SET	 TRIAL
To add or remove information from the ECDIS display.	Chart display settings	CHART DISP SET	

Explanation	Term	Abbreviation	Icon (hot key)
To provide additional mariner's information.	User Chart	USR CHT	 USER
To access route plan functionality	Route plan	ROUTE PLAN	 PLAN
To access route monitoring functionality	Route monitoring	ROUTE MON	 MONIT
To access management chart database	Chart management	CHART MGMT	CHT MGMT
To access alert setting management	Alert Setting	ALERT SET	 ALERT
To access functionality related to MSI	Not specified in this document	Not specified in this document	
To access functionality of received messages, e.g. AIS safety related messages	Not specified in this document	Not specified in this document	

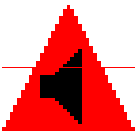
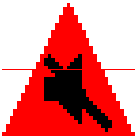
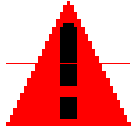
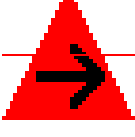
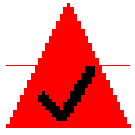
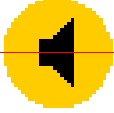
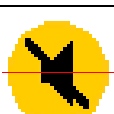
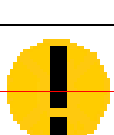
Annex F (normative)

Icons for presentation of the state of an alert

~~The use of icons for presentation of the alerts is optional, but if an icon is used then it is mandatory to use the icons provided in Table F.1 and Table F.2. If IMO has specified for an alert an associated symbol (for example in tables 7.1.1 and 7.1.2 of the Code of Alerts and Indications 2009 (IMO resolution A.1021(26))), then such a symbol shall be used together with icons provided in the Table F.1 and Table F.2.~~

~~Table F.1 and Table F.2 specify icons for daylight use. For other viewing conditions such as night and dusk the “Icon description” in Table F.1 and Table F.2 are in force, but the examples of icon graphics should be modified as appropriate.~~

Table F.1 – Alert management icons – basic

Icon number	Icon name	Icon description (normative)	Icon graphic(s) (example)
n/a	Emergency alarm	As specified in Table 7.1.1 of the Code on Alerts and Indications 2009 (IMO resolution A.1021(26))	See Table 7.1.1 of the Code on Alerts and Indications 2009
1	Active – unacknowledged alarm	A flashing red triangle. A symbol of loudspeaker in the middle of the triangle. To be presented together with the alert text.	
2	Active – silenced alarm	A flashing red triangle. A symbol as in icon number 1 with a prominent diagonal line through it. To be presented together with the alert text.	
3	Active – acknowledged alarm	A red triangle. An exclamation mark in the middle of the triangle. To be presented together with the alert text.	
4	Active – responsibility transferred alarm	A red triangle. An arrow pointing towards the right in the middle of the triangle. To be presented together with the alert text.	
5	Rectified – unacknowledged alarm	A flashing red triangle. A tick mark in the middle of the triangle. To be presented together with the alert text.	
6	Active – unacknowledged warning	A flashing yellowish-orange circle. A symbol of loudspeaker in the middle of the circle. To be presented together with the alert text.	
7	Active – silenced warning	A flashing yellowish-orange circle. A symbol as in icon number 6 with a prominent diagonal line through it. To be presented together with the alert text.	
8	Active – acknowledged warning	A yellowish-orange circle. An exclamation mark in the middle of the circle. To be presented together with the alert text.	

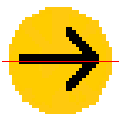
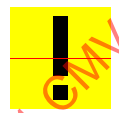
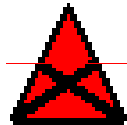
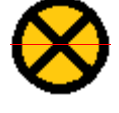
Icon number	Icon-name	Icon-description (normative)	Icon-graphic(s) (example)
9	Active—responsibility transferred-warning	A yellowish-orange circle. An arrow pointing towards the right in the middle of the circle. To be presented together with the alert text.	
10	Rectified—unacknowledged warning	A flashing yellowish-orange circle. A tick-mark in the middle of the circle. To be presented together with the alert text.	
11	Caution	A yellow square. An exclamation mark in the middle of the square. To be presented together with the alert text.	

Table F.2 — Alert management icons — additional qualifiers

Icon number	Icon-name	Icon-description (normative)	Icon-graphic(s) (example)
12	Aggregation	A plus sign. To be presented together with the icon number 1—11 from Table F.1.	
13	Acknowledge not allowed for alarm ^a	A red triangle with a cross in the middle of the triangle. To be presented together with the icon number 1, 2 and 5.	
14	Acknowledge not allowed for warning ^a	A yellowish-orange circle with a cross in the middle of circle. To be presented together with the icon number 6, 7 and 10.	
For printing purposes of this standard the icon symbols in Table F.1 and Table F.2 use red, yellowish-orange, yellow and black colour. Normative is use of red, yellowish-orange and yellow (see column icon description in Table F.1 and Table F.2). Colour black is used as an example and it can be replaced by any suitable colour appropriate for the ambient viewing condition.			
^a —“Acknowledge not allowed” icon is used when a Category A alert cannot be acknowledged in a task station.			

Icons for presentation of the state of an alert shall be presented as defined in IEC 62923-1. **18**

Annex G (normative)

Testing for colours, intensity and flicker

G.1 Testing for colours and intensity

G.1.1 General

The IHO ECDIS Presentation Library contains colour differentiation test diagrams to enable test personnel to determine whether it is possible to discriminate features by colour.

The colours in the IHO ECDIS Presentation Library are defined using the CIE 1931 colour coordinate system (x , y and L) which specify chrominance and luminance. CIE 15 defines the following units for colour difference in terms of chrominance and luminance:

- ΔE^* as a measure of the overall discrimination including both chrominance and luminance differences;

$$\Delta E^* = \text{SQRT} [(L_2^* - L_1^*)^2 + (u_2^* - u_1^*)^2 + (v_2^* - v_1^*)^2]$$

- $\Delta(u^*, v^*)$ as a measure of the discrimination in chrominance alone.

$$\Delta(u^*, v^*) = \text{SQRT} [(u_2^* - u_1^*)^2 + (v_2^* - v_1^*)^2]$$

Tolerances for conversion from CIE 1931 colour coordinates to RGB values for display equipment are defined by three terms:

- ΔE^* between the colour coordinates resulting from the RGB values calculated for each colour and the other colours from the same colour table for each ambient light condition;
- $\Delta(u^*, v^*)$ between the defined colour coordinates and the coordinates resulting from the RGB values calculated for each colour in each colour table for each ambient light condition;
- luminance ratio ($L_{\text{measured}}/L_{\text{defined}}$) between the defined coordinates of the colours within the colour table for each ambient light condition and the coordinates resulting from the RGB values calculated for each colour.

ΔE^* should be a minimum of 10 except for colour pairs listed in IHO S-52 Table of Colour – Colour pairs that are exempt from the colour separation tolerance test, which, as defined, are very close in colour.

$\Delta(u^*, v^*)$ should be a maximum of 16 for display equipment tested as part of the navigational system or equipment (i.e. where the display screen and its source of video are tested together) or for system components between which the transfer of the video is based on a lossless method (for example DVI-D for digital transfer). $\Delta(u^*, v^*)$ should be a maximum of 8 for system components that are tested independently of each other (i.e. where the display screen equipment is not tested with the identical video source that it will be installed with aboard ship or where a computer is not tested with the identical display screen that it will be installed with aboard ship).

For each colour token within the colour table, the luminance should be within 20 % of the value specified in IHO S-52, Colour conversion tolerances and tests, for each colour table specified in the IHO S-52, for example; day, dusk and night. The colour black is an exception, which should be a maximum 0,52 cd/m² as defined in the IHO S-52, Colour conversion tolerances and tests for the day colour table.

Calculations of L^* , u^* , and v^* shall be made in reference to the chromaticity and luminance specified for the brightest white colour token in the respective colour table (Y_0 , u_0 , y_0); where Y_0 is the luminance in cd/m². It should be noted that this is not the brightest white of the monitor.

G.1.2 Test personnel

Personnel conducting tests related to the discrimination of colours should have passed the minimum colour vision and acuity tests required for users by IMO STCW Code Part B. They should also have adapted to night viewing for 10 min before conducting tests using the night display.

G.1.3 Method of test

The method of test is as follows:

- a) confirm by analytical evaluation the measurement process of the manufacturer and confirm by inspection of documented evidence provided by the manufacturer that, for each colour table, the difference between the calculated RGB values for any two colours in the table are at least 10 ΔE^* units, except for those pairs defined to have a tabular ΔE^* less than 20; as defined in the IHO S-52, Colour conversion tolerances and tests and IHO S-52, Table of Colour – Colour pairs that are exempt from the colour separation tolerance test;
- b) confirm by analytical evaluation the measurement process of the manufacturer and confirm by inspection of documented evidence provided by the manufacturer that the results of the colour calibration conversion of each specified colour (x, y, L) for each colour table into RGB values for an individual monitor are within the tolerance as defined in the IHO S-52, Calculations to achieve correct colours;
- c) colour table calibration verification measurements shall be carried out in a dark-room. Manufacturers may choose between two different methods of colour calibration. The first method is for the test of a monitor and a video source intended to be installed together as an integrated system. The second method is for the test of a monitor independent of the video source/computer with which it will be installed or, similarly, a video source tested independently of a monitor.
 - For independent test of monitors, the manufacturer shall provide a reference computer.
 - For independent test of computers, the manufacturer shall provide a reference monitor.

The test shall be performed as follows:

- 1) for the Day colour table, display a completely black image on the screen provided by the manufacturer. Confirm by measurement perpendicular to the centre of the screen that the luminance is as required (less than or equal to 0,52 cd/m² when the CHWHT is set to 80 cd/m² or more (Day colour table));
- 2) for the Day colour table, select a screen provided by the manufacturer which has a box of CHWHT (brightest white) on a black background. The box size should be at least 5 cm per side but not more than 25 % of the total screen area. Confirm by measurement perpendicular to the centre of the screen that the level of CHWHT is within the tolerances of $\Delta(u^*, v^*)$ for $\Delta(u^*, v^*) \leq 16$ for integrated units, $\Delta(u^*, v^*) \leq 8$ for independent test and L is within 20 % of its specified value);
- 3) repeat the test for CHMGF (brightest magenta), CHYLW (brightest yellow) and BKAJ2 (darkest grey) from the Day colour table;
- 4) repeat the tests 2) and 3) for Dusk and Night colour tables and other colour tables provided, for example colour tables with black background for chart radar. Confirm by measurement that BKAJ1 (black background) luminance is 0,05 cd/m² in the night setting when the white level is dimmed down so that CHWHT is 1 cd/m²;
- d) colour table calibration verification observations shall be carried out as follows. The user's manual brightness control and contrast control, if provided, shall be set to their calibration reference settings; while the display is off, adjust the ambient light level reflected from a white paper positioned on the display screen to the appropriate ambient values specified in Table 1. For each colour table provided, under the appropriate ambient light condition, display the colour differentiation test diagram as defined in the IHO S-52 ECDIS presentation library. Confirm by observation that:
 - 1) each foreground stripe is clearly distinguished from its background;

- 2) the foreground stripes representing yellow, orange, magenta, green, blue and grey may be clearly identified;
- e) under each of the ambient light conditions defined above, display the black-adjust boxes available from ECDIS Chart 1 (see ECDIS chart 1 chart AA5C1ABO.) Select each table in turn and confirm by observation that the ECDIS colour token BKAJ2 (dark grey) is clearly distinguished against a black background (BKAJ1);
- f) confirm by observation that the procedure for on-board use of the colour differentiation test diagrams is defined in the equipment manual;
- g) confirm by observation that means are provided to return the display to the calibrated brightness and contrast settings for each ambient light condition defined above;
- h) confirm by observation that each of the mandatory colour tables provided in the IHO S-52 ECDIS presentation library may be selected by the user.

G.2 Testing for flicker

G.2.1 Overview

Clause G.2 reproduces the method originally developed in Annex B of ISO 13406-2:2001.

NOTE The actual perception of flicker is known to vary between individual observers and within an individual observer. Some of these variations are systematic. Flicker sensitivity decreases with age (between individuals) and with fatigue (for the individual). In addition, the conversion of display luminance to retinal illumination requires an assumption about the luminance that drives pupil response. In positive polarity displays, average display luminance and "adapting" luminance can be assumed to be the same. There is some evidence that this is not true for negative polarity displays. Due to cross-coupling of photo receptors in the eye, the correct value probably lies between the average and peak luminance. The average luminance is the worst case and is used in this method.

G.2.2 Analytic model

G.2.2.1 Principle

It can be predicted whether people will detect a homogeneously illuminated display appears to flicker or not by the amount of energy in the temporal frequencies of the display. The first step in the method, therefore, is to find out the amount of energy in the temporal frequencies, E_{obs} . These numbers are then compared to the amounts of energies that people will detect as flicker, the predicted flicker threshold, E_{pred} . Flat panels exhibit more diverse luminance-time functions than progressively scanned cathode ray tubes, so significant energy may exist at several different frequencies. The index, n is carried from 1, at the fundamental repetition frequency of the display (generally, 0,5 times the refreshment rate is necessary on LCD panels), in integer steps until the frequency exceeds 120 Hz. The observed energies may be calculated or measured. The energy at various frequencies is learned by examining the Fourier transform of the luminance-time function.

If $E_{\text{obs}} < E_{\text{pred}}$ at every frequency, then it is likely that people will not see flicker.

If $E_{\text{obs}} > E_{\text{pred}}$ at any frequency, then it is likely that people will see flicker.

G.2.2.2 Fourier coefficients

The average luminance of a luminance-time function, $f(t)$ is:

$$c_0 = \frac{1}{T} \int_{-\frac{T}{2}}^{\frac{T}{2}} f(t) dt$$

where

c_0 the zero Fourier coefficient, is the dark-room luminance averaged over time;

T is the repetition period of the luminance-time function. For progressively scanned cathode ray tubes, the refreshment rate is $1/T$.

NOTE When measuring $f(t)$ and using a fast Fourier transform, FFT, it is sometimes not appropriate to use $\text{FFT}(v)_0$ for c_0 since this could lead to errors depending on the specific form of FFT used.

$\text{FFT}(v)_0$, is the 0 term of the fast Fourier transform of v .

v is the list of measured samples of $f(t)$. The number of items in the list shall be a power of 2 and an integer number of repetition times shall be sampled.

The average luminance c_0 is calculated from dark-room measurements $L_R = qE_S$. In this model, the "adapting" luminance L_t used in converting cd/m^2 to trolands is $c_0 + L_R$.

The general coefficients are:

$$c_n = \frac{1}{T} \int_{-\frac{T}{2}}^{\frac{T}{2}} f(t) e^{-\frac{2n\pi t}{T}} dt$$

where

c_n is the n th Fourier coefficient;

$i = \sqrt{-1}$;

T is the repetition time of $f(t)$.

In the case where $f(t)$ is the sum of components, for example, red, green and blue, the coefficients can be obtained one at a time and added.

$$c_0 = \sum_{j=1}^m c_{0j} = L_t - L_r$$

$$c_n = \sum_{j=1}^m c_{nj}$$

$$\text{AMP}_n = \frac{2 \times |c_n|}{c_0}$$

If there are m components, then:

$$|c_n| = \sqrt{[\text{Re}(c_n)]^2 + [\text{Im}(c_n)]^2}$$

where

AMP is a value between 0 and 2.

The frequency associated with AMP_n, f_n is:

$$f_n = \frac{n}{T} \text{ for } n = 1, 2, \dots$$

while $f_n < 120 \text{ Hz}$

$$\text{AMP}_n = \frac{2 \times |\text{FFT}(v)_n|}{\text{FFT}(v)_0}$$

When using the fast Fourier transform, the set of observations, v_p for $p = 0 \dots 2^z - 1$ is sampled at frequency, f_s and processed with FFT, where z is 6, 7, ... The value AMP_n has a corresponding frequency $n \times f_s/z$. The sampling frequency is $k \times 2^z/T$, where $k = 1, 2, \dots$. The period of $f(t)$ shall be determined. Generally, $k = 1$ yields the best result.

G.2.2.3 Pupil

The pupil area shall be known to convert the luminance to trolands. The expression for pupil area can be simplified:

$$A = b_0 L_t^{b_1}$$

where

$$b_0 = 12,451\ 84;$$

$$b_1 = -0,160\ 32;$$

$$L_t \text{ is the adaptation luminance} = L_{\text{H-dark}}(\theta_D, \phi_D) + q_H(\theta_D, \phi_D) E_s.$$

G.2.2.4 DC component

To calculate the amount of energy in the temporal frequencies of interest.

- Convert the screen luminance into units of retinal illuminance (trolands).
- Calculate the pupil area, A from the formula in G.2.2.3.
- The DC component is:

$$DC = A \times c_0$$

G.2.3 Decision criteria

G.2.3.1 General case

This case applies to technologies with a luminance persistence of 1 ms or more (for example, CRT, LCDs, etc.).

Energy at each frequency is:

$$E_{\text{obs } n} = DC \times \text{AMP}_n$$

The criteria are that the energy at every frequency satisfies:

$$E_{\text{obs } n} \leq E_{\text{pred } n}$$

where

$$E_{\text{pred } n} = ae^{\frac{nb}{T}}$$

where

a and b are as given in Table G.1.

Table G.1 – Values of predicted energy and special coefficients

Row	Screen diagonal arc degrees	Predicted energy coefficients		Special case coefficients	
		a	b	D	E
1	< 20	0,127 6	0,191 9	36,44	13,83
2	20 to 40	0,191 9	0,120 1	39,81	16,40
3	40 to 65	0,507 6	0,100 4	37,93	19,62
4	> 65	0,530	0,099 2	37,96	19,86

G.2.3.2 Simpler special case

This case applies to technologies having luminance persistence that is much less than 1 ms (for example EL, dc plasma, light-emitting diode (LED)). For such technologies, AMP = 2 for refresh rates less than 100 Hz.

Conditions:

- a) Reflected luminance of 5 cd/m² to 15 cd/m².
- b) Average dark-room luminance L_{dark} is from 10 cd/m² to 340 cd/m².

Then, the display meets the requirement if the refresh rate is greater than

$$D + E \log_{10}(L_{\text{dark}})$$

where

D and E are given in the two right-hand columns of Table G.1.

Annex H (normative)

Single and simple operator actions 11

H.1 General

The requirements of Table H.1, Table H.2 and Table H.3 are from a recommendatory source (IMO MSC.1/Circ.1609/Appendix 4) for ECDIS, radar and INS. The implementation of these recommendations is optional. Manufacturers shall declare if these requirements have been implemented.

H.2 Tables for single and simple operator actions

**Table H.1 – Access to functions, as defined before June 2019
(based on MSC.1/Circ.1609)**

<i>Function</i>	<i>Equipment</i>	<i>Access</i>
Select ECDIS Standard Display	ECDIS	Single operator action
Remove radar (image and tracked target), AIS and other navigational target information overlaid over the ENC chart	ECDIS	Single operator action
Select route monitoring display covering own ship's position	ECDIS	Single operator action
Select default ECDIS settings	ECDIS	Single operator action followed by an action to confirm the selection
Select AIS target information	Radar/ECDIS	Simple operator action
Remove chart data	Radar	Single operator action
Reset VRM origin to CCRP	Radar/ECDIS	Simple operator action
Reset EBL origin to CCRP	Radar/ECDIS	Simple operator action
Reset ERBL origin to CCRP	Radar	Simple operator action
Reset Parallel Index line to own ship's heading	Radar	Simple operator action
Remove user defined maps	Radar	Simple operator action
Select default radar settings	Radar	Single operator action followed by an action to confirm the selection
Select presentation mode (radar, chart and other navigation information)	Radar/ECDIS	Simple operator action
Remove AIS Area Notice	Radar/ECDIS	Single operator action
Remove additional information, (including information for route planning, route monitoring, information overlays and supplementary navigation tasks)	Radar/ECDIS	Simple operator action

Table H.2 – Access to functions (based on MSC.1/Circ.1609)

Function	Equipment	Access
Set panel illumination	Radar/ECDIS	Simple operator action
Set display brilliance / Toggle Day /Night mode	Radar/ECDIS	Simple operator action
Select ECDIS mode	INS/Radar/ECDIS	Simple operator action
Select Radar mode	INS/Radar/ECDIS	Simple operator action
Select Conning display mode	INS	Simple operator action
Select CAM-HMI as defined in Bridge Alert Management (BAM) (for example as required by INS)	INS	Simple operator action
Select North Up display	Radar/ECDIS	Simple operator action
Select ship's Head Up display	Radar/ECDIS	Simple operator action
Select ship's Course Up display	Radar/ECDIS	Simple operator action
Select True Motion mode	Radar/ECDIS	Simple operator action
Select Relative Motion mode	Radar	Single operator action
Select Ship centred mode	Radar	Single operator action
Select Ship off centred mode	Radar/ECDIS	Simple operator action
Perform True Motion reset	Radar/ECDIS	Single operator action
Select range	Radar/ECDIS	Simple operator action
Perform Range up	Radar/ECDIS	Single operator action
Perform Range down	Radar/ECDIS	Single operator action
Temporarily suppress the "heading line"	Radar	Single operator action
Toggle Range Rings on and off	Radar/ECDIS	Simple operator action
Start Variable Range Marker adjustment	Radar/ECDIS	Simple operator action
Start Electronic Bearing Line adjustment	Radar/ECDIS	Simple operator action
Start Electronic Range and Bearing Line adjustment	Radar/ECDIS	Simple operator action
Perform Target Acquire	Radar	Simple operator action
Select tracked target	Radar/ECDIS	Simple operator action
Call up the information associated with an object by cursor pick on its symbol	ECDIS	Simple operator action
All AIS targets to Sleep Mode	Radar/ECDIS	Simple operator action
Acknowledge an Alert	Radar/ECDIS	Single operator action
Silence alerts	Radar/ECDIS (if CAM-HMI functionality is incorporated)	Single operator action

Table H.3 – Access to group of functions (based on MSC.1/Circ.1609)

Group of function	Equipment	Access
Record an event	ECDIS	Simple operator action
Set Trial Manoeuvre on	Radar	Simple operator action
Select True Vector	Radar	Single operator action
Select Relative Vector	Radar	Single operator action
Select True Trail	Radar	Simple operator action
Select Relative Trail	Radar	Simple operator action
Select CATZOC	INS/ECDIS	Single operator action
View ECDIS software version	ECDIS	Simple operator action
View ENC information	ECDIS	Simple operator action

Annex I (normative)

Default settings 11

I.1 General

The requirements of this Annex I are from a recommendatory source (MSC.1/Circ.1609/Appendix 5) for ECDIS, radar and INS. The implementation of these recommendations is optional. Manufacturers shall declare if these requirements have been implemented.

I.2 ECDIS default settings

Table I.1 lists the default settings for ECDIS.

**Table I.1 – ECDIS settings configured in response to "Default" selection
(based on MSC.1/Circ.1609)**

<i>Function</i>	<i>Setting</i>
<i>Display category</i>	<i>ECDIS Standard display</i>
<i>Selected sea area</i>	<i>Around own ship with appropriate off-set</i>
<i>Range / Scale</i>	<i>3 NM</i>
<i>Orientation</i>	<i>True motion, north-up</i>
<i>Geodetic datum, if selectable</i>	<i>WGS84</i>
<i>Manual updates</i>	<i>If applied, i.e. displayed if available</i>
<i>Mariner's notes</i>	<i>If applied, i.e. displayed if available</i>
<i>Selected route</i>	<i>Last selected route, including route parameters</i>
<i>Past track</i>	<i>On</i>
<i>Past track length, if selectable</i>	<i>Remain unchanged</i>
<i>Past track time-labels</i>	<i>Off, 30 min</i>
<i>Look-ahead time</i>	<i>6 min</i>
<i>Menu or Edit windows that overlap chart or route monitor data</i>	<i>Minimized or stacked to provide focus on chart and own ship location</i>
<i>Position data source</i>	<i>GNSS, sensor to remain unchanged if previously in use</i>
<i>Safety contour</i>	<i>Remain unchanged</i>
<i>Planned Safety depth</i>	<i>Remain unchanged</i>
<i>Planned Cross track limit</i>	<i>Remain unchanged</i>
<i>Graphical indication of crossing safety contour during route planning, if selection provided</i>	<i>On</i>
<i>Graphical indication of prohibited areas, areas with special conditions and navigational hazards during route planning, if selection provided</i>	<i>On</i>
<i>User-specified distance to prohibited areas, areas with special conditions and navigational hazards, when planning</i>	<i>Remain unchanged</i>
<i>Graphical indication of crossing safety contour during route monitoring, if selection provided</i>	<i>On</i>
<i>Graphical indication of prohibited areas and areas with special conditions during route monitoring, if selection provided</i>	<i>On</i>
<i>Graphical indication of navigational hazards during route monitoring, if selection provided</i>	<i>On</i>
<i>Object highlight, selected object, track display from log</i>	<i>Cleared from display</i>

Function	Setting
Cursor pick	Closed
Any additional window (dual view, 3d, tides, etc.)	Closed
Any additional information layer, proprietary layer (weather, tides, Additional Military Layer (AML), etc.)	Cleared from display
Chart update, Chart information exchange	Aborted
Colour differentiation test diagrams	Closed
Update review	Off
Chart 1	Closed
Units	m, NM, kn
Crossing a navigational hazard in route monitoring mode	Alert priority set as caution
Vector time (length)	6 min
Vector mode	True
Vector stabilization	Ground
Collision warnings, if provided	On (limits, CPA = 2 NM; TCPA = 12 min)
Radar and AIS target association, if provided	On
Radar and AIS target association priority	AIS
AIS target filtering, if provided	Target range = 6 NM
Target CPA = 4 NM	
Target TCPA = 24 min	
Target display = On	
Sleeping target display = Off	
Class A display = On	
Class B display = On	
AtoN display = On	
SART display = On	
Repeated target display = Off	
AIS data reports display, if provided	On
AIS locating devices display, if provided	On
AIS ASM display, if provided	Off
AIS true target outline	Off
AIS AtoN dimension outline	Off
Display of Radar image overlay, if provided	Off
Display of Radar tracked targets, if provided	On
Display of AIS reported targets, if provided	On
Target past positions, if provided	Off
Target trails, if provided	Off
Lost target warning, if provided	Off
AIS interrogation, if provided	Off
Own ship true outline	On, unless the resultant outline would be smaller than 6 mm on the screen
LOP source indication	Off
User selected time for warning escalation	60 s
Suppression of indication of user selected MSI messages based on first character of NAVTEX code field, if provided	Remain unchanged
Suppression of indication of user selected messages based on time and distance from own ship, monitored route or planned route	No
Brightness and contrast controls, if software controlled	Calibrated setting

I.3 Radar default settings

Table I.2 lists the default settings for Radar.

**Table I.2 – Radar control settings configured in response to "Default" selection
(based on MSC.1/Circ.1609)**

Function	Setting
<i>Band ^a</i>	X-band, if selectable, otherwise remain as selected
<i>Gain and anti-clutter functions (Sea, Rain)</i>	<i>Radar gain automatically optimized, where provided. Anti-sea and anti-rain clutter manual controls set "as is" or set to "zero" if such functionality exists</i>
<i>Tuning</i>	<i>Automatically optimized where provided, otherwise remain as is</i>
<i>Range</i>	6 NM
<i>Fixed range rings</i>	Off
<i>VRMs</i>	On
<i>EBLs</i>	On
<i>Parallel index lines</i>	Remain unchanged
<i>Orientation Mode</i>	North Up
<i>Presentation Mode</i>	True Motion
<i>Vector mode</i>	Relative
<i>Vector time</i>	6 min
<i>Stabilization Sea/Ground</i>	Sea
<i>Off-Centre</i>	Off-Centre, with appropriate look ahead
<i>Target trails</i>	On
<i>Past positions</i>	Off
<i>Radar target tracking</i>	Continued
<i>Automatic radar target acquisition</i>	Off
<i>Graphical AIS reported target display</i>	On
<i>Graphical AIS data report display</i>	On
<i>Graphical AIS locating device display</i>	On
<i>Graphical AIS ASM display</i>	Off
<i>Radar and AIS Target fusion</i>	Association on, priority AIS
<i>Operational alerts (except collision warnings)</i>	On
<i>Collision warnings</i>	On (limits CPA 2 nm; TCPA 12 min)
<i>Display of maps, navigation lines and routes</i>	Last setting
<i>Display of charts</i>	Off
^a Radar band default setting deviates from MSC.1/Circ.1609 due to alignment with IMO MSC 252(83).	

Annex J (normative)

Implementation details of AIS ASM 5

J.1 General

This Annex J describes details of implementation of AIS ASM.

J.2 AIS ASM

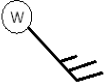
Table J.1 specifies display layers and display sub-layers of AIS ASM and additionally specifies the symbols to be used from Annex A.

Table J.1 – Details of AIS ASM

Display layer	Display sub-layer	Symbol ^a	AIS ASM parameters to be available from cursor pick of the symbol	Source FI
Hydrological Data	Tidal window	5.6 	Combined from Source FI 32 (Tidal window)	
			Time Stamp	32
			Position #1 Latitude	32
			Position #1 Longitude	32
			From UTC Hour #1	32
			From UTC Minute #1	32
			To UTC Hour #1	32
			To UTC Minute #1	32
			Current Direction predicted #1	32
			Current Speed predicted #1	32
			Position #2 Latitude	32
			Position #2 Longitude	32
			From UTC Hour #2	32
			From UTC Minute #2	32
			Current Direction predicted #2	32
			Current Speed predicted #2	32
			Position #3 Latitude	32
			Position #3 Longitude	32
			From UTC Hour #3	32
			From UTC Minute #3	32
			To UTC Hour #3	32
			To UTC Minute #3	32
			Current Direction predicted #3	32
			Current Speed predicted #3	32

Display layer	Display sub-layer	Symbol ^a	AIS ASM parameters to be available from cursor pick of the symbol	Source FI
Hydrological Data	Water level	5.6 	Combined from Source FI 26 (Site Location) 26 (Station ID report) 26 (Water level report) 31 (Meteorological and Hydrographic data)	
			Site ID (from header)	26
			Time stamp (from header)	26, 31
			Data timeout (from site location)	26
			Latitude (from site location)	26, 31
			Longitude (from site location)	26, 31
			Position Accuracy	31
			Name (Station ID report)	26
			Water Level Type	26
			Sensor Data Description	26
			Water Level / Water level (incl, tide)	26, 31
			Water Level Trend	26, 31
			Vertical Reference Datum	26
			Forecast Water Level Type	26
			Forecast Water Level	26
			Valid Time of Forecast	26
			Duration (forecast)	26

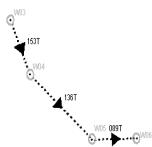
Display layer	Display sub-layer	Symbol ^a	AIS ASM parameters to be available from cursor pick of the symbol	Source FI
Hydrological Data	Current	5.13 	Combined from Source FI	
			26 (Site Location)	
			26 (Station ID report)	
			26 (Current flow report 2-D)	
			26 (Current flow report 3-D)	
			26 (Horizontal current flow report)	
			31 (Meteorological and Hydrographic data)	
			Site ID (from header)	26
			Time stamp (from header)	26, 31
			Data timeout (from site location)	26
			Latitude (from site location)	26, 31
			Longitude (from site location)	26, 31
			Position Accuracy	31
			Name (Station ID report)	26
			Sensor Data Description	26
			Current Measuring level #1	26
			Current Speed #1	26
			Current Direction #1	26
			Current Vector Component Up #1	26
			Surface Current Speed (incl. tide)	31
			Surface Current Direction	31
Current Measuring level #2	26, 31			
Current Speed #2	26, 31			
Current Direction #2	26, 31			
Current Vector Component Up #2	26			
Current Measuring level #3	26, 31			
Current Speed #3	26, 31			
Current Direction #3	26, 31			
The "Horizontal current flow report" may include two separate locations of current values. Both locations shall be presented by symbol 5.13 for which the location shall be based on calculation using parameters "Current Reading 1 Bearing/Current Reading 1 Distance" or "Current Reading 2 Bearing/Current Reading 2 Distance" applied on "Latitude/longitude". The alphanumeric presentation shall also present the calculated location of the symbol 5.13 instead of values used for calculation. The "Current flow report 3-D" may include two separate 3-D current values. The alphanumeric presentation shall be in form of "Current speed/Current direction" calculated from the parameters "Current Vector Component North/Current Vector Component East".				

Display layer	Display sub-layer	Symbol ^a	AIS ASM parameters to be available from cursor pick of the symbol	Source FI
Meteorological Data	Wind	5.5 Dover 	Combined from Source FI	
			26 (Site Location)	
			26 (Station ID report)	
			26 (Wind report)	
			31 (Meteorological and Hydrographic data)	
			Site ID (from header)	26
			Time stamp (from header)	26, 31
			Data timeout (from site location)	26
			Latitude (from site location)	26, 31
			Longitude (from site location)	26, 31
			Altitude (from site location)	26
			Position Accuracy	31
			Name (Station ID report)	26
			Average Wind Speed	26, 31
			Wind Direction	26, 31
			Wind Gust	26, 31
			Wind Direction	26, 31
			Sensor Data Description	26
			Forecast Wind Speed	26
			Forecast Wind Direction	26
			Forecast Wind Gust	26
			Forecast Wind Direction	26
			Valid Time of Forecast	26
			Duration (forecast)	26

Display layer	Display sub-layer	Symbol ^a	AIS ASM parameters to be available from cursor pick of the symbol	Source FI
Environmental Data	Sea state	5.13 	Combined from Source FI 26 (Site Location) 26 (Station ID report) 26 (Sea state report) 31 (Meteorological and Hydrographic data)	
			Site ID (from header)	26
			Time stamp (from header)	26, 31
			Data timeout (from site location)	26
			Latitude (from site location)	26, 31
			Longitude (from site location)	26, 31
			Position Accuracy	31
			Name (Station ID report)	26
			Sea state	26, 31
			Water Temperature	26, 31
			Water Temperature Depth	26
			Sensor Data Description (water temperature)	26
			Significant Wave Height	26, 31
			Wave Period	26, 31
			Wave Direction	26, 31
			Sensor Data Description (wave)	26
			Swell Height	26, 31
			Swell Period	26, 31
			Swell Direction	26, 31
			Sensor Data Description (swell)	26
			Ice	31
			Salinity	26, 31

Display layer	Display sub-layer	Symbol ^a	AIS ASM parameters to be available from cursor pick of the symbol	Source FI
Meteorological Data	Weather	5.5 Dover 	Combined from Source FI 26 (Site Location) 26 (Station ID report) 26 (Weather report) 31 (Meteorological and Hydrographic data)	
			Site ID (from header)	26
			Time stamp (from header)	26, 31
			Data timeout (from site location)	26
			Latitude (from site location)	26, 31
			Longitude (from site location)	26, 31
			Name (Station ID report)	26
			Position Accuracy	31
			Air Temperature	26
			Sensor Data Description (air temperature)	26
			Relative Humidity	31
			Precipitation	26, 31
			Horizontal Visibility	26, 31
			Dew Point	26, 31
			Sensor Data Description (dew point)	26
			Air Pressure	26, 31
			Air Pressure Trend/Tendency	26, 31
			Sensor Data Description (air pressure)	26
			Salinity	26, 31
Navigational Services	Air Gap	5.12 	Combined from Source FI 26 (Site Location) 26 (Station ID report) 26 (Air gap/Air draft)	
			Site ID (from header)	26
			Time stamp (from header)	26
			Data timeout (from site location)	26
			Latitude (from site location)	26
			Longitude (from site location)	26
			Name (Station ID report)	26
			Air Gap	26
			Air Gap Trend	26
			Forecast Air Gap	26
			Valid Time of the Forecast UTC Day UTC Hour UTC Minute	26

Display layer	Display sub-layer	Symbol ^a	AIS ASM parameters to be available from cursor pick of the symbol	Source FI
Navigational Services	Area Notice may be sub-divided into: Caution Restricted Anchorage Distress Chart feature (see Notice description)	5.11  Default 5.14  when "Notice description = 18"	Combined from Source FI 22 (Area notice – broadcast) 23 (Area notice – addressed) 29 (Text description – broadcast) 30 (Text description – addressed)	
			Notice Description	22, 23
			Start date and time of Area	22, 23
			Duration	22, 23
			Text description – broadcast	29
			Text description – addressed	30
Navigational Services	Berthing Data	5.9 	Combined from Source FI 18 (Clearance time to enter port) 20 (Berthing data) 29 (Text description – broadcast) 30 (Text description – addressed)	
			Destination	18
			Latitude	18
			Longitude	18
			Centre position of Berth, Latitude	20
			Centre position of Berth, Longitude	20
			Clearance date/time to enter port	18
			Berthing date and time	20
			Name of port and berth	18
			Name of Berth	20
			Berth Length	20
			Water Depth at Berth	20
			Mooring Position	20
			Services availability	20
			Type of Services Available	20
			Text description – broadcast	29
			Text description – addressed	30

Display layer	Display sub-layer	Symbol ^a	AIS ASM parameters to be available from cursor pick of the symbol	Source FI
Navigational Services	Routing	5.8 	Combined from Source FI 27 (Route information – broadcast) 28 (Route information – addressed) 29 (Text description – broadcast) 30 (Text description – addressed)	
			Route Type	27, 28
			Sender Classification	27, 28
			Start Date and Time	27, 28
			Duration	27, 28
			Number of Waypoints	27, 28
			Waypoints WP #n, Latitude WP #n, Longitude	27, 28
			Text description – broadcast	29
			Text description – addressed	30
Navigational Services	Signal Station	5.7 	Combined from Source FI 19 (Marine traffic signal) 29 (Text description – broadcast) 30 (Text description – addressed)	
			Name of Signal Station	19
			Position of Station, Latitude	19
			Position of Station, Longitude	19
			Signal in Service	19
			Status of Signal	19
			Time of next signal shift	19
			Expected Next Signal	19
			Text description – broadcast	29
			Text description – addressed	30

Display layer	Display sub-layer	Symbol ^a	AIS ASM parameters to be available from cursor pick of the symbol	Source FI
Meteorological Data	Weather	5.19 	Combined from Source FI 21 (Weather observation report from ship), when Type of weather report = 0	
			Geographic Location (text, 20 characters)	21
			Source ID (MMSI of source)	21
			Date and Time of Observation	21
			Position of observation, Latitude	21
			Position of observation, Longitude	21
			Present Weather	21
			Horizontal Visibility	21
			Relative Humidity	21
			Average Wind Speed	21
			Wind Direction	21
			Air Pressure	21
			Air Pressure tendency	21
			Air Temperature	21
			Water Temperature	21
			Wave period	21
			Significant Wave height	21
			Wave Direction	21
			Swell Height	21
			Swell Direction	21
			Swell Period	21
See 4.3.2 for consistent time presentation.				
^a See requirements in Annex A.				

Annex K (informative)

Overview of AIS Messages 5

K.1 General

Table K.1 provides an overview of AIS Messages and Table K.2 provides an overview of AIS ASM Messages.

Table K.1 – AIS Messages

ITU-R M.1371 AIS standard Messages ID	AIS Message descriptions	Use in this document
1,2,3	Position Report – 1 = autonomous(A), 2 = assigned(C), 3 = interrogated/pollled(I) – every 2 s, 3½ s, 6 s, or 10 s; 3 min < 3 kn or anchored	AIS target AIS data report AIS locating device
4	Base Station Report – every 10 s.	AIS data report
5	Class A Report – static and voyage related data – every 6 min	AIS target
6,8	Binary message – addressed (6) or broadcast (8)	AIS ASM AIS synthetic target
7	Binary message – acknowledgment to a Message 6	Not applicable in this document
9	SAR aircraft position report – every 10 s.	AIS data report
10,11	Universal Time Coordinated / Date – 10 = enquiry, 11 = response	Not applicable in this document
12	Safety related Texting – addressed (12)	AIS safety related message
14	Safety related Texting – broadcast (14)	AIS safety related message AIS locating device
13	Safety related text message – acknowledgment to Message 12	Not applicable in this document
15	Interrogation – poll for specific messages	Not applicable in this document
16	Assignment Mode Command	Not applicable in this document
17	GNSS Correction Binary message	Not applicable in this document
18	Class B Position Report – 3 min < 2 kn – Class B"CS" every 30 s/Class B"SO" every 5 s, 15 s, 30 s	AIS target
19	Class B Extended Report (when polled by a base station)	AIS target
20	Data Link Management – reserve slots	Not applicable in this document
21	ATON Report – position and status – every 3 min	AIS data report
22	Channel Management	Not applicable in this document
23	Group Assignment Command	Not applicable in this document
24 _{A/B}	Static Data Report – every 6 min (w/in 30 s upon a poll)	AIS target
25	Single-Slot Binary message	AIS ASM AIS synthetic target
26	Multi-Slot Binary message w/Communication State	AIS ASM AIS synthetic target
27	Long-range automatic identification system broadcast message	Not applicable in this document

Table K.2 – AIS ASM Messages

ITU-R M.1371 Message 8 Application Specific Message, FI	Description	Comment	Use in this document
11	Met/Hydrological	SN/Circ.236 Trial message; not to be used after 1 Jan 2013	Not applicable
13	Fairway closed	SN/Circ.236 Trial message; not to be used after 1 Jan 2013	Not applicable
14	Tidal window	SN/Circ.236 Trial message; not to be used after 1 Jan 2013	Not applicable
15	Extended ship static and voyage-related data	SN/Circ.236 Trial message 6; not to be used after 1 Jan 2013	Not applicable
16	Number of persons on board – addressed	SN/Circ.236 Trial message 6; as corrected in SN.1/Circ.289	AIS target
17	VTS-generated/synthetic targets – broadcast	SN/Circ.236 Trial message 7; SN.1/Circ.289 Renamed to "VTS-generated/Synthetic targets"	AIS synthetic targets
18	Clearance time to enter port – addressed	SN.1/Circ.289	AIS ASM
19	Marine traffic signal – broadcast	SN.1/Circ.289	AIS ASM
20	Berthing data – addressed	SN.1/Circ.289	AIS ASM (from shore to ship)
21	Weather observation report from ship – broadcast	SN.1/Circ.289	AIS ASM
22	Area notice – broadcast	SN.1/Circ.289	AIS ASM AIS synthetic targets
23	Area notice – addressed	SN.1/Circ.289	AIS ASM AIS synthetic targets
24	Extended ship static and voyage-related data – broadcast	SN.1/Circ.289	AIS target
25	Dangerous cargo indication – addressed	SN.1/Circ.289	Not applicable
26	Environmental – broadcast	SN.1/Circ.289	AIS ASM
27	Route information – broadcast	SN.1/Circ.289	AIS ASM
28	Route information – addressed	SN.1/Circ.289	AIS ASM
29	Text description – broadcast	SN.1/Circ.289	AIS ASM
30	Text description – addressed	SN.1/Circ.289	AIS ASM
31	Meteorological and Hydrographic data – broadcast	SN.1/Circ.289	AIS ASM
32	Tidal window – addressed	SN.1/Circ.289	AIS ASM
33-63	Reserved for Future Use	SN.1/Circ.289	
Not all ASMs (i.e. AIS binary messages 6, 8, 25 or 26) are defined in IMO SN.1/Circ.289. Regional ASMs provide the same parameter data denoted in Table J.1 and may optionally be presented consistent with this document. A catalogue of regional ASMs can be found at http://www.iala-aism.org/asm/.			

K.2 Use case guidance on AIS ASM

Some details of the use of AIS ASM are given which are useful to know for implementers of presentation and functionality of AIS ASM for equipment which receives AIS ASM information.

- The AIS ASM concept includes a parameter called DAC. For the IMO SN.1/Circ.289 specified AIS ASMs addressed by this document, the DAC is always 1. Within each value of DAC, there could be as many as 64 different AIS ASMs specified by value of FI (6 bits). It should be noted that the value range of "10 bit" DAC is 700 for local/regional use and 10 for international use and within each value of DAC there could be 64 values of FI. Some AIS ASMs outside of DAC = 1 might be of interest to implement. More information is available from the following link <https://www.iala-aism.org/asm/>.
- Some AIS ASM objects include "message linkage ID". The value is set by the information provider and it is unique for each individual AIS ASM object which includes "message linkage ID". The information provider is identified by the first six digits of the source MMSI. The information provider controls the uniqueness of the "message linkage ID". When available, the "message linkage ID" together with value of source MMSI is used as part of unique identifier of an AIS ASM object. For some AIS ASM objects, the first six digits of the nine digits of MMSI is used and in some cases all digits of MMSI are used. The other use of "message linkage ID" is to combine the content of the "Text description" AIS ASMs (FI = 29 and 30) into the AIS ASM object defined by the "main" AIS ASM (FI = 18, 19, 22, 23, 27 and 28).
- AIS ASM object of category "Addressed"
 - These are strictly intended for reception by a single vessel and the "addressed" message type means that these are transmitted until acknowledged by AIS Message 7. This means that there cannot be any concept of automatic removal based on timeout from last reception.
 - Some of these could be valid for short time periods, but some could be valid for long time periods. This depends on the content and user decision. Therefore, the removal from the storage is under user control.
- Environmental information
 - Multiple AIS stations (for example AIS base stations, AIS repeater stations, AIS AtoN stations) may duplicate transmission of the content. An end user is intended to see only one AIS ASM object. This is done intentionally so that the resulting coverage area is larger.
 - May include "end of validity" concept. Again, multiple AIS stations may transmit duplicate AIS ASMs. One should note that the information may be necessary after the vessel has left the reception range of the transmitting AIS stations because coverage area of the information might be much larger. Therefore, these AIS ASMs with "end of validity" concept information are not automatically removed from the storage after the standard 18 min timeout from last reception. Therefore, the manufacturer may as well provide an option for the user to remove these by criteria (i.e. user is able to make decision to remove or to keep depending of the content).
- Area notices
 - Separate area notices are identified by unique combination of "message linkage ID" and MMSI of source. Addressed area notices are possible only by a single source station (for example AIS base station, AIS AtoN station) as the unique identification includes full content of the MMSI of the source. Broadcast area notices use only the first six digits of the source MMSI and therefore transmission of them is possible by multiple source stations when the information provider has coordinated their system to assign the MMSI.
 - Area notices may include "end of validity" concept as described in environmental information.

Annex L (informative)

Overview of the use AIS AtoN status field bits 5

NOTE Refer to IALA A-126 for possible later versions of Table L.1.

Table L.1 provides an overview of AIS AtoN status field bits.

Table L.1 – AIS AtoN status field

Bit order		RACON/Light	Bit order		Mobile AtoN and method and direction of movement		Regional AtoN	
8 th 7 th and 6 th	Bits	Page ID = 111	8 th 7 th and 6 th	Bits	Page ID = 101		Page ID = 001	
5 th and 4 th	00	No RACON installed	5 th , 4 th , 3 rd and 2 nd	0000	Direction not reported	No further information default	Reserved for regional use ^a	
	01	RACON installed but not monitored		0001		Free-floating ABCD values denote an area (e.g. oil spill)		
	10	RACON operational		0010		Free-floating ABCD values denote an object (e.g. craft, gear, flotsam, etc.)		
	11	RACON Error		0011		Moves as defined (Synthetic) ABCD values denote an object (e.g. craft, gear, flotsam, etc.)		
3 rd and 2 nd	00	No light or no monitoring		0100	Direction of movement (COG)	Moves as defined (Synthetic) ABCD values denote an area (e.g. dredging zone)		
	01	Light ON		0101		Tethered from a watercraft (e.g. cable, pipe, net)		
	10	Light OFF		0110		Reserved for future use		
	11	Light fail or at reduced range		0111		Self-propelled, but direction not reported or unavailable		
1 st	0	Good health		1000	Direction of movement (COG)	000° ± 22,5°		
				1001		045° ± 22,5°		
				1010		090° ± 22,5°		
				1011		000° ± 22,5°		
			1100	135° ± 22,5°				
			1101	180° ± 22,5°				
			1110	225° ± 22,5°				
			1111	270° ± 22,5°				
	1	Alarm	1 st	0	Monitored			
			1	Unmonitored				

NOTE 8th bit is most significant and 1st bit is least significant.

^a E.g. VTT-EG AIS AtoN for inland use standard.

NOTE 8th bit is most significant and 1st bit is least significant.

^a E.g. VTT-EG AIS AtoN for inland use standard.

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~~ITU-R Recommendation M.585-5, Assignment and Use of Maritime Mobile Service Identities~~

IALA Recommendation A-126, *The Use of Automatic Identification System (AIS) in Marine Aids to Navigation Services*

WMO-No. 485:2010, *Manual on the Global Data-processing and Forecasting System*

List of comments

- 1 IMO has amended MSC.191(79) and the related circular Circ.243. IMO has added into presentation rules a new circular 1609.
 - 2 Previous edition 2.0 of IEC 62288 included symbol to be used for AIS. This edition clarifies what else than just the symbol shape is part of technical implementation of AIS Application Specific Messages.
 - 3 This reference removed as referencing IHO presentation rules is changed to be generic in order to include both older IHO S-52 and newer IHO S-100.
 - 4 Improved wording.
 - 5 Part of clarification on technical implementation of various object related AIS.
 - 6 In reality the software of the equipment specifies the time interval.
 - 7 Part of new feature to present sources of received DSC calls from other ships to own ship.
 - 8 Since edition 2.0 of IEC 62288 IMO has amended this resolution.
 - 9 Part of clarification on technical implementation of MSI.
 - 10 Clarify which standard have preference in case of conflict.
 - 11 Part of IMO amendments for presentation.
 - 12 Clarify when these levels of ambient light is used for testing.
 - 13 Clarify technically what is colour “white” in context of this Standard.
 - 14 Missing test for existing requirement.
 - 15 This is changed to be generic in order to include both older IHO S-52 and newer IHO S-100.
 - 16 Clarifications on interpretation of size requirements.
 - 17 Clarify that colour red can also be used for other purposes than alarms.
 - 18 IEC has published a separate Standard IEC 62923-1, which is referenced for presentation of alerts.
 - 19 Technical clarifications on implementation and added exception if individual equipment standard have specified otherwise.
 - 20 Clarifications on technical implementation.
 - 21 Clarification on integrated systems: Term “INS” added into the title and related note removed.
 - 22 Old note changed as requirement.
 - 23 Clarify source.
 - 24 Improve clarity.
 - 25 Clarify that label may contain characters.
 - 26 Symbols shape in figure is unchanged from edition 2.0. Text is amended to be same as figure.
-

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INTERNATIONAL STANDARD

NORME INTERNATIONALE



**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**

**Matériels et systèmes de navigation et de radiocommunication maritimes –
Présentation des informations relatives à la navigation sur des affichages de
navigation de bord – Exigences générales, méthodes d'essai et résultats
d'essai exigés**

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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

FOREWORD

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IEC 62288 has been prepared by IEC technical committee 80: Maritime navigation and radiocommunication equipment and systems. It is an International Standard.

This third edition cancels and replaces the second edition published in 2014. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

- a) Clause 4 has been revised to remove requirements for indications of alerts which are now given in IEC 62923-1;
- b) Clause 5 has been extensively revised to add new requirements for AIS, ASM and DSC presentation together with three new supporting annexes, Annex J, Annex K, Annex L;
- c) Annex A and Annex B have been revised to incorporate changes to IMO circular SN.1/Circ.243;

- d) Annex E has been revised to incorporate changes to IMO resolution MSC.191(79) and renamed as "Operational controls and logical grouping".
- e) two new annexes have been added, Annex H on operator actions and Annex I on default settings in support of IMO circular MSC.1/Circ.1609.

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

Draft	Report on voting
80/1013/FDIS	80/1017/RVD

Full information on the voting for its approval can be found in the report on voting indicated in the above table.

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/standardsdev/publications.

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

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

IMPORTANT – The "colour inside" logo on the cover page of this document indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

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

1 Scope

This document specifies the general requirements, methods of testing, and required test results, for the presentation of navigation-related information on shipborne navigational displays in support of IMO resolutions MSC.191(79) as amended by MSC.466(101) in June 2019, and where applicable MSC.302(87).

This document also supports the guidelines included in the related IMO Circulars MSC.1/Circ.1609 on the standardization of user interface design for navigation equipment and SN.1/Circ.243 as revised in June 2019 on the presentation of navigation related symbols, terms and abbreviations.

This document also specifies the presentation of AIS data reports and the AIS Application Specific Messages defined for international use in IMO SN.1/Circ.289 and intended to be received by a ship for display onboard.

NOTE All text in this document whose wording is identical to text contained in an IMO document is printed in *italics*. Reference to the document is noted at the beginning of the paragraph. The notation contains a prefix referring to the document and a suffix with the paragraph number from the document (for example, (MSC191/1); (SN243/1), etc.).

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 60945:2002, *Maritime navigation and radiocommunication equipment and systems – General requirements – Methods of testing and required test results*

IEC 61174, *Maritime navigation and radiocommunication equipment and systems – Electronic chart display and information system (ECDIS) – Operational and performance requirements, methods of testing and required test results*

IEC 61966-4, *Multimedia systems and equipment – Colour measurement and management – Part 4: Equipment using liquid crystal display panels*

IEC 62388, *Maritime navigation and radiocommunication equipment and systems – Shipborne radar – Performance 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*

IHO S-52, *Specifications for chart content and display aspects of ECDIS*

IMO, *Seafarers' Training, Certification and Watchkeeping Code (STCW Code)*

IMO A.694(17):1991, *General requirements for shipborne radio equipment forming part of the global maritime distress and safety system (GMDSS) and for electronic navigational aids*

IMO MSC.191(79):2004, *Performance standards for the presentation of navigation related information on shipborne navigational displays*

IMO MSC.192(79):2004, *Performance standards for radar equipment*

IMO MSC.232(82):2006, *Revised performance standards for electronic chart display and information systems (ECDIS)*

IMO SN.1/Circ.243/Rev.2:2019+Corr.1, *Guidelines for the presentation of navigation related symbols, terms and abbreviations*

IMO SN.1/Circ.289:2010, *Guidance on the use of AIS application-specific messages*

IMO MSC.302(87):2010, *Performance standards for bridge alert management (BAM)*

IMO MSC.1/Circ.1609:2019, *Guidelines for the standardization of user interface design for navigation equipment*

IMO A.1021(26):2009, *Code on Alerts and Indications*

VESA-2001-6, *Flat Panel Display Measurements (FPDM)*

3 Terms, definitions and abbreviated terms

For the purposes of this document, the following terms, definitions and abbreviated terms apply.

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>

3.1 Terms and definitions

3.1.1

activated AIS target

(MSC191/A) target representing the automatic or manual activation of a sleeping target for the display of additional graphically presented information

3.1.2

automatic identification system

AIS

system which complies with the requirements set forth in Annex 3 of IMO Resolution MSC.74(69)

3.1.3

AIS Application Specific Message

AIS ASM

AIS Messages 6, 8, 25 or 26, excluding AIS synthetic targets

Note 1 to entry: This document specifically addresses only AIS ASM defined for international use in IMO SN.1/Circ.289 and that are intended to be received by a ship for display onboard. Various Administrations have implemented application specific messages not defined in IMO SN.1/Circ.289, but are catalogued by IALA at <https://www.iala-aism.org/asm/> which, if appropriate, may be displayed using the same symbols and rules in this document.

Note 2 to entry: See Annex J.

3.1.4

AIS ASM object

information constructed from one or more AIS ASMs

Note 1 to entry: See Annex J.

3.1.5

AIS data report

information derived from AIS Aids to Navigation (AtoN), AIS SAR Aircraft and AIS Base Stations reports

Note 1 to entry: See Annex J.

3.1.6

AIS locating devices

AIS-SART, EPIRB-AIS and AIS MOB stations that transmit AIS Messages 1 and 14 using the burst transmissions as described in ITU-R M.1371

Note 1 to entry: AIS MOB means information derived from a DSC Class M device capable of reporting using AIS burst transmissions.

3.1.7

AIS safety related messages

AIS Messages 12 or 14

3.1.8

AIS synthetic target

object generated from an AIS Message 6, 8, 25 or 26 when FI=17 VTS-generated/synthetic target; or when FI=22 or FI=23 Area Notice with "Sub-areas" set to "0" circle or point and "Area shape" set to "0" and "Radius" set to "0" and "Notice Description" set to a value in range from 64 to 74

Note 1 to entry: AIS Synthetic targets are generated by shore-based information systems (for example VTS) and transmitted through AIS base stations.

Note 2 to entry: "Notice Description" set to a value in the range from 64 to 73 represents vessel distress situations and set to a value 74 represents person distress situation. These messages may or may not have an associated GMDSS Distress Alert.

3.1.9

AIS target

reported AIS target

(MSC191/A) *target generated from an AIS position report message* from a ship, vessel or craft, based on AIS Message 1, 2, 3 or 18

Note 1 to entry: The MMSI number within AIS Messages 1, 2, 3 or 18 identifies the source as a ship, vessel or craft in accordance with ITU-R M.585-8:2019, Annex 1, Sections 1 and 5.

Note 2 to entry: AIS Class A uses Messages 1, 2 and 3. AIS Class B uses Message 18.

3.1.10

alarm

(MSC.302/A) *condition requiring immediate attention and action by the bridge team, to maintain the safe navigation of the ship*

Note 1 to entry: An alarm is a *high-priority alert*.

3.1.11

alert

(MSC.302/A) *announcement of abnormal situations and conditions requiring attention.*

Note 1 to entry: Alerts are divided in four priorities: *emergency alarms, alarms, warnings and cautions*. An alert provides information about a defined state change in connection with information about how to announce this event in a defined way to the system and the operator.

3.1.12

associated target

(MSC191/A) *target simultaneously representing a tracked radar target and a reported AIS target having similar parameters (for example, position, course, speed, etc.) and which comply with an association algorithm*

3.1.13

brilliance

adjustment of luminance of a display for ambient light

EXAMPLE Control of backlight for LCD (liquid crystal display).

3.1.14

caution

(MSC.302/A) *awareness of a condition which does not warrant an alarm or warning condition, but still requires attention out of the ordinary consideration of the situation or of given information*

Note 1 to entry: A caution is the *lowest priority of an alert*.

3.1.15

consistent common reference point

CCRP

(MSC191/A) *location on own ship, to which all horizontal measurements such as own ship position, heading, and target range, bearing, relative course, relative speed, closest point of approach (CPA) or time to closest point of approach (TCPA) are referenced, typically the conning position of the ship*

Note 1 to entry: An alternative location (or multiple locations) may be used, as necessary, where clearly indicated or distinctively obvious, for example, the origin of the reference axis of the ship.

3.1.16

composite presentation

integrated presentation that is derived from the simultaneous display of information from two or more navigational systems or from other pieces of equipment

3.1.17

dangerous target

(MSC191/A) *tracked radar or reported AIS target with a predicted CPA and TCPA that violates values preset by the user*

Note 1 to entry: The respective target is marked by a "dangerous target" symbol.

3.1.18**dead reckoned position****DR**

position extrapolated from the last accepted position update, based on present course and speed, and updated on a time interval

3.1.19**display base**

(MSC191/A) *level of information which cannot be removed from the ECDIS display, consisting of information which is required at all times in all geographic areas and all circumstances*

Note 1 to entry: It is not intended to be sufficient for safe navigation.

3.1.20**display equipment**

device capable of representing information visually

3.1.21**doubtful integrity**

state when integrity cannot be verified

3.1.22**DSC received call**

information generated from a received DSC message

Note 1 to entry: DSC received call may be available from all DSC compliant equipment classes which are able to provide information through a standardized interface.

3.1.23**electronic chart display and information system****ECDIS**

system which complies with the requirements set forth in IMO Resolution MSC.232(82)

3.1.24**electronic chart information**

electronic chart database(s)

EXAMPLE ENC.

3.1.25**electronic navigational chart****ENC**

(MSC191/A) *database standardised as to content, structure and format according to IHO S-57 and its Appendix B.1 and issued by, or on the authority of, a Government*

3.1.26**emergency alarm**

(MSC.302/A) *alarms which indicate immediate danger to human life or to the ship and its machinery exists and require immediate action*

Note 1 to entry: An emergency alarm is the *highest priority of an alert*.

3.1.27**estimated position****EP**

position extrapolated from the last accepted position update, based on present course and speed (STW), including effects of wind, tide, current, and updated on a time interval

3.1.28

fix

position of own ship determined, without reference to any former position

3.1.29

heading

(MSC191/A) horizontal *direction in which the bow of a ship is actually pointing* at any instant, *expressed as an angular displacement from north*

3.1.30

icon

graphical symbol with a particular meaning used to convey information independent of language

Note 1 to entry: Icons may be used for visual identification or reinforcement of a textual description, to invoke a function, or to open an object when selected with the cursor.

3.1.31

important indication

(MSC191/A) *marking of an operational status of displayed information which needs special attention, for example, information with low integrity or invalid information*

Note 1 to entry: The important indication is not part of alert classification.

3.1.32

indication

display of regular information and conditions, not part of alert management

3.1.33

integrated navigation system

INS

system which complies with the requirements set forth in IMO Resolution MSC.252(83) as amended by IMO Resolution MSC.452(99)

3.1.34

integrity

property of information as being within the specified accuracy in a timely, complete and unambiguous manner

3.1.35

line of position

LOP

plotted line on which own ship is located determined by observation or measurement of the range or bearing to an aid to navigation or other charted element

3.1.36

lost target

(MSC191/A) tracked radar or reported *target* for which the system is no longer receiving *valid position* data

Note 1 to entry: The target is *represented* by a "lost target" symbol.

3.1.37

maritime safety information

MSI

(SOLAS IV/2) *navigational and meteorological warnings, meteorological forecasts and other urgent safety-related messages broadcast to ships*

Note 1 to entry: MSI is promulgated using NAVTEX and EGC services (see IMO MSC.468(101)).

3.1.38**menu**

area of the display that is allocated to a structured list of options for the selection and entry of operational parameters, data and commands

3.1.39**multifunction display**

single visual display unit that can present, either simultaneously or through a series of selectable pages, information from multiple systems or equipment

Note 1 to entry: A multifunction display may typically be part of an INS (for example, providing dedicated presentation modes conforming to both radar and ECDIS presentation requirements), and may replace their individual display units.

3.1.40**operational display area**

(MSC191/A) *area of the display used to graphically present electronic chart and/or radar information, excluding the user dialogue area*

Note 1 to entry: On the chart display this is the area of the chart presentation. On the radar display this is the area encompassing the radar video image.

3.1.41**past positions**

(MSC191/A) *time-spaced marks on the past track of own ship, or a tracked radar or reported AIS target*

3.1.42**permanent**

property of information as existing for a long time (or forever) without change

3.1.43**persistent**

property of information as existing continuously

3.1.44**radar**

system which complies with the requirements set forth in IMO Resolution MSC.192(79)

3.1.45**radar echo**

returned radar signal (i.e. "paint") appearing in the radar video image

3.1.46**radar video image**

set of displayed information constructed from radar echoes processed, for example by anti-clutter means and other tools

3.1.47**readily available**

<information> directly accessible

Note 1 to entry: For example, in a top-level menu, from a screen function, or an icon, etc.

3.1.48**selected target**

(MSC191/A) *target selected manually or automatically for the display of detailed alphanumeric data, information and text in a separate user dialogue area*

Note 1 to entry: The target is represented by a "selected target" symbol.

3.1.49

simple operator action

(MSC252/A1) *procedure achieved by no more than two hard-key or soft-key actions, excluding any necessary cursor movements, or voice actuation using programmed codes or equivalent alternative means*

3.1.50

single operator action

(MSC252/A1) *procedure achieved by no more than one hard-key or soft-key action, excluding any necessary cursor movements, or voice actuation using programmed codes*

3.1.51

sleeping AIS target

(MSC191/A) *AIS target indicating the presence of a vessel equipped with AIS in a certain location*

Note 1 to entry: *The target is represented by a "sleeping target" symbol indicating the vessel's orientation. No additional information is presented until the AIS target is activated.*

3.1.52

standard display

(MSC191/A) *level of information that should be shown when a chart is first displayed on ECDIS*

Note 1 to entry: *The level of the information it provides for route planning or route monitoring may be modified by the user according to the user's needs.*

3.1.53

target tracking system

system which complies with the requirements set forth in IMO Resolution MSC.192(79)

3.1.54

task-at-hand

specific navigation-related activity performed by a user

EXAMPLE Route planning, route monitoring, target tracking, collision avoidance.

3.1.55

tracked radar target

object, fixed or moving, which is tracked by a radar or target tracking function

3.1.56

trial manoeuvre

(MSC191/A) *facility used to assist the user to perform a simulated manoeuvre for navigation and collision avoidance purposes, by displaying the predicted future status of all tracked radar and reported AIS targets as a result of the simulated manoeuvres*

3.1.57

user-added electronic chart information

electronic chart information manually entered by the user for presentation

EXAMPLE Navigational notes, safety zones of interest, local notices to mariners.

3.1.58

user-configured presentation

(MSC191/A) *auxiliary presentation configured by the user for a specific task-at-hand*

Note 1 to entry: *The presentation may include radar and/or electronic chart information, in combination with other navigational or ship related data.*

3.1.59**user dialogue area**

(MSC191/A) *area of the display consisting of data fields and/or menus that is allocated to the interactive presentation and entry or selection of operational parameters, data, information, text and commands mainly in alphanumeric form*

3.1.60**validity**

property of information as conforming to specified criteria, and the marking of such information as being "valid" or "invalid" (i.e. "good" or "no good") for its intended use

3.1.61**warning**

(MSC.302/A) *alert for condition requiring immediate attention, but no immediate action by the bridge team*

Note 1 to entry: *Warnings are presented for precautionary reasons to make the bridge team aware of changed conditions which are not immediately hazardous, but may become so if no action is taken.*

3.2 Abbreviated terms

DAC designated area code

FI function identifier

MID maritime identity digits

VTs vessel traffic services

4 General requirements for all displays on the bridge of a ship**4.1 Relationship to IMO standards**

(MSC191/1) IMO resolution MSC.191(79) *harmonizes the requirements for the presentation of navigation-related information on the bridge of a ship to ensure that all navigational displays adopt a consistent human machine interface philosophy and implementation.*

(MSC191/1) IMO resolution MSC.191(79) *supplements and, in the case of a conflict, takes priority over, the presentation requirements of the individual performance standards adopted by the IMO for relevant navigational systems and equipment and covers the presentation of navigation-related information by equipment for which Performance Standards have not been adopted by the IMO.*

This document supplements and, in the case of a conflict, takes priority over, the presentation requirements of the individual testing standards for relevant navigational systems and equipment and covers the presentation of navigation-related information by equipment for which testing standards are not available.

NOTE 1 Individual testing standards are, for example, standards for specific equipment published by IEC or ISO. An example of equipment without a testing standard at the time of publishing of this document is navigation lights control.

(MSC302/3.6) *In case of conflict with alert requirements of existing performance standards, the present Performance standards (MSC.302(87)) will take precedence.*

NOTE 2 In case of conflict for alert presentation related issues, the priority of IMO performance standards is from the highest MSC.302(87), MSC.252(83), MSC.191(79), after which all performance standards are equal.

(MSC191/2) IMO resolution MSC.191(79) as amended by IMO resolution MSC.466(101) *specifies the presentation of navigational information on the bridge of a ship, including the consistent use of navigational terms, abbreviations, colours and symbols, as well as other presentation characteristics.*

(MSC191/2) IMO resolution MSC.191(79) *also addresses the presentation of information related to specific navigational tasks by recognising user selected presentations in addition to presentations required by the relevant individual performance standards adopted by the IMO.*

This document further addresses the guidelines for the presentation of navigation-related symbols, terms and abbreviations in Safety of Navigation circular SN/Circ.243.

(MSC191/3) This document *is applicable to any display equipment associated with the navigational systems and equipment for which individual performance standards have been adopted by the IMO.* It addresses the stand-alone displays for radar, ECDIS, multifunction displays and composite presentations that integrate information derived from two or more systems. This document *also addresses display equipment associated with navigational systems and equipment for which individual performance standards have not been adopted by the IMO.*

(MSC191/3) *The general principles and the physical characteristics specified in Clause 4 and Clause 7, respectively, of this document are applicable to all displays on the bridge of a ship.*

Some requirements set forth in MSC.191(79) duplicate requirements set forth in other IMO documents or in the IEC standards further specifying the methods of test and required test results for those requirements (for example, IEC 60945, IEC 61174, IEC 61993-2, IEC 62388, etc.). Where this document duplicates a requirement in another standard, the method(s) of test for that requirement may refer to the other standard. Manufacturers may offer relevant test data from compliance tests to other standards as evidence of compliance with appropriate tests of this document.

AIS messages are defined in ITU-R M.1371. The IMO performance standards for Presentation and Radar use the term "AIS targets" and "reported targets" for targets received by AIS messages and use the term "AIS information" for information related to these AIS targets.

NOTE 3 The word "target" as used in "radar target", "AIS target" and "reported target" derives from the original development of radar for gunnery control.

The IMO performance standards for Integrated Navigation System (INS) refers to the following types of AIS messages:

- AIS targets;
- AIS reports of AtoNs;
- AIS safety related and binary messages;
- Application Specific Messages (ASM).

This document refers to the following types of AIS messages (see Annex K):

- AIS targets;
- AIS data reports;
- AIS locating devices;
- AIS synthetic targets;
- AIS safety related messages;
- AIS ASM.

This document uses the following terms for the concept that IMO refers to as "AIS targets" and "reported targets":

- AIS targets;
- AIS data reports;
- AIS locating devices;

- AIS synthetic targets.

IMO use the term "AIS report of AtoNs" for the concept referred to as:

- "AIS AtoNs" in this document.

NOTE Additional technical guidance on AIS ASM can be found in IMO SN.1/Circ.289.

The additional guidance on display and dialogue design in IMO MSC/Circ.982 is referenced in Annex C.

4.2 Application of IEC 60945

4.2.1 Remark

If display equipment is permitted to be monochrome, then the colour-related requirements specified in 4.5.1, 4.7.1, 4.7.2, 4.7.3 and 4.8.2 will not apply.

4.2.2 General requirements

4.2.2.1 Requirement

(MSC191/3) *In addition to the general requirements set forth in IMO Resolution A.694(17) and further specified in IEC 60945, display equipment shall meet the requirements set forth in IMO Resolution MSC.191(79) and further specified in this document, as applicable.*

4.2.2.2 Methods of test and required results

See Annex D for guidance in the application of IEC 60945 for testing.

4.3 Arrangement of information

4.3.1 Consistency of layout and logical grouping

4.3.1.1 Requirement

(MSC191/5.1.1 as amended by MSC.466) *The presentation of information shall be consistent within the user interface with respect to screen layout and arrangement of information, for example, with respect to concepts, terminology, labelling and interaction paradigms used across the application and from screen to screen and/or from page to page. Data and control functions shall be logically grouped according to their function or the task-at-hand, see Annex E. Clause E.2 defines groups of related navigational information. Priority information essential to the task-at-hand shall be identified for each application (for example, radar, ECDIS, etc.), permanently or persistently displayed, as appropriate for the application, and presented to the user in a prominent manner by, for example, use of position (for example, screen location), size and colour.*

(MSC/Circ.1609/Appendix 3/1) *Clause E.2 defines groups of related navigational information that shall be displayed together on the user interface, to enable the user to quickly locate and react to essential navigation information, if available on the screen. Logical grouping in Clause E.2 applies to radar equipment, ECDIS and minimum INS functions. Logical grouping in Clause E.2 may be applied to other electronic navigation equipment and navigation sensors where applicable, to improve standardization and usability.*

(MSC/Circ.1609/Appendix 3/2) *Clause E.2 does not specify where the groups of information should appear on the screen, or the order in which the individual information elements should be grouped. The groups of related navigational information presented on the user interface are not limited to the information listed in Clause E.2. The groups in Clause E.2 may be extended by associated information. These groupings apply to both mandatory and non-mandatory information. Within an individual group, it is not required to display all information, only to group it, if displayed.*

4.3.1.2 Methods of test and required results

The methods of test and the required results are as follows:

- a) confirm by analytical evaluation that the arrangement, logical grouping, operation and identification of controls, screen displays and indications are in accordance with Annex E and IEC 60945:2002, 4.2.1.2 through 4.2.1.5;
- b) confirm by analytical evaluation that the concepts, terminology, labelling and interaction paradigms, screen layout and arrangement of information is consistent from screen to screen and/or page to page;
- c) confirm by analytical evaluation that priority information essential to the task-at-hand is identified and permanently or persistently displayed in a prominent manner, as appropriate, for each application.

4.3.2 Consistent presentation of information

4.3.2.1 Requirement

(MSC191/5.1.2) *The presentation of information shall be consistent with respect to:*

- numerical *values* (for example, position, speed, distance, time, etc.);
- *units*;
- *meaning* of information (for example, using the terms and abbreviations in Annex B);
- *sources* of information (for example, using the terms and abbreviations in Annex B);
- *validity* of information (see also 4.8.1 and 4.8.2); and
- *integrity* of information, if available (see also 4.8.1 and 4.8.2).

(See also IEC 60945:2002, 4.2.1.5)

4.3.2.2 Methods of test and required results

Confirm by observation that numerical values and their units, the meaning and source(s) of information, and the validity and integrity of information are presented in a consistent manner.

4.3.3 Separation of operational display area

4.3.3.1 Requirement

(MSC191/5.1.3) *The presentation of information shall be clearly separated into one or more operational display areas (for example radar, chart) and one or more user dialogue areas (for example, menus, data, control functions).*

4.3.3.2 Methods of test and required results

Confirm by observation that the presentation is clearly separated into one or more operational display areas and one or more user dialogue areas.

4.4 Readability

4.4.1 Readability under all ambient light conditions

4.4.1.1 Requirement

(MSC191/5.2.1) *The presentation of alphanumeric data, text, symbols and other graphical information (for example, chart information, radar echoes or a radar video image, etc.) shall support readability from typical user positions (i.e. with respect to reading distance) under all ambient light conditions likely to be experienced on the bridge of a ship (for example, day, dusk and night), and with due consideration to the night vision of the officer of the watch. (See also 4.5.1 and 7.2.1)*

Table 1 characterizes light levels for the ambient light conditions day, dusk and night.

Table 1 – Ambient light conditions

Ambient condition	Light level
Day	200 cd/m ² ± 50 %
Dusk	10 cd/m ² ± 50 %
Night	Darkness (i.e. where the display is the predominant light source)
NOTE 1 Natural daylight is preferred for the day and dusk conditions.	
NOTE 2 The adjustment of the appropriate ambient light conditions for calibrated monitors, for example to display charted information, is described in G.1.3 d).	

NOTE 1 It is possible the white background used in the "Day" colour table provided in the IHO ECDIS Presentation Library does not support readability under all light conditions and is a risk to safety of navigation for some navigational systems and equipment, including radar. Readability can be achieved by using the black background in the "Dusk" or "Night" colour tables provided in the IHO ECDIS Presentation Library and adjusting brightness and contrast, if provided, for use under all light conditions.

Display equipment shall provide a luminance of at least 85 cd/m² measured at the centre of the display when set to the maximum brightness setting. The white luminance level of the display shall be adjustable down to 1 cd/m² ± 20 % and may be extinguishable below that point.

If provided, dimming below 0,8 cd/m² as white level shall continue to ensure readability of alerts (alarms, warnings and cautions) while readability of all other items is not required.

NOTE 2 General requirements for illumination are described in IEC 60945.

Transflective and reflective displays shall provide adjustable self-illumination suitable for all ambient light conditions likely to be experienced on the bridge of a ship (day, dusk and night) and with due consideration to the night vision of the officer of the watch. It shall be adjustable to produce display luminance at least from 1 cd/m² to 5 cd/m² under night conditions.

The luminance across the operational display area shall not have a variance of more than 30 % from the brightest point to the dimmest point.

NOTE 3 Variance is determined by the equation:

$$1 - \left(\frac{L_{\min}}{L_{\max}} \right)$$

where

$L_{\min}$ is the minimum luminance;

$L_{\max}$ is the maximum luminance measured across the operational display area, or the entire screen depending on the application.

It shall be possible to display alphanumeric data, text, symbols (see 4.6) and other graphical information using a lighter foreground (for instance character, symbol, etc.) against a dark background of high contrast, emitting as little light as possible at night. The brightest elements of the presentation shall be restricted to points and thin lines.

If display equipment is intended to present symbols for charted information (see 4.6.2), it shall provide a means or method for the user to verify that the colour black is visually distinguishable against a background set to dark grey and vice-versa.

NOTE 4 The IHO ECDIS Presentation Library provides "black-adjust" symbols BKAJ1 and BKAJ2, for the colours black and grey, respectively.

If display equipment is not intended to present symbols for charted information (see 4.6.2), it shall maintain that any colours used are visually distinguishable against the background.

NOTE 5 Visually distinguishable is at least luminance ratio 1:2 when using instrumental verification.

It is important to avoid affecting the night vision of the officer of the watch by excessive glow from displays on the bridge at night. The display shall be capable of providing a contrast of 100:1 between the 1 cd/m² white level and the black background.

NOTE 6 The white level can be created using a standardized method (i.e. RGB values or the CIE 1931 colour coordinates (x, y and L) for white) specified by the manufacturer or, if no manufacturer specification is available, using the RGB values 255, 255, 255.

4.4.1.2 Methods of test and required results

Set up the display equipment for measurements of luminance, contrast and colour according to the guidelines of IEC 61966-4 or the VESA Flat Panel Display Measurement (FPDM), see VESA-2001-6. Before measurements are taken, power up the display equipment and allow it to stabilize for the period of time specified by the manufacturer, as follows.

- a) Confirm by observation at the manufacturer's recommended viewing distance that alphanumeric data, text, symbols and other graphical information including alerts are readable under the ambient light conditions described in Table 1.
- b) For direct view displays (for example CRT (cathode ray tube), LCD (liquid crystal display) with backlight, etc.), confirm by measurement using a test image with a white square at the centre of the operational display area (to be provided by the manufacturer) that the brightness can be varied from a minimum level of at most 1 cd/m² ± 20 % to a maximum level of at least 85 cd/m² measured under dark condition. Confirm by measurement that the values for brightness used for the setup are stable after the stabilisation period defined by the manufacturer. Confirm by measurement in the night ambient condition that the contrast ratio between the 1 cd/m² white level and the black background is 100:1, minimum.
- c) For transfective and reflective displays, confirm by measurement using a test image with a white square at the centre of the operational display area (to be provided by the manufacturer) that the brightness can be adjustable at least from 1 cd/m² to 5 cd/m² under conditions of night ambient illumination to a maximum level of at least 85 cd/m² under conditions of daylight ambient illumination. Confirm by measurement that the values for brightness used for the setup are stable after the stabilisation period defined by the manufacturer. Confirm by measurement in the night ambient condition that the contrast ratio between the 1 cd/m² white level and the black background is 100:1, minimum. The ambient illumination levels shall be as specified in Table 1.

NOTE This test image is not generated internally by the display equipment.

- d) Confirm by observation that alphanumeric data, text, symbols and other graphical information including alerts can be presented using a lighter foreground against a dark background.
- e) Confirm by measurement that, when the display equipment is set to maximum brightness, the luminance does not vary across the operational display area by more than 30 % from the brightest point to the dimmest point.
- f) Confirm by observation that the brightest elements of the presentation in the night ambient light condition described in Table 1 are points and thin lines.
- g) Where display equipment is intended to present symbols for charted information, confirm by observation for each ambient light condition that the user can verify that the colour black is visually distinguishable against a background set to dark grey, and vice-versa.
- h) Where display equipment is not intended to present symbols for charted information, confirm by observation for each ambient light condition that any colours used are visually distinguishable against background.

- i) If dimming below 0,8 cd/m² as white level is provided, then confirm by observation after 10 min adaptation period to night ambient light condition by the observer that at least the alerts (alarms, warnings, cautions) are readable and different alert levels are distinguishable from each other.

4.4.2 Legibility of alphanumeric data and text

4.4.2.1 Requirement

(MSC191/5.2.2) *Alphanumeric data and text shall be presented using a clearly legible non-italic, sans-serif font. The font size shall be appropriate for the viewing distance from user positions (i.e. with respect to reading distance and viewing angles) likely to be experienced on the bridge of a ship.*

The character height in millimetres shall be not less than 3,5 times the nominal viewing distance in metres. The manufacturer's documentation shall identify the nominal viewing distance for the display equipment.

4.4.2.2 Methods of test and required results

The methods of test and the required results are as follows:

- a) confirm by observation that alphanumeric data and text is presented using non-italic, sans-serif font;
- b) confirm by measurement that the character height (i.e. the distance between the top and bottom edges of the smallest capital letter used in the presentation) in millimetres is not less than 3,5 times the nominal viewing distance in metres;
- c) confirm by inspection of manufacturer's documentation that the nominal viewing distance for the display equipment is identified in the manufacturer's documentation.

4.4.3 Presentation of text and icons

4.4.3.1 Requirement

(MSC191/5.2.3 as amended by MSC.466) *Text shall be presented using simple unambiguous language that is easy to understand (for example, standard marine terminology or text that provides clear meaning by its context). Navigational terms and abbreviations shall be presented using the nomenclature set forth in Annex B and Clause E.3.*

(MSC191/5.2.4 as amended by MSC.466) *When icons are used, their purpose shall be intuitively recognized by appearance, placement, and grouping as defined in Clause E.3.*

Circ.1609/Appendix 2 and Clause E.3 identify commonly-used functions on navigation equipment and for each function specifies the associated terminology, abbreviation and (where appropriate) icons to achieve consistency of presentation across navigation equipment.

For the functions listed in Clause E.3, the following applies.

- a) (Circ.1609/Appendix 2/2) *Where icons, terms and/or abbreviations are used, they shall meet the requirements of Clause E.3. Where a standard term, abbreviation, or icon is not available, another icon, term or abbreviation may be used, but these shall not conflict with those listed in Clause E.3.*
- b) (Circ.1609/Appendix 2/3) *The icons specified may indicate a status, may execute a specific function (hot key), or may provide access to a group of related functions (shortcut).*
- c) (Circ.1609/Appendix 2/4) *Only the shape of the icon is specified; Clause E.3 does not specify a colour scheme for icons, except for the icons depicted in colour in Table E.6 which shall follow the IHO colour scheme or similar.*

- d) (Circ.1609/Appendix 2/5) *Where appropriate and practical, a brief explanation of the purpose of an icon shall be easily obtainable by the user. This functionality shall be able to be turned off easily by the user.*

Icons used for the presentation of alerts shall be presented according to Annex F.

4.4.3.2 Methods of test and required results

The methods of test and the required results for text are as follows:

- a) confirm by analytical evaluation that text is presented using simple unambiguous language;
- b) confirm by observation that navigational terms and abbreviations are presented using the nomenclature in Annex B and in Clause E.3;
- c) confirm by inspection of documented evidence that other terminology or abbreviations, if used, are explained in the operator's manual and do not conflict with those listed in Clause E.3.

The methods of test and the required results for icons are as follows:

- d) for icons not specified in Clause E.3 or Annex F, confirm by analytical evaluation that icons and their purpose can be intuitively recognized by appearance, placement, and grouping and that these icons do not conflict with those in Clause E.3;
- e) confirm by observation that shape of icons used for data and control function are presented according to Clause E.3;
- f) confirm by observation that colours of icons specified in Table E.6 follows the IHO colour scheme or similar;
- g) confirm by observation that icons used for the presentation of alerts are presented according to Annex F (see also 5.6.1.2).

4.5 Colours and intensity

4.5.1 Discrimination of colours – Requirement

(MSC191/5.3.1) *The colours used for the presentation of alphanumeric data, text, symbols and other graphical information shall provide sufficient contrast for discrimination and identification against the background under all ambient light conditions likely to be experienced on the bridge of a ship (for example, day, dusk and night) and with due consideration to the night vision of the officer of the watch.*

(MSC191/5.3.2) *The colours and brightness shall take into account the ambient light conditions of day, dusk and night. The presentation shall support night viewing by showing lighter foreground information on a dark non-reflecting background.*

(MSC191/5.3.3) *The background colour and contrast shall be chosen to allow displayed information to be easily discriminated without degrading the colour coding aspects of the presentation.*

Display equipment may use a range of tones of basic colours, provided they are identifiable and visually distinguishable from each other. Colours used for the presentation of information in the user dialogue areas shall not detract from the presentation of information in the operational display area.

If display equipment is intended to present symbols for charted information, it shall use colours that comply with or are based upon the colours specified in the relevant IHO standards, for example the IHO ECDIS Presentation Library in IHO S-52 and its Appendices, or an equivalent set of colour tables, as far as practical.

NOTE It is possible the white background used in the "Day" colour table provided in the IHO ECDIS Presentation Library does not support readability under all light conditions and is a risk to safety of navigation for some navigational systems and equipment, including radar. Readability can be achieved by using the black background in the "Dusk" or "Night" colour tables provided in the IHO ECDIS Presentation Library and adjusting brightness and contrast, if provided, for use under all light conditions.

4.5.2 Methods of test and required results

The person conducting this test shall have passed the minimum colour vision and acuity tests required for users by IMO STCW Code Part B and have adapted to night viewing for 10 min before checking the night display.

- a) Confirm by observation that the colours used for the presentation of alphanumeric data, text, symbols and other graphical information provide sufficient contrast for identification and discrimination against the background under the ambient light conditions described in Table 1.
- b) Confirm by observation that the colours used for the presentation of alphanumeric data, text, symbols and other graphical information support night viewing by showing lighter foreground information on a dark non-reflecting background.
- c) Confirm by observation that the colours used for the presentation of alphanumeric data, text, symbols and other graphical information are identifiable and visually distinguishable from each other.
- d) Confirm by observation that the colours used in the user dialogue areas do not detract from the presentation of information in the operational display area.
- e) Where display equipment is intended to present symbols for charted information, confirm by analytical evaluation that the colours used conform to the IHO specified colours in the IHO S-52 ECDIS Presentation Library, or equivalent, as far as practical (see Clause G.1 for additional guidance).

4.6 Symbols

4.6.1 Operational information

4.6.1.1 Requirement

(MSC191/5.4.1) *Symbols used for the presentation of operational information other than chart information shall comply with or be based upon the symbols set forth in Annex A.*

(SN-Circ.243/1/3) *Where a standard symbol is not available, another symbol may be used, but this symbol shall not conflict with the symbols listed in Annex A or in the IHO S-52 ECDIS presentation library. (For additional guidance, see also ISO 80416-4.)*

Colours used for the presentation of operational information shall be discriminated from the colours used for the presentation of the radar image, target trails, additional processed radar information and electronic chart information.

For symbols for which the size is not specified by this document, the following applies: A symbol shall subtend at least 5 mm/m (17 min of arc) at the nominal viewing distance. Where accurate colour identification of a symbol is required by an individual equipment standard, then, in the absence of size requirements in that standard, the symbol shall subtend at least 8,7 mm/m (30 min of arc) at the nominal viewing distance. The use of spectrally extreme blue ($v' < 0,2$) shall be avoided for images subtending less than 35 mm/m (2° of arc) of viewing distance.

Annex A specifies standardized symbols including the size at a viewing distance of 1 m. Where the manufacturer declares a different viewing distance, the symbol size shall be measured according to the ratio to a viewing distance (e.g. a symbol of 5 mm at 1 m viewing distance shall be 7,5 mm if the declared viewing distance is 1,5 m).

4.6.1.2 Methods of test and required results

The methods of test and the required results are as follows:

- a) confirm by inspection of documented evidence that the symbols used to present operational information are presented in accordance with Annex A;
- b) confirm by measurement that the largest dimension of the symbol is at least 5 mm/m (17 min of arc) at the nominal viewing distance, and includes at least 16 pixels;
- c) where accurate colour identification is required for a symbol, confirm by measurement that the largest dimension of the symbol is at least 8,7 mm/m (30 min of arc) at the nominal viewing distance, and includes at least 29 pixels;

4.6.2 Electronic chart information

4.6.2.1 Requirement

(MSC191/5.4.2) *Symbols used for the presentation of charted information shall comply with relevant IHO standard*, for example, the IHO ECDIS Presentation Library in IHO S-52 and its Appendices, or an equivalent symbol set, as far as practical.

NOTE It is possible some symbols provided in the IHO ECDIS Presentation Library are not suitable for the display of electronic chart information on radar or in a composite presentation based upon radar. IHO S-52 and its Appendices allow minor deviations to symbology. It provides a framework and guidelines for chart symbolization from which manufacturers can derive a customized symbol set.

If symbols that deviate from the IHO S-52 ECDIS Presentation Library are used for the presentation of any chart information, then they shall:

- be legible;
- be certain and unambiguous in their meaning;
- be of sufficient size to support the nominal viewing distance (see also 4.4.2);
- have the same general shape as IHO S-52 ECDIS Presentation Library symbols used for the same or similar purpose(s).

Symbols added to the ECDIS Presentation Library shall not be confused with IHO S-52 ECDIS Presentation Library symbols.

4.6.2.2 Methods of test and required results

The methods of test and the required results are as follows:

- a) confirm by inspection of documented evidence that the symbols used to present charted information are presented in accordance with relevant IHO standards, for example IHO S-52 and its Appendices;
- b) where symbols deviate from the IHO S-52 ECDIS Presentation Library, confirm by observation that they:
 - 1) are legible;
 - 2) are certain and unambiguous in their meaning;
 - 3) are of sufficient size to support the nominal viewing distance;
 - 4) have the same general shape as IHO S-52 ECDIS Presentation Library symbols used for the same or similar purposes;
- c) confirm by observation that symbols added to the ECDIS Presentation Library cannot be confused with IHO S-52 ECDIS Presentation Library symbols.

4.7 Colour coding

4.7.1 Colour coding for discrimination

4.7.1.1 Requirement

(MSC191/5.5.1) If *colour coding is used for discrimination or conspicuousness of alphanumeric text, symbols and other graphical information all colours in each colour table shall clearly differ from one another* (see also 4.5.1).

4.7.1.2 Methods of test and required results

Confirm by observation that the colours within each colour table clearly differ from one another.

4.7.2 Colour coding of information

4.7.2.1 Requirement

(MSC191/5.5.2) If *colour coding is used*, then *the colour red shall be used for the coding of alert related information* for alarm and emergency alarm conditions unless otherwise specified by the IMO (for example in Tables 7.1.1 and 7.1.2 of the IMO A.1021(26) Code on Alerts and Indications).

If colour coding is used and if the colour red is used for other purposes than for the coding of alert related information for alarm and emergency alarm conditions, its purpose (e.g. for the indication of port vs starboard, colour of a buoy, colour of a light, etc.) shall be sufficiently clear.

4.7.2.2 Methods of test and required results

If colour coding is used, confirm by inspection of documented evidence or by observation that the colour red is used to indicate an alarm or emergency alarm condition unless otherwise specified by the IMO or unless the purpose is sufficiently clear.

4.7.3 Colour coding in combination with other attributes

4.7.3.1 Requirement

(MSC191/5.5.3). If *colour coding is used it shall be used in combination with other symbol attributes, such as size, shape and orientation*.

A specific implementation shall not rely solely on a single saturated colour. If the display equipment technology relies on the separate transmission of primary colours, the presentation of alerts shall be visible and identifiable even after the failure of any one primary colour input to the display.

4.7.3.2 Methods of test and required results

The methods of test and the required results are as follows:

- a) confirm by inspection of documented evidence or by observation that the colour coding is always combined with another symbol attribute;
- b) where the display equipment technology relies on the separate transmission of primary colours, confirm by observation that alerts remain identifiable even after transmission of each of the primary colours is disabled one at a time.

4.7.4 Flashing of information

4.7.4.1 Requirement

(MSC191/5.5.4) *Flashing of information shall be reserved for indicating the state of unacknowledged alerts*.

4.7.4.2 Methods of test and required results

Confirm by observation that flashing of information is only used for unacknowledged alerts.

4.8 Integrity marking

4.8.1 Indication of source, validity and integrity status

4.8.1.1 Requirement

(MSC191/5.6.1) *The source, validity, and where possible, the integrity of information shall be indicated. Invalid information or information with low integrity shall be clearly marked qualitatively and/or quantitatively (see important indication). Invalid information or information with low integrity may be quantitatively indicated by displaying absolute or percentage values.*

4.8.1.2 Methods of test and required results

The methods of test and the required results are as follows:

- a) confirm by observation that the source of information can be indicated;
- b) confirm by observation that the validity of information is indicated;
- c) confirm by observation that the integrity of information is indicated, where available. Where integrity is indicated quantitatively, confirm by observation that either absolute values or percentage values are displayed.

4.8.2 Colour coding of validity and integrity

4.8.2.1 Requirement

(MSC191/5.6.2) *If colour coding is used, then information with low or doubtful integrity shall be qualitatively marked by using the colour as defined in Table 2, and invalid information shall be qualitatively marked by using the colour as defined in Table 2.*

4.8.2.2 Methods of test and required results

If colour coding is used, the methods of test and the required results are as follows:

- a) confirm by observation that the colour as defined in Table 2 is used to indicate information with low or doubtful integrity;
- b) confirm by observation that the colour as defined in Table 2 is used to indicate invalid information.

4.8.3 Indication of presentation failure

4.8.3.1 Requirement

(MSC191/5.6.3) *In many cases, information on the display does not change frequently enough to make presentation failure immediately obvious to the user. In order to show that the screen is being refreshed, a means or method shall be provided to immediately make the user aware of a presentation failure on an operational display (for example, "picture freeze").*

A conspicuous periodically time-varying element shall be provided as a prominent indication of normal screen refresh (for example two alternating dots, etc.).

4.8.3.2 Methods of test and required results

Confirm by observation that a conspicuous periodically time-varying indication is provided in all presentation modes.

4.9 Alerts and indications

4.9.1 Operational status

4.9.1.1 Requirement

(MSC191/5.7.1) *The operational status of information (indications) shall be indicated as in Table 2 unless otherwise specified by the IMO (for example in Tables 7.1.1 and 7.1.2 of the Code on Alerts and Indications, 2009).*

For alerts, the equipment shall comply with IEC 62923-1.

Table 2 – Operational status of indications

Status	Visual indication	Audible signal
<i>Invalid information</i>	<i>Red</i>	<i>Silence</i>
<i>Information with low integrity</i>	<i>Yellow</i>	<i>Silence</i>
<i>Important Indications</i>	<i>Yellow</i>	<i>Silence</i>
<i>Indication</i>	<i>No special requirement</i>	<i>Silence</i>
<i>Normal state</i>	<i>Optionally green</i>	<i>Silence</i>

4.9.1.2 Method of test and required results

Confirm by inspection of documented evidence that indications are presented in accordance with Table 2 unless otherwise specified by the IMO and that the equipment complies with IEC 62923-1.

4.9.2 List of alerts

See IEC 62923-1 for the requirements and tests regarding the list of active alerts.

NOTE Resolution MSC.302 and derived IEC 62923-1 have superseded the requirement: (MSC191/5.7.2).

4.9.3 Alert related information from multiple sources

See IEC 62923-1 for the requirements and tests.

NOTE Resolution MSC.302 and derived IEC 62923-1 have superseded the requirement: (MSC191/5.7.3).

4.9.4 Speech output for alarms and warnings

See IEC 62923-1 for the requirements and tests.

4.10 Presentation mode

4.10.1 Requirement

(MSC191/5.8) *If displays are capable of presenting information in different modes, then there shall be a clear indication of the modes in use, for example:*

- *orientation* (north-up, course-up, head-up);
- *stabilisation* (ground-stabilised, sea-stabilised);
- *motion* (true, relative); *and*
- *chart projection* (Mercator, gnomonic, etc.).

The indication of chart projection is only required when electronic chart information is presented. It can be provided to the user on request.

4.10.2 Methods of test and required results

Confirm by observation that the presentation modes in use are clearly indicated.

4.11 User manuals, instructions and reference guides

4.11.1 Requirement

(MSC191/5.9) *The user manual and instructions and reference guides shall be available in the English language at least. The user manual or reference guide shall include a list of all terms, abbreviations, symbols, icons and their explanations presented by the equipment. (See also Annex A, Annex B and Annex E.)*

4.11.2 Methods of test and required results

The methods of test and the required results are as follows:

- a) confirm by observation that user manual, instructions and reference guide are available in the English language;
- b) confirm by inspection of documented evidence that the user manual and/or reference guide includes a list of all terms, abbreviations, symbols, icons and their explanations used by the system.

5 Presentation of operational information

5.1 Application

The provisions of Clause 5 are applicable to displays on the bridge of a ship that provide functionality as described in 5.2 to 5.20.

5.2 Presentation of own ship information

5.2.1 Graphical representation of own ship – Requirement

(MSC191/6.1.1) *When a graphical representation of own ship is provided, it shall be possible for the user to select either a true scaled ship's outline or a simplified symbol as set forth in Annex A. The size (length) of the ship's true scaled outline or the simplified symbol in the graphical presentation shall be the true scale size of the ship or 6 mm, at a nominal viewing distance of 1 m, whichever is greater.*

The manufacturer should adjust the symbol sizes to properly account for the nominal viewing distance of the display equipment.

Display equipment may (unless stipulated as mandatory in an equipment standard) provide the capability to automatically switch from the ship's true scaled outline to the simplified symbol when the beam of own ship's true scale outline is less than 3 mm at the nominal viewing distance, and vice versa. The true scaled outline shall not be used when the heading is not known in a gyro/THD-stabilized mode. The user shall always have the capability to select the simplified symbol in lieu of the scaled ship's outline.

(MSC191/6.1.2) *A heading line, and where appropriate a velocity vector, shall be associated with own ship symbol and shall originate at the position of the consistent common reference point (CCRP) as set forth in Annex A.*

The combination of the heading line and beam line (the minimised symbol) may be used as an alternative to the simplified symbol and may be selectable as such. Display equipment may provide the capability to automatically switch from the ship's true scaled outline to the heading and beam line when the beam of own ship's true scale outline is less than 3 mm at the nominal viewing distance, and vice versa.

5.2.2 Methods of test and required results

Where display equipment provides a graphical representation of own ship:

- a) confirm by observation that the system provides a ship's true scaled outline and a simplified symbol in accordance with Annex A;
- b) confirm by observation that the display equipment provides the user with the capability to select the representation of own ship as either the ship's true scaled outline or the simplified symbol;
- c) confirm by measurement that the size of the ship's outline is correct for the scale of the display;
- d) confirm by observation that the simplified symbol is automatically selected when the beam of the ship's true scaled outline is less than 3 mm, and vice versa;
- e) confirm by observation that the display equipment provides a heading line in accordance with Annex A;
- f) confirm by observation that the display equipment provides a velocity vector in accordance with Annex A.

Note that the minimised symbol may be used as alternative to the simplified symbol.

5.3 Presentation of chart information

5.3.1 Alteration of chart information

5.3.1.1 Requirement

It shall not be possible to alter the electronic chart information, except by update.

5.3.1.2 Methods of test and required results

Confirm by observation that it is not possible to alter the electronic chart information.

5.3.2 Colours and symbols for charted information

5.3.2.1 Requirement

(MSC191/6.2.1) *The presentation of official electronic charted information that is issued by, or on the authority of a government authorized hydrographic office, or other relevant government institution or agency (for example, ENC), shall comply with the relevant IHO standards, for example, colours and symbols specified for the IHO ECDIS Presentation Library in IHO S-52 and its Appendices, or an equivalent colour and symbol set, as far as is practicable.*

(MSC191/6.2.2) *The presentation of proprietary electronic chart information shall comply with relevant IHO standards, as far as practical, for example, be based upon the colours and symbols specified for the IHO ECDIS Presentation Library in IHO S-52 and its Appendices, or an equivalent colour and symbol set. There shall be a clear indication when the presentation is not in accordance with IHO standards.*

(MSC191/6.2.3) *The presentation of user-added electronic chart information shall comply with the relevant IHO standards, as far as practical, for example, be based upon the colours and symbols specified for the IHO ECDIS Presentation Library in IHO S-52 and its Appendices, or an equivalent colour and symbol set.*

NOTE It is possible some colours and symbols provided in the IHO ECDIS Presentation Library or otherwise specified by IHO in S-52 and its Appendices are not suitable for the display of electronic chart information on radar or in a composite presentation based upon radar. IHO S-52 and its Appendices allow minor deviations to symbology. It provides a framework and guidelines for chart symbolization from which manufacturers can derive a customized symbol set.

(MSC191/6.2.4) *If electronic chart information derived from different scales appears in the presentation, the scale boundary shall be clearly indicated as defined in the relevant IHO standards, for example, IHO ECDIS Presentation Library in IHO S-52 and its Appendices.*

5.3.2.2 Methods of test and required results

The methods of test and the required results are as follows:

- a) confirm by observation that the presentation of official and user-added electronic charted information, as applicable, is in accordance with 5.3.2.1 and 4.5.1;
- b) confirm by observation that the presentation of proprietary electronic charted information, as applicable, is either in accordance with 5.3.2.1 and 4.5.1 or that an indication is provided;
- c) when electronic chart information derived from different scales (for example, adjacent ENC cells) is displayed, confirm by observation that a scale boundary is presented between the scales.

5.4 Presentation of radar information

5.4.1 Radar video images

5.4.1.1 Requirement

(MSC191/6.3.1) *Radar video images shall be displayed by using a basic colour that provides optimum contrast. Radar echoes shall be clearly visible when presented on top of a chart background. The relative strength of radar echoes may be differentiated by tones of the same basic colour. The colours may be different for operation under different ambient light conditions (day, dusk and night) likely to be experienced on the bridge of a ship, and with due consideration to the night vision of the officer of the watch.*

Additional processed radar information that is not a part of the radar video image may be discriminated from the radar video by tones of the basic colour used to present the image. Alternatively, it may be differentiated by tones of other basic colours.

For radar displays, a dark non-reflecting background shall be used. The colour used for the radar image shall provide contrast against the background and shall be clearly visible when presented over a chart background.

NOTE 1 It is possible the "Day" table based on a white background included in the colour tables specified by IHO and provided in IHO ECDIS Presentation Library does not support readability under daylight conditions and can be a risk to safety of navigation for some navigational systems and equipment, including radar. Readability under daylight conditions can be achieved by using the black background in the "Dusk" or "Night" colour tables provided in IHO ECDIS Presentation Library and adjusting brightness and contrast, if provided.

If the colour red is used for the radar video image, then it shall be distinguishable from other uses of the colour red, for example, alarms including dangerous targets.

If electronic chart information overlays radar information (i.e. a radar video image), or a radar image overlays chart information, then the overlay may be displayed as transparent or opaque. If a transparent overlay is used, then it may be variable so that the underlying information is visible through the overlay. If an opaque chart overlay is used, then the colour fill of area objects shall be excluded. Optionally, the colour fill of point objects may also be excluded. In either case, the background of the radar image shall be the same basic colour as the chart's water surfaces.

NOTE 2 If display equipment provides facilities for the overlay of radar information that are independent of a shipborne radar system (for example, by a separate radar scan converter), then the facilities are described in the relevant clauses of IEC 62388.

5.4.1.2 Methods of test and required results

The methods of test and the required results are as follows:

- a) confirm by observation, under each of the ambient light conditions described in Table 1, that radar information is presented using a contrasting colour against the background and that the background shall be dark for radar displays;
- b) confirm by observation that radar information is clearly visible when presented on top of a chart background for the ambient light conditions described in Table 1;
- c) if the colour red is used for the radar video image, confirm by observation that it is distinguishable from other uses of the colour red, for example, alarms including dangerous targets.

5.4.2 Target trails

5.4.2.1 Requirement

(MSC191/6.3.2) If display equipment provides *target trails*, then they shall be *distinguishable from radar echoes and clearly visible under all ambient light conditions* (day, dusk and night) likely to be experienced on the bridge of a ship, and with due consideration to the night vision of the officer of the watch. Target trails may be differentiated by tones of the basic colour used for the radar video image. Alternatively, they may be distinguished by tones of another basic colour.

If display equipment provides target trails, then there shall be an indication of trail time and motion stabilisation *mode*.

5.4.2.2 Methods of test and required results

Where target trails are provided:

- a) confirm by observation that they are distinguishable from radar echoes and clearly visible under the ambient light conditions described in Table 1;
- b) confirm by observation that the trail time and motion stabilization mode are indicated.

5.5 Presentation of target information

5.5.1 Providing target information

5.5.1.1 Requirement

(MSC191/6.4.1.1) *Target information may be provided by a radar target tracking system and/or by the AIS.*

A radar target tracking system detects and tracks radar targets. Other navigational systems may provide remote presentation of tracked radar targets. These systems shall present reported radar targets in accordance with Annex A.

NOTE If display equipment provides facilities for radar target detection and tracking that are independent of a shipborne radar system, then the facilities are described in the relevant clauses of IEC 62388.

Any navigational system or equipment may provide remote presentation of reported AIS targets. These systems shall present reported AIS targets in accordance with Annex A.

Navigational system or equipment may receive information of AIS targets via an interface from a radar and receive information of AIS targets from an AIS. AIS target information from these sources shall be combined using the MMSI of each AIS target to avoid duplication of AIS targets.

NOTE Radar can report AIS targets using TTD and TLB sentence. The MMSI value included in the TLB sentence is the basis for the combination process of both radar and AIS as sources of AIS targets.

An AIS target may be repeated (see 5.5.4.1). In such case, the presentation shall be as for reported AIS target in accordance with Annex A.

5.5.1.2 Methods of test and required results

The methods of test and the required results are as follows:

- a) where display equipment provides the capability to connect to a radar target tracking system, confirm by observation that the presentation is in accordance with Annex A;
- b) where display equipment provides the capability to connect to an AIS: confirm by observation that the presentation is in accordance with Annex A;
- c) where display equipment provides the possibility to receive AIS targets both via an interface from a radar and from an AIS, use a radar simulation arrangement and an AIS simulator to provide AIS target information from both sources and confirm by observation that AIS target information has been combined from both sources to avoid duplication of AIS targets.

5.5.2 Consistent user interface for target information

5.5.2.1 Requirement

(MSC191/6.4.1.3) *As far as practical, the user interface and data format for operating and presenting tracked radar target information and reported AIS target information shall be consistent.*

5.5.2.2 Methods of test and required results

Confirm by observation that the presentation of tracked radar target information and reported AIS target information is consistent.

5.5.3 Indication of exceeding target capacity

5.5.3.1 Requirement

(MSC191/6.4.2.1) *There shall be an indication when the target tracking and/or reported target processing/display capacity is about to be exceeded unless otherwise specified in individual equipment standards (for example as a caution).*

(MSC191/6.4.2.2) *There shall be an indication when the target tracking and/or reported target processing/display capacity have been exceeded unless otherwise specified in individual equipment standards (for example as a warning).*

Target tracking means the capability of a target tracking system to track targets. Reported targets means targets reported by AIS. The manufacturer shall declare the processing and display capacity of the equipment separately for tracked and reported targets (i.e. 4 values of capacity).

NOTE A definition of minimum target capacities is given in IEC 62388.

Processing capacity means the number of targets that it is possible to process simultaneously by the equipment. Display capacity means the number of targets that it is possible to display at same time. Processing capacity may be higher than display capacity. If the manufacturer declared processing capacity is higher than the manufacturer declared display capacity, there shall be separate indications, or alerts, if specified by individual equipment standards, for exceeding the display and processing capacities.

NOTE Equipment can provide functionality to select or filter displayed targets. This can lead to a situation in which processing capacity is about to be exceeded or exceeded while the display capacity is not.

The user manual shall describe the operational consequences of the processing and displaying of current and new targets in the event that the capacity for processing or displaying has been reached and further targets occur.

5.5.3.2 Methods of test and required results

Confirm by inspection of manufacturer documentation that the processing and display capacity of the equipment are declared separately for tracked and reported targets (i.e. 4 values of capacity).

Then there are two methods of test depending on the capability of the equipment.

a) Where display equipment provides the capability to connect to a radar target tracking system:

- 1) confirm by observation that it provides an indication, or an alert (e.g. a caution) if specified by an individual equipment standard, that the tracked radar target display capacity is about to be exceeded, for example, when the number of tracked radar targets presented exceeds 95 % of the display capacity;
- 2) confirm by observation that it provides an indication, or an alert (e.g. a warning) if specified by an individual equipment standard, that the tracked radar target display capacity has been exceeded when the number of tracked radar targets presented exceeds 100 % of the display capacity;
- 3) if processing capacity is higher than display capacity, confirm by observation that it provides an indication, or an alert (e.g. a caution) if specified by an individual equipment standard, that the tracked radar target processing capacity is about to be exceeded, for example, when the number of tracked radar targets processed exceeds 95 % of the processing capacity;
- 4) if processing capacity is higher than display capacity, confirm by observation that it provides an indication, or an alert (e.g. a warning) if specified by an individual equipment standard, that the tracked radar target processing capacity has been exceeded when the number of tracked radar targets processed exceeds 100 % of the processing capacity.

b) Where display equipment provides the capability to connect to an AIS:

- 1) confirm by observation that it provides an indication, or an alert (e.g. a caution) if specified by an individual equipment standard, that the reported AIS target display capacity is about to be exceeded, for example, when the number of reported AIS targets presented exceeds 95 % of the display capacity;
- 2) confirm by observation that it provides an indication, or an alert (e.g. a warning) if specified by an individual equipment standard, that the reported AIS target display capacity has been exceeded when the number of reported AIS targets presented exceeds 100 % of the display capacity;
- 3) if processing capacity is higher than display capacity, confirm by observation that it provides an indication, or an alert (e.g. a caution) if specified by an individual equipment standard, that the reported AIS target processing capacity is about to be exceeded, for example, when the number of reported AIS targets processed exceeds 95 % of the processing capacity;
- 4) if processing capacity is higher than display capacity, confirm by observation that it provides an indication, or an alert (e.g. a warning) if specified by an individual equipment standard, that the reported AIS target processing capacity has been exceeded when the number of reported AIS targets processed exceeds 100 % of the processing capacity.

Confirm by inspection of the user manual that it contains a description of the operational consequences of the processing and display of current and new targets in the event that the capacity for processing or displaying has been reached and further targets occur.

5.5.4 Presentation of repeated AIS reports

5.5.4.1 Requirement

AIS Base Stations and AIS Repeater Stations may repeat AIS information and target reports with a lower update rate than transmitted from the sending vessel and with latency that is significant and variable.

If both repeated and direct AIS reports are received for the same target, the repeated reports shall not be processed for display of the AIS target or related information.

If multiple repeated AIS reports are received for the same target, only the report with the lowest repeat count shall be processed for display of the AIS target or related information.

5.5.4.2 Methods of test and required results

The methods of test and the required results are as follows:

- confirm, by analytical evaluation and using the AIS simulator to produce AIS reports for a nearby AIS target moving at 24 kn and repeated AIS reports for this target with delayed and reduced update rate (for example: delayed by 30 s with a 10 s update rate), that the repeated data is not displayed;
- confirm, by analytical evaluation and using the AIS simulator to produce two or more repeated AIS reports for a target with delayed and reduced update rate (for example: delayed by 30 s with a 10 s update rate), that only data from lowest repeat count is displayed.

5.5.5 Filtering sleeping AIS targets

5.5.5.1 Requirement

(MSC191/6.4.3.1) *It shall be possible to filter the presentation of sleeping AIS targets (for example, by target range, CPA/TCPA, AIS target class A/B, or proximity to or otherwise related to a monitored route, etc.).*

Criteria for filtering shall only include sleeping class A or sleeping class B when combined with one or more other factors, for example including CPA/TCPA, Speed, Range or Course.

(MSC191/6.4.3.2) *If a filter is applied, then there shall be a clear and permanent or persistent indication, as appropriate for the application. The filter criteria in use shall be readily available to the user.*

(MSC191/6.4.3.3) *It shall not be possible to remove individual AIS targets from the presentation.*

5.5.5.2 Methods of test and required results

The methods of test and the required results are as follows:

- a) confirm by observation that the user can filter the presentation of sleeping AIS targets and that filtering criteria includes only sleeping class A or sleeping class B combined with one or more other factors;
- b) confirm by observation that an indication is provided when sleeping targets are filtered from the presentation;
- c) confirm by observation that the indication remains while the filter is active;
- d) confirm by analytical evaluation that the filter criteria in use is readily available;
- e) confirm by observation that the user cannot remove individual AIS targets from the presentation.

5.5.6 Activation of AIS targets

5.5.6.1 Requirement

(MSC191/6.4.4.1) *If zones for the automatic activation of AIS targets are provided, they shall be the same as for automatic radar target acquisition, if available. Any user defined zones (for example, acquisition/activation zones) in use shall be presented in graphical form with their relevant symbols set forth in Annex A.*

(MSC191/6.4.4.2) *In addition, sleeping AIS targets shall be automatically activated when they meet user defined parameters (for example, target range, activation zones, CPA/TCPA or AIS target class A/B).*

Automatic activation is independent of AIS target filtering. If means are provided for automatic activation of AIS targets, then means for disabling that function shall be provided and the disable status shall be indicated.

NOTE If display equipment provides facilities for the calculation of CPA/TCPA that are independent of a shipborne radar target tracking system, then the facilities are described in the relevant clauses of IEC 62388.

5.5.6.2 Methods of test and required results

Where display equipment provides zones for the automatic activation of AIS targets:

- a) confirm by observation that the zones are the same as for automatic radar target acquisition, if provided;
- b) confirm by observation that the zones are presented in accordance with Annex A;
- c) confirm by observation that it is possible to disable automatic activation and that the disabled status is indicated;
- d) confirm by observation that both filtered and displayed sleeping AIS targets entering a zone are automatically activated when they meet user defined criteria.

5.5.7 Graphical presentation of targets

5.5.7.1 Requirement

(MSC191/6.4.5.1) *Targets shall be presented with their relevant symbols as set forth in Annex A.*

(MSC191/6.4.5.2) *Reported AIS targets shall be graphically presented at predicted positions either as sleeping or activated. Where no separate symbol is defined for the active and sleeping states, the reported AIS target shall be graphically presented with the single symbol type available in Annex A.*

EXAMPLE AIS SAR vessel (symbol 2.16) keeps all requirements for AIS sleeping target and AIS activated target except for the graphical representation of the symbol.

(MSC191/6.4.5.3) *The course and speed of a tracked radar target or an activated reported AIS target shall be indicated by a vector that clearly shows the predicted motion. The vector time (i.e. length) shall be consistent for presentation of any target regardless of its source.*

(MSC191/6.4.5.4) *The presentation of vector symbols shall be consistent irrespective of the source of information. The presentation mode shall be clearly and permanently or persistently indicated, as appropriate for the application, including for example,*

- *True/Relative motion,*
- *vector time, and*
- *stabilisation.*

(MSC191/6.4.5.5) *The orientation of the AIS target symbol shall indicate its heading (HDG). If the heading information is not received, the orientation of the AIS symbol shall be aligned to the reported course over ground (COG). If neither heading nor course over ground (COG) is available, the orientation of the AIS symbol shall be aligned towards top of the operational display area. If available, the turn or rate of turn (ROT) indicator and/or the path prediction shall indicate the manoeuvre of an activated AIS target.*

(MSC191/6.4.5.6) *Own ship's CCRP shall be used for alignment of tracked radar target symbols and reported AIS target symbols with other information on the same display.*

(MSC191/6.4.5.7) *On large scale, low range displays, a means or method to present a true scale outline of an activated AIS target shall be provided in accordance with Annex A.*

(MSC191/6.4.5.8) *It shall be possible to display the past positions of activated AIS targets.*

The user manual shall describe the length in time or in number of the past positions available for each target.

5.5.7.2 Methods of test and required results

The methods of test and the required results are as follows:

- a) confirm by observation that targets are presented with their relevant symbols according to Annex A;
- b) confirm by observation that reported AIS targets are graphically presented at predicted position as sleeping or activated targets in accordance with Annex A;
- c) confirm by observation that the predicted motion of tracked radar targets and activated reported AIS targets is clearly indicated by a vector;
- d) confirm by observation that the vector time (i.e. length) is consistent for all targets;
- e) confirm by observation that the presentation of vector symbols are consistent irrespective of the source of information;
- f) verify that the presentation mode is clearly indicated in accordance with 4.10.1;
- g) confirm by observation that the vector time is clearly indicated;
- h) confirm by observation that the orientation of the AIS target symbol clearly indicates its heading. Change the heading information to "not available" for one reported AIS target and confirm by observation that the orientation of the AIS symbol is aligned to the reported COG. Change also the COG information to "not available" for the same reported AIS target and confirm by observation that the orientation of that reported AIS target is aligned towards the top of the operational display area;
- i) confirm by observation that the turn or rate of turn (ROT) flag and/or the path prediction, if available, indicates the manoeuvre of an activated AIS target changing course;
- j) confirm by analytical evaluation that own ship's CCRP is used to align tracked radar target symbols and reported AIS target symbols with other information on the same display;
- k) confirm by observation that on large scale, low range displays, a means or method to present a true scaled outline of an activated AIS target is provided;
- l) confirm by observation that it is possible to display the past positions of activated AIS targets for the length in time or in number as described in the user manual.

5.5.8 Target selection

5.5.8.1 Requirement

(MSC191/6.4.6.1) *A target selected for the display of its alphanumeric information shall be identified by the relevant symbol set forth in Annex A. If more than one target is selected for data display, the symbols and the corresponding target data shall be clearly identified.*

5.5.8.2 Methods of test and required results

The methods of test and the required results are as follows:

- a) confirm by observation that a selected target is identified in accordance with Annex A;
- b) confirm by observation that, if more than one target is selected, the symbols and corresponding target information is clearly identified in accordance with Annex A.

5.5.9 Indication of target derivation

5.5.9.1 Requirement

(MSC191/6.4.6.2) *There shall be a clear indication to show that target information is derived from radar or AIS or from a combination of these.*

5.5.9.2 Methods of test and required results

Confirm by analytical evaluation that there is a clear indication of the source of target information.

5.5.10 Presentation of tracked radar target information

5.5.10.1 Requirement

(MSC191/6.4.6.3) *For each selected tracked radar target the following information shall be presented in alphanumeric form:*

- *source(s) of target information,*
- *measured range of target,*
- *measured bearing of target,*
- *predicted target range at the closest point of approach (CPA),*
- *predicted time to CPA (TCPA),*
- *calculated CTW of target (or calculated COG if ground stabilised),*
- *calculated STW of target (or calculated SOG if ground stabilised).*

Additional target information, where available, shall be provided to the user on request. If additional target information is available, an indication shall be provided when viewing alphanumeric information of the selected target.

If multiple targets are selected, a subset of alphanumeric data, information and text may be presented.

Target information shall be logically "paired" for presentation (i.e. range and bearing, CPA and TCPA, course and speed).

NOTE If display equipment provides facilities for the calculation of CPA/TCPA that are independent of a shipborne radar target tracking system, then the facilities are described in the relevant clauses of IEC 62388.

5.5.10.2 Methods of test and required results

The methods of test and the required results are as follows:

- a) confirm by observation that the information listed above is presented in alphanumeric form for each selected target;
- b) confirm by observation that additional information, where available, is indicated and provided to the user on request;
- c) confirm by analytical evaluation that the target information is logically "paired" for presentation.

5.5.11 Presentation of reported AIS target information

5.5.11.1 Requirement

(MSC191/6.4.6.4) *For each selected reported AIS target, the following information shall be presented in alphanumeric form:*

- *source(s)* of target information (for example, repeated);
- target *identification* (at least one of MMSI, call sign, name or IMO number);
- reported *position* and where available *its quality* (Position accuracy as " $\leq 10\text{m}$ " or " $> 10\text{m}$ " and RAIM as "not in use" or "in use");
- calculated *range* of target;
- calculated *bearing* of target;
- calculated *CPA*;
- calculated *TCPA*;
- reported *COG* (or calculated *CTW* if the display is sea stabilised). In sea stabilized display, the reported *COG* shall at least be available on demand;
- reported *SOG* (or calculated *STW* if the display is sea stabilised). In sea stabilized display, the reported *SOG* shall at least be available on demand;
- reported *navigational status*;
- reported *heading* (*HDG*) and reported *rate of turn* (*ROT*) shall also be made available.

Additional target information shall be provided to the user on request. If additional target information is available, an indication shall be provided when viewing alphanumeric information of the selected target. Additional target information consists of:

- MMSI, if not yet presented;
- call sign, if not yet presented;
- name, if not yet presented;
- IMO number, if not yet presented;
- dimensions;
- ship and cargo type;
- destination;
- ETA;
- static draught;
- DTE indicator;
- AIS class;
- if supported, extended reported AIS target information (see Table 8 and 5.18);
- if receiving of AIS safety related messages is supported, on user request, where available, a link to or full content of most recent received AIS safety related messages related to the same MMSI, see 5.19;
- optionally, if sending of AIS safety related messages is supported, a link to or full content of all AIS safety related messages sent by the own ship to the target (basis is MMSI), see 5.20.

Further target information may be presented as well.

If multiple targets are selected, a subset of alphanumeric data, information and text may be presented.

Target information shall be logically "paired" for presentation (i.e. range and bearing, CPA and TCPA, COG and SOG, heading and ROT).

(MSC191/6.4.6.5) *If the received AIS target information is incomplete, then the absent information shall be clearly indicated in the target data field as missing.*

5.5.11.2 Methods of test and required results

The methods of test and the required results are as follows.

Select a reported AIS target and:

- a) confirm by observation that the information listed above is presented in alphanumeric form;
- b) confirm by observation that all additional target information, where available, is provided to the user on request;
- c) confirm by analytical evaluation that the target information is logically "paired" for presentation;
- d) confirm by observation that there is a clear indication of absent information in the target data field.
- e) confirm by observation that when available there is a clear indication that additional information is available.

5.5.12 Continual update of target information

5.5.12.1 Requirement

(MSC191/6.4.6.6) *The information for a selected target shall be displayed and continually updated, until another target, AIS data report, AIS locating device or AIS synthetic target is selected for information display or, if applicable, until the user dialogue area is closed.*

NOTE Information can be displayed in a separate user dialogue area.

5.5.12.2 Methods of test and required results

The methods of test and the required results are as follows:

- a) confirm by observation that information displayed for a selected target is continually updated;
- b) confirm by observation that the information displayed for a selected target remains displayed until another target, AIS data report, AIS locating device or AIS synthetic target is selected or the user dialogue is closed.

5.5.13 Own ship's AIS information

5.5.13.1 Requirement

(MSC191/6.4.6.7) *A means or method shall be provided to present own ship AIS data on request.*

Own ship AIS data includes:

- identification (MMSI, call sign, name, IMO number);
- navigational status;
- additional information (dimensions, ship and cargo type, destination, ETA, static draught);
- if supported, extended information (see Table 8).

5.5.13.2 Methods of test and required results

Confirm by observation that it is possible to present own ship's AIS data on request.

5.5.14 Obscuring the operational display area

5.5.14.1 Requirement

(MSC191/6.4.6.8) *The display of alphanumeric data, information and text shall not obscure graphically presented operational information.*

5.5.14.2 Methods of test and required results

Confirm by analytical evaluation that the display of alphanumeric data, information and text does not obscure graphically presented operational information.

5.6 Operational alerts

5.6.1 Alert status

5.6.1.1 Requirement

(MSC191/6.4.7.1) *A clear indication of the status of the alerts and the alert criteria (i.e. identification) shall be given to the user. (See also 4.9.1 and 4.9.3.)*

The equipment shall comply with IEC 62923-1 to ensure that the status of alerts is clearly given to the user, see 4.9.1.2.

Except for IMO requirements for radar and AIS target symbols displayed in the operational area and for ECDIS highlight of danger, warnings, and caution in the chart area, only text-based visual indication of alert (e.g. in user dialog area) is mandatory. Optionally icons can be presented together with the text, see IEC 62923-1 and Annex F.

5.6.1.2 Methods of test and required results

Confirm by analytic evaluation that a clear indication of the alert criteria is provided as text to the user.

Confirm by observation that, if icons are additionally provided, they conform to IEC 62923-1 and Annex F (see also 4.4.3.2)

5.6.2 CPA/TCPA alarms

5.6.2.1 Requirement

(MSC191/6.4.7.2) *A CPA/TCPA alarm of a tracked radar or activated AIS target shall be clearly indicated and the target shall be clearly marked by a dangerous target symbol as set forth in Annex A (both acknowledged and unacknowledged state). This includes cases when CPA/TCPA alarm information is received by TTD-sentence (see IEC 61162-1).*

NOTE 1 If display equipment provides facilities for the calculation of CPA/TCPA that are independent of a shipborne radar target tracking system, then the facilities are described in the relevant clauses of IEC 62388.

CPA/TCPA alarms shall not be repeated as an alert by the equipment receiving target information by TTD sentence.

NOTE 2 The presentation of the symbol is related to state of the target and is not related to the alert functionality of the equipment.

5.6.2.2 Methods of test and required results

Confirm by observation that dangerous targets are presented in accordance with Annex A.

For equipment receiving target information by TTD sentence, confirm by observation that there are no alerts generated from targets with active CPA/TCPA alarms indicated by the TTD sentence.

5.6.3 Acquisition/activation zones warnings

5.6.3.1 Requirement

(MSC191/6.4.7.3) *If a user defined acquisition/activation zone facility is provided, a target entering or within the zone shall be clearly identified with the relevant symbol set forth in Annex A and for tracked radar targets a warning shall be given. The zone shall be identified with the relevant symbology set forth in Annex A, and shall be applicable to both tracked radar and reported AIS targets.*

A radar target tracking system shall control radar target acquisition zones. The target tracking system shall provide all warnings and indications associated with target detection and tracking including entry into or detection within an acquisition area. Other navigational systems and equipment may provide acquisition zone warnings and indications only if they provide a radar target tracking function complying to IEC 62388.

NOTE 1 The TTD sentence does not provide other navigational systems and equipment that provide remote presentation of tracked radar targets with information about whether the target was manually or automatically acquired nor the status of any automatic acquisition alert.

Any navigational system or equipment may provide remote presentation of reported AIS targets. These systems shall provide their own AIS activation zone facilities.

NOTE 2 If display equipment provides facilities for acquisition zones for the detection of radar targets that are independent of a shipborne radar target tracking system, then the facilities are described in the relevant clauses of IEC 62388.

5.6.3.2 Methods of test and required results

Where display equipment provides zones for automatic acquisition/activation:

- a) confirm by observation that the zones are presented with their relevant symbology in accordance with Annex A;
- b) confirm by observation that detected radar targets entering or within a zone are acquired;

NOTE The acquisition status of tracked radar targets is reported by the radar target tracking system, for example, in accordance with IEC 61162 (all parts).

- c) confirm by observation that radar targets in acquisition state are presented in accordance with Annex A;
- d) confirm by analytical evaluation that the zones apply to both radar targets and reported AIS targets in accordance with 5.5.7;

5.6.4 Lost target warnings

5.6.4.1 Requirement

(MSC191/6.4.7.4) *The last predicted position of a lost target shall be clearly marked by a lost target symbol on the display as set forth in Annex A, and the lost target warning shall be given if the lost target warning function is enabled. The lost target symbol shall disappear if the signal (or message) for the target is received again or after the warning has been acknowledged. A means or method shall be provided for the user to enable/disable the lost target warning function. There shall be a clear indication whether the lost target warning function for tracked radar targets and activated AIS targets is enabled or disabled. If a target is beyond a user defined range, then no warning shall be generated.*

Navigational systems and equipment that provide remote presentation of received tracked radar targets and activated AIS targets (for example by TTD sentence) shall present the lost target symbol and shall not provide warnings in lost target state.

5.6.4.2 Methods of test and required results

The methods of test and the required results are as follows:

- a) confirm by observation that, when a tracked radar target or reported AIS target that is not received from remote equipment (for example by TTD sentence) is lost, a warning is given and the last predicted position is clearly marked by the lost target symbol in accordance with Annex A;
- b) for navigational system or equipment that provides remote presentation of received tracked radar targets and activated AIS targets (for example by TTD sentence) in lost target state, confirm by observation that there is the lost target symbol and that there is no related warning;
- c) confirm by observation that the lost target symbol disappears if the signal for the target is received again or after the lost target warning has been acknowledged;
- d) confirm by observation that a means or method is provided to enable/disable the lost target warning function;
- e) confirm by observation that there is a clear indication of whether the lost target warning function for tracked radar targets and activated AIS targets is enabled or disabled;
- f) confirm by observation that no warning is generated for a lost target that is beyond the user defined range.

5.7 AIS and radar target association

5.7.1 Requirement

(MSC191/6.4.8.1) *If target information from AIS and radar tracking are both available and where the AIS and radar information are considered as one target, then as a default condition, the activated AIS target symbol and the alphanumeric AIS target information shall be automatically selected and displayed as set forth in Annex A. The user shall have the option to change the default condition to the display of tracked radar targets and shall be permitted to select either radar tracking or AIS alphanumeric information.*

(MSC191/6.4.8.2) *Where the AIS and radar information are considered as two distinct targets, one activated AIS target symbol and one tracked radar target symbol shall be displayed as set forth in Annex A. No alert shall be raised.*

NOTE If display equipment provides facilities for the automatic association of reported AIS targets with tracked radar targets that are independent of a shipborne radar target tracking system, then the facilities are described in the relevant clauses of IEC 62388.

5.7.2 Methods of test and required results

Where display equipment provides the capability to automatically associate reported AIS targets with tracked radar targets:

- a) confirm by observation that a reported AIS target associated with a tracked radar target is presented in accordance with Annex A:
 - 1) as an activated AIS target, the default condition;
 - 2) as a tracked radar target, based upon user-selection as the default condition;
- b) confirm by observation that the user can select either AIS or radar tracking information.

5.8 AIS presentation user selectors and their status indications

5.8.1 Requirement

Where applicable (i.e. if equipment provides related functionality for presentation), the user selectors for AIS presentation shall be provided according to Table 3.

Table 3 – User selectors for AIS presentation

Selector	Function
AIS ON/OFF This is master selector for all AIS presentation	Select all AIS related graphical presentation on or off
AIS sleeping target filter Separate selector for each provided AIS sleeping target filter criteria (see 5.5.5)	Select AIS sleeping target filter for criteria N on or off ^a
AIS locating devices (see 5.14.3.1)	Select AIS locating devices presentation on or off
AIS base stations (see 5.13.3.1 a))	Select AIS base stations presentation on or off
AIS SAR aircraft (see 5.13.3.1 b))	Select AIS SAR aircraft presentation on or off
AIS AtoNs, physical (see 5.13.3.1 c) and symbol 2.10 a)	Select AIS AtoN, physical presentation on or off or unhealthy (unhealthy AtoNs include symbol '2.10a' versions "Off Posn", "Unlit", "Racon err", "Error" and "Missing")
AIS AtoNs, virtual (see 5.13.3.1 c) and symbol 2.10 b)	Select AIS AtoN, virtual presentation on or off
AIS AtoNs, mobile physical (see 5.13.3.1 c) and symbol 2.10 c)	Select AIS AtoN, mobile physical presentation on or off
AIS AtoNs, mobile virtual (see 5.13.3.1 c) and symbol 2.10 c)	Select AIS AtoN, mobile virtual presentation on or off
AIS AtoNs, synthetic (see 5.13.3.1 c) and symbol 2.10 a)	Select AIS AtoN, synthetic presentation on or off
AIS AtoNs, dimension outline (see 5.13.4 and symbol 2.10 d)	Select AIS AtoN outline presentation on or off
AIS ASMs Separate selector for each layer or sub-layers (see 5.15 and Annex J)	Select AIS ASM presentation for layer/sub-layer N on or off ^b
AIS ASMs Optionally separate selector for each display criteria (see 5.15.4.1)	Select AIS ASM presentation for criteria N on or off ^a
AIS Synthetic targets (see 5.16)	Select AIS Synthetic targets presentation on or off
AIS safety related messages (see 5.19 and symbol 5.16)	Select AIS safety related messages on or off
^a Replace "N" by each available criteria.	
^b Replace "N" by each available layer or sub-layer.	

When a user selector in Table 3 has caused any related AIS object not to be displayed, a permanent or persisting indication shall be provided (see also 5.5.5.1). The details of individual selectors shall be readily available to the user.

(MSC191/6.4.9) Where applicable (i.e. if equipment provides related functionality), *the AIS presentation status shall be indicated as follows* in Table 4.

Table 4 – AIS status indications

Function	Cases to be presented		Presentation
	<i>AIS processing switched ON/ graphical presentation switched OFF</i>	<i>AIS processing switched ON/ graphical presentation switched ON</i>	
<i>AIS ON/OFF</i>	Indicate AIS graphical presentation is switched OFF	Indicate AIS graphical presentation is switched ON	<i>Alphanumeric or graphical</i> (see Table E.4)
<i>Filtering of sleeping AIS targets</i> (see 5.5.5)	Indicate whether the <i>filter status</i> for sleeping AIS targets is switched ON or OFF	Indicate whether the <i>filter status</i> for sleeping AIS targets is switched ON or OFF	Indications may be <i>alphanumeric or graphical</i> (for example by icon)
<i>Activation of targets</i> (see 5.5.6)		Indicate the status of automatic <i>activation criteria</i> for AIS targets, including graphical presentation of automatic activation zones in use	Indications shall be <i>graphical</i> (see symbol 2.14)
<i>CPA/TCPA alarm</i> (see 5.6.2)	Indicate whether the CPA/TCPA Alarm <i>function</i> is switched ON/OFF Indicate the CPA/TCPA <i>Criteria</i> Indicate whether <i>Sleeping AIS targets</i> are <i>included</i> or <i>excluded</i> from CPA/TCPA processing	Indicate whether the CPA/TCPA Alarm <i>function</i> is switched ON/OFF Indicate the CPA/TCPA <i>Criteria</i> Indicate whether <i>Sleeping AIS targets</i> are <i>included</i> or <i>excluded</i> from CPA/TCPA processing	Indications shall be <i>alphanumeric and, if applicable, graphical</i> (for example by icon)
<i>Lost target warning</i> (see 5.6.4)	Indicate whether the Lost Target Warning <i>function</i> is switched ON/OFF If applicable, indicate the <i>Lost target Filter Criteria</i>	Indicate whether the Lost Target Warning <i>function</i> is switched ON/OFF If applicable, indicate the <i>Lost target Filter Criteria</i>	Indications shall be <i>alphanumeric and, if applicable, graphical</i>
<i>Target association</i> (see 5.7)	Indicate whether the Target Association <i>function</i> is switched ON/OFF Indicate the Association <i>Criteria</i> Indicate the target priority as AIS (<i>Default</i>) or Tracked <i>Target Priority</i>	Indicate whether the Target Association <i>function</i> is switched ON/OFF Indicate the Association <i>Criteria</i> Indicate the target priority as AIS (<i>Default</i>) or Tracked <i>Target Priority</i>	Indications shall be <i>alphanumeric</i>

5.8.2 Methods of test and required results

Where applicable, the methods of test and the required results are as follows:

- confirm by observation that the user selectors for AIS presentation are provided according to Table 3;
- confirm by observation that when a user selector in Table 3 has caused any related AIS object not to be displayed, a permanent or persisting indication is provided and that the details of individual selectors are readily available to the user;
- confirm by observation that the AIS presentation status is indicated according to Table 4.

5.9 Trial manoeuvre

5.9.1 Requirement

(MSC191/6.4.10) A trial manoeuvre simulation shall be clearly identified by the relevant symbol set forth in Annex A, *positioned* in a conspicuous location within the operational display area, for example, nominally centred at the bottom of the presentation area or *astern of own ship* symbol.

NOTE If display equipment provides facilities for trial manoeuvre that are independent of a shipborne radar target tracking system, then the facilities are described in the relevant clauses of IEC 62388.

5.9.2 Methods of test and required results

Where display equipment provides a trial manoeuvre simulation:

- a) confirm by observation that the manoeuvre is identified in accordance with Annex A;
- b) confirm by analytical evaluation that the symbol is positioned in a conspicuous location.

5.10 Measurement

5.10.1 Measurement from own ship

5.10.1.1 Requirement

Measurements from own ship (for example, range rings, range and bearing, cursor, tracking data) shall be made with respect to the CCRP (for example, conning position).

For consistency of measured ranges and bearings, the recommended reference location should be the conning position. Alternative reference locations may be used where clearly indicated or distinctively obvious.

5.10.1.2 Methods of test and required results

The methods of test and the required results are as follows:

- a) confirm by observation that the means of taking measurements are centred on to the CCRP and not centred on any other position except where specifically selected and clearly indicated;
- b) confirm by measurement, by comparing at least two alternative sensor inputs that have different position offsets from CCRP, that the range and bearing measurements are correct to the CCRP position and, if provided, alternative reference position;
- c) confirm by measurement that, when switching from CCRP to an alternative reference position, displayed data is changing accordingly but data transmitted via the interface remains referenced to the CCRP.

5.10.2 Bearing and range measurements

5.10.2.1 Requirement

Bearings and distances (ranges) drawn on the display, or bearing and range measurements between features already drawn on the display, shall have an accuracy no less than that afforded by the scale and resolution of the display.

Range measurements shall be in nautical miles. In addition, facilities for metric measurements may be provided. All indicated values for range measurement shall be consistent and unambiguous. Where metric range measurements are required, the accuracy shall not be inferior to other range measurements.

5.10.2.2 Methods of test and required results

The methods of test and the required results are as follows:

- a) confirm by analytical evaluation that bearings and distances are measured to an accuracy consistent with the scale and resolution of the display;
- b) confirm by observation that distances can be measured in nautical miles;
- c) confirm by observation that the units used for range measurements and range scales are consistent within the system;
- d) confirm by observation that an indication of the units used for measurement is provided.

5.11 Navigation tools

5.11.1 General requirements

Subclause 5.11 addresses user tools that are common to navigational systems and equipment. Requirements for the provision of these tools are addressed in the relevant individual performance standards. When provided, these tools shall be presented with their relevant symbol(s) as set forth in Annex A.

5.11.2 Range rings

5.11.2.1 Requirement

(MSC191/7.1.4) If *range rings are displayed*, then *the range ring scale shall be indicated*.

Range rings shall be spaced to logically separate the range scale into equal divisions. Typically from two to six range rings would be provided for nautical mile range scale units, and up to five rings for metric range scale units.

The system accuracy of range rings shall be within 1 % of the maximum range of the range scale in use or 30 m, whichever is the greater distance.

Range rings shall always be centred at the CCRP.

A means or method shall be provided to enable and disable the set of range rings (see also 6.1.4).

5.11.2.2 Methods of test and required results

Where range rings are provided:

- a) confirm by observation that range rings are presented in accordance with Annex A;
- b) confirm by observation that the range ring separation (scale) is indicated;
- c) confirm by analytical evaluation that the range ring spacing logically separates each range scale into equal divisions;
- d) confirm by measurement that the accuracy of the range rings is within ± 1 % of the range scale in use or 30 m, whichever is greater;
- e) confirm by observation that the range rings are always centred at the CCRP;
- f) confirm by observation that a means or method is provided to enable and disable the set of range rings.

5.11.3 Variable range marker (VRM)

5.11.3.1 Requirement

Variable range marker(s) (VRMs) may be provided to measure the range of any point object within the operational display area.

Each active VRM shall have a numerical readout and the readout shall have a resolution compatible with the range scale in use.

Each active VRM shall be capable of adjustment to resolution of 0,01 NM, or to appropriate metric equivalent. A coarser resolution may be provided for higher range scales. The readout shall be available in the user dialogue area or, additionally, adjacent to the cursor when the cursor is over the VRM.

The VRM shall enable the user to measure the range of an object within the operational display area with a maximum system error of 1 % of the range scale in use or 30 m, whichever is the greater distance.

It shall be possible to use each VRM to measure the range to any point within the operational area and with the specified accuracy within 5 s.

A means or method to switch each VRM on and off shall be provided.

The VRM range set by the user shall be retained when there is a change in range scale.

If means are provided to move VRM origin from the CCRP to other points within the operational display area, geographically fixed or moving with the velocity of own ship, then a means shall be provided to reset the VRM origin to the CCRP position by a simple operator action.

5.11.3.2 Methods of test and required results

Where a VRM is provided:

- a) confirm by observation that each VRM is presented in accordance with Annex A;
- b) confirm by observation that a dedicated readout is available for each active VRM;
- c) confirm that the VRMs are capable of adjustment to 0,01 NM (or appropriate metric equivalent). A coarser adjustment may be provided for ranges greater than 24 NM or appropriate metric equivalent;
- d) confirm by measurement that the accuracy of the VRMs meet the requirement using a calibrated target or marker;
- e) confirm by measurement that, when metric measurements are provided, the readout and accuracy is equivalent to those relevant to nautical miles;
- f) confirm by measurement that the range to any object within the operational display area can be measured within 5 s with the required accuracy;
- g) confirm by observation that a means or method to switch each VRM on and off is provided;
- h) confirm by observation that the range of the VRM is maintained from range scale to range scale;
- i) confirm by observation that, if means are provided to move VRM origin from the CCRP to other points, means are provided to reset the VRM origin to the CCRP position by a simple operator action.

5.11.4 Bearing scale

5.11.4.1 Requirement

A bearing scale may be provided. The bearing scale shall indicate the bearing from the CCRP.

For radar display equipment, including radar with charted information, the bearing scale shall be outside of the operational display area (i.e. around its periphery and outside of which no radar video shall be displayed). For other display equipment, the bearing scale may be inside the operational display area. It shall be numbered at least every 30° division and shall have division marks of at least 5°. The 5° and 10° division marks shall be clearly distinguishable from each other. 1° division marks may be presented where they are clearly distinguishable from each other and from the 5° and 10° division marks.

If the display is off-centred or the position of own ship is outside of the operational display area, then the bearing scale shall be suppressed or its marks shall be adjusted to represent the bearing from CCRP.

For display equipment not presenting radar, a means or method shall be provided to enable and disable the bearing scale.

5.11.4.2 Methods of test and required results

Where a bearing scale is provided:

- a) confirm by analytical evaluation that the bearing scale indicates bearings as measured from the CCRP;
- b) for radar display equipment, confirm by observation that the bearing scale is around the periphery of the operational display area;
- c) confirm by observation that the bearing scale remains centred at the CCRP (for example, in a true motion display mode);
- d) confirm by observation that the bearing scale is numbered at least every 30° and has division marks at least every 5°;
- e) confirm by observation that the 5° division marks are clearly distinguishable from the 10° division marks;
- f) where 1° division marks are provided, confirm by observation that they are clearly distinguishable from each other and from the 5° and 10° division marks;
- g) for display equipment not presenting radar, confirm by observation that a means or method is provided to enable and disable the bearing scale.

5.11.5 Electronic bearing line (EBL)

5.11.5.1 Requirement

Electronic bearing line(s) (EBLs) may be provided to measure the bearing of any point object within the operational display area, with a maximum system error of 1° at the periphery of the display.

The EBL(s) shall be capable of measurement from the CCRP relative to the ships heading and relative to true north. There shall be a clear indication of the bearing reference (i.e. true or relative).

It shall be possible to move the EBL origin from the CCRP to any point within the operational display area and to reset the EBL to the CCRP by a simple operator action.

It shall be possible to fix the EBL origin or to move the EBL origin at the velocity of own ship.

A means or method shall be provided to ensure that the user is able to position the EBL smoothly in either direction, with an incremental adjustment adequate to maintain the system measurement accuracy requirements.

It shall be possible to use the EBL to measure the bearing to any point object in the operational display area within 5 s.

Each active EBL shall have a numerical readout with a resolution of $0,1^\circ$ adequate to maintain the system measurement accuracy requirements based on a measurement uncertainty of $\pm 0,5^\circ$.

A means or method shall be provided to enable and disable each EBL.

The bearing of the EBL (i.e. set by the user) shall be retained while the EBL is enabled (for example, after a change in range scale or after a change in display orientation).

5.11.5.2 Methods of test and required results

Where an EBL is provided:

- a) confirm by observation that each EBL is presented in accordance with Annex A;
- b) confirm by measurement that the bearing to any point object within the operational display area can be measured to within an accuracy of 1° ;
- c) confirm by analytical evaluation that bearings can be measured relative to the ships heading and relative to true north, and that a clear indication of the bearing reference is provided;
- d) confirm by observation that a means or method is provided to move the origin of an EBL from the CCRP to any point within the operational display area;
- e) confirm by observation that it is possible to return the origin of the EBL to the CCRP by a simple user action;
- f) confirm by observation that a means or method is provided to fix the origin of the EBL in a geographic location;
- g) confirm by observation that a means or method is provided to move the origin of the EBL at the velocity of own ship;
- h) confirm by observation that the EBL can be rotated smoothly in either direction;
- i) confirm by observation that the incremental adjustment is at least $0,1^\circ$;
- j) confirm by measurement that the EBL can be used to measure the bearing to any point object in the operational display area within $\pm 0,5^\circ$ in less than 5 s;
- k) confirm by observation that a numerical readout with a resolution of $0,1^\circ$ is available for each active EBL;
- l) confirm by observation that a means or method is provided to enable and disable each EBL;
- m) confirm by observation that an enabled EBL remains over the same point object during a change of range scale and a change of orientation mode.

5.11.6 Parallel index lines (PI)

5.11.6.1 Requirement

Parallel index (PI) lines may be provided. If parallel index lines are provided:

- independent parallel index lines with a means or method to truncate and switch off individual lines shall be provided;
- a simple and quick means or method of setting the bearing and beam range of a parallel index line shall be provided.

The bearing and beam range of any selected parallel index line shall be available on demand.

It shall be possible to set the bearing and beam range of a parallel index line within 5 s.

PI line range settings shall remain constant when the operator changes the range scale of the display and PI line bearing settings shall remain constant when own ship heading changes.

In addition to on/off selection of individual PI lines, means shall be provided to turn on/off all PI lines as a group.

5.11.6.2 Methods of test and required results

Where parallel index lines are provided:

- a) confirm by observation that parallel index lines are presented in accordance with Annex A;
- b) confirm by observation that a means or method is provided to truncate the length of each PI line;
- c) confirm by observation that PI lines are selectable for display on/off individually and as a group including all PI lines;
- d) confirm by measurement that a means or method is provided to set the bearing or range of a parallel index line within 5 s;
- e) confirm by observation that means are provided to display the bearing and range for any parallel index line on demand;
- f) confirm by observation that the distance of a PI line from the own ship and the true bearing of PI line does not change when a different range scale is selected, when own ship heading changes, and during True motion operation.

5.11.7 Offset measurement of range and bearing

5.11.7.1 Requirement

There may be a means or method to measure the range and bearing of one position on the display relative to any other position within the operational display area. This may be accomplished, for example, using an electronic range and bearing line (ERBL), a combination of a VRM and an EBL, or the cursor.

If a separate tool is provided to measure the combination of range and bearing (for example, an ERBL):

- it shall have a numerical range and bearing readout. The resolution of the range readout shall be compatible with the range scale in use. The resolution of the bearing readout shall be 0,1° adequate to maintain the system measurement accuracy requirements;
- it shall enable the user to measure the range of an object within the operational display area with a maximum system error of 1 % of the range scale in use or 30 m, whichever is the greater distance, and the bearing of any point object with a maximum system error of 1° based on a measurement uncertainty of $\pm 0,5^\circ$ at the periphery of the display;
- the user setting shall be retained while the tool is enabled (for example, after a change in range scale or after a change in display orientation);
- it shall enable the user to position its bearing component smoothly in either direction, with an incremental adjustment adequate to maintain the system measurement accuracy requirements.

It shall be possible to measure the range and bearing to any object in the operational display area within 5 s.

5.11.7.2 Methods of test and required results

Where a means or method is provided to measure the range and bearing from one position to another in the operational display area:

- a) confirm by observation that numerical readouts are available to display the range and bearing;
- b) confirm by analytical evaluation that the resolution of the range readout is compatible with each range scale;
- c) confirm by observation that the resolution of the bearing readout is 0,1°;

- d) confirm by measurement that the range from one position within the operational display area to any other position can be measured to an accuracy of ± 1 % of the range scale in use or 30 m, whichever is greater;
- e) confirm by measurement that the bearing from one position within the operational display area to any position can be measured to an accuracy of $0,5^\circ$ at the periphery of the display;
- f) confirm by observation that the bearing component can be rotated smoothly in either direction;
- g) confirm by measurement that the range and bearing to any object within the operational display area can be measured within 5 s;
- h) where a separate tool is provided to measure the combination of range and bearing, confirm by observation that a means or method is provided to enable and disable that tool;
- i) confirm by observation that the user settings are retained after the change of the range scale and a change of orientation mode while the tool is enabled.

5.11.8 User cursor

5.11.8.1 Requirement

A user cursor may be provided to enable a fast and concise means or method to designate any position on the operational display area. If a user cursor is provided:

- the cursor position shall have a continuous numerical readout to provide the range and bearing, measured from the CCRP, and the latitude and longitude of the cursor position presented either alternatively or simultaneously;
- a means or method shall be provided to easily locate the cursor position in the operational display area;
- the accuracy of the range and bearing measurements provided by the cursor shall meet the relevant requirements for VRM and EBL.

It shall be possible to measure the range and bearing to any object in the operational display area within 5 s.

5.11.8.2 Methods of test and required results

Where a user cursor is provided:

- a) confirm by observation that the cursor is presented in accordance with Annex A;
- b) confirm by observation that a numerical readout is available and that it continuously displays, either alternatively or simultaneously, the range and bearing of the cursor's position measured from own ship's CCRP, and the latitude and longitude of the cursor's position;
- c) confirm by observation that a means or method is provided to locate the cursor in the operational display area;
- d) confirm by analytical evaluation that the resolution of the range readout is compatible with each range scale;
- e) confirm by observation that the resolution of the bearing readout is $0,1^\circ$;
- f) confirm by analytical evaluation that the resolution of the latitude and longitude readout is compatible with each display scale;
- g) confirm by measurement that the range to an object within the operational display area can be measured to within an accuracy of ± 1 % of the range scale in use or 30 m, whichever is greater;
- h) confirm by measurement that the bearing to any point object within the operational display area can be measured to within an accuracy of $0,5^\circ$ at the periphery of the display;
- i) confirm by observation that the cursor can be moved smoothly to create rotation in either direction;

- j) confirm by measurement that the range and bearing to any object within the operational display area can be measured within 5 s.

5.12 AIS data link message processing capacity

5.12.1 General

Presentation of AIS related information may be provided. If provided, the following requirements and tests apply.

5.12.2 Requirements

The data link message processing capacity of the equipment shall provide the capability to process the number of VDM (VHF data link messages) corresponding to 90 % of fully loaded VDL (VHF data link). In that condition, continuous and smooth update of displayed AIS data shall be maintained.

NOTE IEC 61162-1 describes the AIS interface as having a maximum data rate of 4 500 messages per minute.

5.12.3 Methods of test and required results

Use the AIS simulator to generate a scenario of VDM sentences for 130 moving AIS targets updated every 2 s and for 10 other AIS objects supported by the equipment and updated every 3 min, corresponding to approximately 90 % of a fully loaded VDL. Confirm by observation that the displayed update of AIS objects supported by the equipment shows smooth and continuous updates.

If AIS targets are supported, use the AIS simulator to generate a scenario of VDM sentences for 6 000 AIS targets at anchor updated every 3 min with one or more moving AIS targets updated every 2 s. Confirm by observation that the displayed update of a sample set of 10 displayed AIS targets of both types selected at random shows smooth and continuous updates.

5.13 AIS data report

5.13.1 General

AIS data reports include AIS AtoNs, AIS SAR aircraft and AIS base stations.

Presentation of AIS data reports may be provided. If provided, then the following requirements and tests apply.

5.13.2 AIS data report capacity

5.13.2.1 Requirements

The equipment shall provide the capability to display a minimum number of AIS data reports according to Table 5 if no higher number is specified in individual equipment standards.

The user manual shall specify the processing and display capacity of AIS data reports. In addition, the user manual shall describe the operational consequences to the processing and display of current and new AIS data reports in the event that the capacity is at the maximum provided for each case when further AIS data reports are received.

There shall be an indication, or an alert (e.g. a caution) if specified by individual equipment standards, when the AIS data report processing or display capacity has been exceeded.

Table 5 – AIS data report capacity

Requirement	Capacity
Minimum display capacity for AIS data reports	20
Minimum processing capacity for AIS data reports	20

5.13.2.2 Methods of test and required results

The methods of test and the required results are as follows:

- confirm by inspection of the user manual that it specifies the processing and display capacity of AIS data reports and that at least the minimum capacities are provided;
- use the AIS simulator and confirm by observation that there is an indication, or an alert (e.g. a caution) if specified by individual equipment standards, when the capacity of processing or display of AIS data reports has been exceeded and that the EUT operates as described in the user manual;
- confirm by inspection of the user manual that it describes the operational consequences to the processing and display of current and new AIS data reports in the event that the processing or display capacity is at the maximum provided for each case when further AIS data reports are received.

5.13.3 AIS data report display

5.13.3.1 Requirement

It shall be possible to add or remove AIS data reports from the display by layer, but not as individual objects. The following layers shall be provided:

- AIS AtoNs, physical (including unhealthy state);
- AIS AtoNs, virtual;
- AIS AtoNs, mobile physical;
- AIS AtoNs, mobile virtual;
- AIS AtoNs, synthetic;

NOTE 1 Synthetic AtoN is a physical AtoN structure, without an AIS transmitter, but for which AIS messages are broadcast from another (usually land-based) location. An AtoN is a physical AtoN when "virtual AtoN flag = 0" and "repeat indicator = 0". An AtoN is a synthetic AtoN when "virtual AtoN flag = 0" and "repeat indicator = 1, 2 or 3".

- AIS SAR aircraft;
- AIS base stations.

The "unhealthy" state provides an easy-to-use method to detect charted AtoNs which cause significant issues for navigation. The unhealthy AtoN includes symbol 2.10 a versions "Off Posn", "Unlit", "Racon err", "Error" and "Missing".

AIS data reports shall be presented by means of an appropriate symbol displayed using the reported/predicted position, see Annex A. Requirements related to the graphical presentation of AIS AtoN dimensions are in 5.13.4.

An AIS data report selected for display of its alphanumeric information shall be identified by the relevant symbol 2.12 given in Annex A.

For each selected AIS data report, the following information shall be presented in alphanumeric form:

a) Message 4, Base station report

- identification (Name, from AIS Message 24A, and/or MMSI. Both available at least on demand);
- reported position;
- if receiving of AIS safety related messages is supported, on user request, where available a link to or full content of the most recent received AIS safety related messages related to the same MMSI, see 5.19.

b) Message 9, SAR aircraft position report

- identification (Name from AIS Message 5 or 24A, Call sign from AIS Message 5 or 24B and MMSI. All available at least on demand);
- reported position and where available its quality (Position accuracy as " ≤ 10 m" or " > 10 m" and RAIM as "not in use" or "in use");
- reported altitude and where available its source;
- calculated range of target (2-dimensional calculation without altitude);
- calculated bearing of target;
- reported COG;
- reported SOG;
- if receiving of AIS safety related messages is supported, on user request, where available a link to or full content of the most recent received AIS safety related messages related to the same MMSI, see 5.19.

c) Message 21, AtoN report

- identification (Name, if not available then MMSI. MMSI at least available on demand);

NOTE 2 Name for an AtoN is a combination from "Name of Aid-to-Navigation" and "Name of Aid-to-Navigation Extension".
- reported position and where available its quality (Position accuracy as " ≤ 10 m" or " > 10 m" and RAIM as "not in use" or "in use") and source (Type of electronic position fixing device);
- indication of type (nature);
- AtoN status, see Annex L;
- dimensions, at least available on demand;
- if receiving of AIS safety related messages is supported, a link to a list or full content of all AIS safety related messages received from the AIS AtoN report (basis is MMSI). It shall at least be possible to present the most recent AIS safety related message for each AtoN. The AIS safety related messages received from the AIS AtoN shall be automatically removed after a timeout period of 18 min after reception or after removal of the related AtoN itself;
- optionally for Mobile AtoN, if derived from movement of position, calculated COG/SOG if ground stabilised (or calculated CTW/STW if sea stabilised).

If the received AIS data report information is incomplete, then the absent information shall be clearly indicated in the related data field as missing.

The information for a selected AIS data report shall be displayed and continually updated, until another target, AIS data report, AIS locating device or AIS synthetic target is selected for information display or, if applicable, until the user dialogue area is closed.

NOTE 3 Information can be displayed in a separate user dialogue area.

AIS data reports shall become lost after 6 times the nominal reporting interval for AtoNs, SAR aircraft and base stations from the last received report.

NOTE 4 Nominal reporting intervals are given in ITU R M.1371.

For lost AIS SAR aircraft and AIS base stations, there shall be no lost AIS data report symbol and the AIS data report symbol shall be removed automatically from the display.

The last reported/predicted position of an AIS AtoN shall be clearly marked by a lost AIS AtoN symbol on the display as set forth in Annex A, and the lost AIS AtoN warning shall be given if the lost AIS AtoN warning function is enabled. If the lost AIS AtoN warning function is disabled or if the AIS AtoN is beyond a user defined range, there shall be no lost AIS AtoN symbol and the AIS AtoN symbol shall be removed automatically from the display.

The lost AIS AtoN symbol shall disappear if the signal (or message) for the AIS AtoN is received again or after the warning has been acknowledged.

A means or method shall be provided for the user to enable/disable the lost AIS AtoN warning function. There shall be a clear indication of whether the lost AIS AtoN warning function is disabled. If an AIS AtoN is beyond a user defined range, then no warning shall be generated.

The lost AIS AtoN function enable/disable and the user defined range parameters may be shared with the lost target function, see 5.6.4, and/or the lost AIS locating device function, see 5.14.3.1.

5.13.3.2 Methods of test and required results

Use the AIS simulator and confirm by observation that the user can add and remove information from the presentation by layers, but not as individual objects.

Use the AIS simulator and confirm by observation that AIS data reports are displayed at the reported/predicted position and that the symbol is as defined in Annex A.

Use the AIS simulator and confirm by observation that an AIS data report selected for the display of its alphanumeric information is identified by the relevant symbol 2.12 given in Annex A.

Use the AIS simulator and confirm by observation that, for each selected AIS data report, the required information is presented in alphanumeric form or that there is a clear indication of absent information in the related data field.

Use the AIS simulator and confirm by observation that, for each AIS AtoN, the received AIS safety related messages are automatically removed after 18 min or after removal of the related AtoN itself.

Use the AIS simulator and confirm by observation that information displayed for a selected AIS data report is continually updated and that the information displayed for a selected target. AIS data report, AIS locating device or AIS synthetic target remains displayed until another AIS data report is selected or the user dialogue is closed.

For the following tests related to the lost AIS data reports, the timeout for the state of the lost AIS data report is 6 times the nominal reporting interval for AtoNs from the last received report.

Use the AIS simulator to simulate a lost AIS SAR aircraft and a lost AIS base station and confirm by observation that no lost AIS data report symbol is displayed and that the AIS data report symbol is removed automatically from the display.

Confirm by observation that a means or method is provided for the user to enable/disable the lost AIS AtoN warning function; and that there is a clear indication of whether the lost AIS AtoN warning function is disabled; and that a user defined range is available to control the functionality of the lost AIS AtoN.

Use the AIS simulator to simulate a lost AIS AtoN and confirm by observation that, when the lost AIS AtoN warning function is enabled, the last reported/predicted position of a AIS AtoN is clearly marked by a lost AIS AtoN symbol on the display and that the lost AIS AtoN warning is created.

Use the AIS simulator to simulate a lost AIS AtoN and confirm by observation that, when the lost AIS AtoN function is disabled or when the AIS AtoN is beyond a user defined range, no lost AIS AtoN symbol is displayed and that the AIS AtoN symbol is removed automatically from the display.

Use the AIS simulator and confirm by observation that, when signal (or message) for the AIS AtoN is received again or after the lost AIS AtoN warning has been acknowledged, the lost AIS AtoN symbol disappears.

5.13.4 Graphical presentation of AIS AtoN dimensions

5.13.4.1 Requirements

Graphical presentation of physical AIS AtoN dimensions may be provided. If provided, the following requirements and tests apply.

The user shall have means to select and deselect the graphical display of the true scaled dimensional outline of physical AIS AtoNs (symbol 2.10 d) in addition to the related physical AIS AtoN symbol as set forth in Annex A. The size of this outline shall be the true scale representation based on the reported dimensions. The true scaled outline shall only be presented when the largest of the ABCD values is at least 9 mm at a nominal viewing distance of 1 m.

Equipment may provide user selectable means to automatically select or deselect display of the AIS AtoN true scaled outline based on conditions provided by the manufacturer. The user shall be able to disable the functionality of the automatic selection.

5.13.4.2 Methods of test and required results

Use the AIS simulator to send the physical AIS AtoN objects including true scaled outline and:

- a) confirm by observation that the true scaled outline and the related symbol are as given in Annex A;
- b) confirm by observation that means are provided to select and deselect the graphical presentation of AIS AtoN dimensions;
- c) confirm by measurement that the dimension of the outline of the AIS AtoN is correct for the scale of the display;
- d) confirm by observation that the true-scaled outline of the AIS AtoN is not presented when none of the ABCD values is at least 9 mm at the nominal viewing distance of 1 m;
- e) if provided, confirm by observation that user selectable means to automatically select or deselect the display of the AIS AtoN true scaled outline are based on conditions described in the user manual.

5.14 AIS locating device

5.14.1 General

Presentation of AIS locating devices may be provided. If provided, then the following requirements and tests apply.

5.14.2 AIS locating device capacity

5.14.2.1 Requirements

The equipment shall provide the capability to display a minimum number of AIS locating devices nearest to the own ship according to Table 6 if no higher number is specified in individual equipment standard.

The user manual shall specify the processing and display capacity of AIS locating devices. In addition, the user manual shall describe the operational consequences to the processing and display of AIS locating devices in the event that the capacity is at the maximum provided for each case when further AIS locating devices are received.

There shall be an indication, or an alert (e.g. a caution) if specified by individual equipment standards, when the AIS locating devices processing or display capacity has been exceeded.

Table 6 – AIS locating devices capacity

Requirement	Capacity
Minimum display capacity for AIS locating devices	20
Minimum processing capacity for AIS locating devices	20

5.14.2.2 Methods of test and required results

The methods of test and the required results are as follows:

- confirm by inspection of user manual that it specifies the processing and display capacity of AIS locating devices; and that at least the minimum capacities are provided;
- use the AIS simulator and confirm by observation that there is an indication, or an alert (e.g. a caution) if specified by individual equipment standards, when the capacity of processing or display of AIS locating devices has been exceeded; that the displayed AIS locating devices are the nearest and that the EUT operates as described in the user manual;
- confirm by inspection of the user manual that it describes the operational consequences to the processing and display of AIS locating devices in the event that the processing or display capacity is at the maximum provided for each case when further AIS locating devices are received.

5.14.3 AIS locating device display

5.14.3.1 Requirement

It shall be possible to add or remove AIS locating devices from the display by a single layer (see Table 3) and it may be possible to add or remove AIS locating devices from the display by sub-layer (AIS-SART, EPIRB-AIS and AIS MOB), but not as individual objects.

AIS locating devices shall be presented by means of an appropriate symbol displayed using the predicted position, see Annex A.

An AIS locating device selected for display of its alphanumeric information shall be identified by the relevant symbol 2.12 given in Annex A;

For each selected AIS locating device, the following information shall be presented in alphanumeric form:

- Message 1 and 14, for AIS locating devices
 - identification (Name, from AIS Message 24A, 15-character HEX ID (applicable for EPIRB AIS), from Message 14, and/or MMSI. All available at least on demand);

- reported position, its age (based on current time and 'Time stamp' from AIS Message 1) and where available its quality (Position accuracy as " ≤ 10 m" or " > 10 m" and RAIM as "not in use" or "in use");
- calculated range of target;
- calculated bearing of target;
- reported COG (or calculated CTW if the display is sea stabilised). In sea stabilized display, the reported COG shall at least be available on demand;
- reported SOG (or calculated STW if the display is sea stabilised). In sea stabilized display, the reported SOG shall at least be available on demand;
- reported navigational status (active or under test);
- on user request, where available for AIS-SART and AIS MOB text from last received and for EPIRB-AIS text from the last two received unique AIS Message 14 related to the same MMSI. Received AIS Messages 14 having identical source and content shall replace existing messages that they duplicate. Received AIS Message 14 shall be automatically removed when the related AIS locating device is removed.

NOTE 1 Some examples of textual content of AIS Message 14 for AIS locating devices are: "SART ACTIVE", "SART TEST", "MOB ACTIVE", "MOB TEST", "EPIRB ACTIVE", "EPIRB TEST" and the 15-character HEX-ID of a Cospas-Sarsat beacon.

If the received AIS locating device information is incomplete, then the absent information shall be clearly indicated in the related data field as missing.

The information for a selected AIS locating device shall be displayed and continually updated, until another target, AIS data report, AIS locating device or AIS synthetic target is selected for information display or, if applicable, until the user dialogue area is closed.

NOTE 2 Information can be displayed in a separate user dialogue area.

AIS locating devices shall become lost after 6 min from the last received report.

NOTE 3 Nominal reporting intervals are given in ITU R M.1371.

The last predicted position of an AIS locating device shall be clearly marked by a lost AIS locating device symbol on the display as set forth in Annex A, and the lost AIS locating device warning shall be given if the lost AIS locating device warning function is enabled. If the lost AIS locating device warning function is disabled or if the AIS locating device is beyond a user defined range or if the AIS locating device is in testing, there shall be no lost AIS locating device symbol and the AIS locating device symbol shall be removed automatically from the display.

The lost AIS locating device symbol shall disappear if the signal (or message) for the AIS locating device is received again or after the warning has been acknowledged.

A means or method shall be provided for the user to enable/disable the lost AIS locating device warning function. There shall be a clear indication of whether the lost AIS locating device warning function is enabled or disabled. If an AIS locating device is beyond a user defined range, then no warning shall be generated.

The lost AIS locating device function enable/disable and the user defined range parameters may be shared with the lost target function, see 5.6.4, and/or the lost AIS data report device function, see 5.13.3.1.

5.14.3.2 Methods of test and required results

Use the AIS simulator and confirm by observation that the user can add and remove information from the presentation by layer and optionally sub-layers, but not as individual objects.

Use the AIS simulator and confirm by observation that AIS locating devices are displayed at the predicted position and that the symbol is as defined in Annex A.

Use the AIS simulator and confirm by observation that an AIS locating device selected for the display of its alphanumeric information is identified by the relevant symbol 2.12 given in Annex A.

Use the AIS simulator and confirm by observation that, for each selected AIS locating device, the required information is presented in alphanumeric form or that there is a clear indication of absent information in the related data field.

Use the AIS simulator and confirm by observation that information displayed for a selected AIS locating device is continually updated and that the information displayed for a selected AIS locating device remains displayed until another target, AIS data report, AIS locating device or AIS synthetic target is selected or the user dialogue is closed.

For the following tests related to the lost AIS reports, the timeout for the state of the lost AIS report is 6 min from the last received report.

Confirm by observation that a means or method is provided for the user to enable/disable the lost AIS locating device warning function; and that there is a clear indication of whether the lost AIS locating device warning function is disabled; and that a user defined range is available to control the functionality of the lost AIS locating device.

Use the AIS simulator to simulate a lost AIS locating device and confirm by observation that, when the lost AIS locating device warning function is enabled, the last predicted position of a AIS locating device is clearly marked by a lost AIS locating device symbol on the display and that the lost AIS locating device warning is created.

Use the AIS simulator to simulate a lost AIS locating device and confirm by observation that, when the lost AIS locating device function is disabled or when the AIS locating device is beyond a user defined range, no lost AIS locating device symbol is displayed and that the AIS locating device symbol is removed automatically from the display.

Use the AIS simulator and confirm by observation that, when signal (or message) for the AIS locating device is received again or after the lost AIS locating device warning has been acknowledged, the lost AIS locating device symbol disappears.

Use the AIS simulator to send an AIS locating device with associated AIS Message 14 and allow the AIS locating device to be lost and to be removed. Resend the AIS locating device after it has been removed and confirm by observation that no information remains available from the associated AIS Message 14.

5.15 AIS ASM

5.15.1 General

AIS ASMs used in this document are specified in IMO SN.1/Circ.289. An AIS ASM object represents information received from one or more AIS ASMs related to same uniquely identified AIS ASM object. See Annex J for the combinations of AIS ASMs to be combined as an AIS ASM object.

AIS ASMs are uniquely identified by their Application Identifier (AI), which is the combination of Designated Area Code (DAC) and Function Identifier (FI). All AIS ASMs described in this document have the DAC set as 1.

The AIS ASM objects used in this document are identified by the AI and one of the following:

- "Message linkage ID" and first six digits of source MMSI (FI = 18);
- "Message linkage ID" and first six digits of source MMSI (FI = 19);
- "Centre position of Berth, Latitude", "Centre position of Berth, Longitude" (FI = 20);
- "Position of observation, Latitude" and "Position of observation, Longitude" (FI = 21);
- "Message linkage ID" and first six digits of source MMSI (FI = 22);
- "Message linkage ID" and full source MMSI (FI = 23);
- "Latitude (from site location)" and "Longitude (from site location)" (FI = 26 and 31);
- "Message linkage ID" and first six digits of source MMSI (FI = 27 and 28);
- "Position #1 Latitude" and "Position #1 Longitude" (FI = 32).

NOTE 1 For the AIS base station as source, the first six digits of the source MMSI are $0_1 0_2 M_3 I_4 D_5 X_6$ of $0_1 0_2 M_3 I_4 D_5 X_6 X_7 X_8 X_9$. This leaves the last three digits $X_7 X_8 X_9$ available for possible repeated transmission of AIS ASMs by multiple sources coordinated by the shore operator.

NOTE 2 MMSI of the AIS ASM identifies the transmission source. For example, for redundancy purposes or expanded range, there cannot be multiple AIS Base or AIS AtoN stations with different MMSIs transmitting the same AIS ASM object.

Some AIS ASMs support a concept of "end of validity". This concept is based on the following combination of attributes related to AIS ASM validity, where provided and depending on the FI:

- End of "Duration" after "Start Date and Time" (FI=22 or 27);
- End of "Duration (forecast)" after "Valid time of forecast" (FI=26);
- End of "Data timeout (from site location)" (FI=26); or
- End of "Expected Next Signal" (FI=19).

NOTE 3 The validity period can include the current time or can start in the future.

Text description AIS ASMs (FI = 29 and 30) provide additional information related to an AIS ASM object (FI = 18, 19, 22, 23, 27 and 28). In the case that "Message linkage ID" and "MMSI of the source" from the text description AIS ASM matches an existing AIS ASM object, the text is combined into the AIS ASM object.

5.15.2 Categories

There are three categories of AIS ASM objects. For some categories of AIS ASM objects, the user can manage the storage by removing individual AIS ASM objects from the storage. The user may be able to remove and exclude AIS ASM objects from the storage by setting criteria. The user may also be able to control the display of AIS ASM objects in the storage by setting display criteria. The criteria can be for example, by layer, by range, by category.

For all categories of AIS ASM objects, only AIS ASM objects available from the storage can be displayed. Removing an AIS ASM object from the storage also causes it to be removed from the display.

NOTE Many AIS related objects, for example AIS targets, have one user functionality rule both for removal from storage and for add/remove from the display. AIS ASM does not apply one user functionality rule both for removal from storage and for add/remove from the display.

The three categories of AIS ASM objects are:

- 1) Addressed (FI = 18, 20, 23, 28, 30 and 32)
 - a) transmitted as addressed to a single vessel identified by the MMSI (AIS Message 6, Destination ID);
 - b) transmission is repeated until the source ends repetition or the destination has acknowledged received AIS ASM (AIS Message 7);
 - c) there is no timeout for automatic removal of the received AIS ASM;
 - d) automatic removal of AIS ASM object FI = 23 or FI = 28 happens after reception of a cancellation message as per IMO SN.1/Circ.289;
 - e) when the storage capacity limit is reached, the oldest AIS ASM object is replaced by the new AIS ASM object. The oldest AIS ASM object is the object for which the last reception of any related AIS ASM is the oldest;
 - f) an individual AIS ASM object can be removed from the storage by the user;
 - g) optionally received AIS ASM objects may be excluded and AIS ASM objects may be automatically removed from the storage by user selectable criteria. Examples of criteria are:
 - i) selected range: when outside, then excluded from reception and removed from the storage;
 - ii) selected by sub-layers (see Annex J): when de-selected, then excluded from reception and removed from the storage;
 - iii) selected by source (MMSI of source): when de-selected, then excluded from reception and removed from the storage;
 - iv) selected by FI: when de-selected, then excluded from reception and removed from the storage;
 - v) selected time since reception, when time passed, then excluded from reception and removed from the storage;
- 2) Broadcast – Date dependent (FI = 19, 22, 26, and 27; Include "end of validity")
 - a) transmitted as broadcast (AIS Message 8) with the combination of received AIS ASM information (i.e. AIS ASM object) and including "end of validity" concept related information;
 - b) transmission is repeated until end of validity;
 - c) optionally received AIS ASM may be excluded and AIS ASM objects may be automatically removed from the storage by user selectable criteria. Examples of criteria are:
 - i) selected range: when outside, then excluded from reception and removed from the storage;
 - ii) selected by sub-layers (see Annex J): when de-selected, then excluded from reception and removed from the storage;
 - iii) selected by source (MMSI of source): when de-selected, then excluded from reception and removed from the storage;
 - iv) selected by FI: when de-selected, then excluded from reception and removed from the storage;
 - v) selected time since reception, when time passed, then excluded from reception and removed from the storage;
 - d) automatic removal of AIS ASM object from the storage happens at the end of validity or after reception of a cancellation message as per IMO SN.1/Circ.289;
 - e) when the storage capacity limit is reached, the behaviour is as described by the manufacturer in the user manual;

- 3) Broadcast – Other (FI = 19, 21, 22, 26, 27, 29 and 31; Not including "end of validity")
 - a) transmitted as broadcast (AIS Message 8) with the combination of received AIS ASM information (i.e. AIS ASM object) and does not include "end of validity" concept related information;
 - b) transmission is repeated as long as the information is valid;
 - c) timeout for automatic removal of AIS ASM objects from the storage is 18 min from the last AIS ASM reception for a single AIS ASM object;
 - d) when the storage capacity limit is reached, the oldest AIS ASM object is replaced by the new AIS ASM object;
 - e) optionally received AIS ASM may be excluded and AIS ASM objects may be automatically removed from the storage by user selectable criteria. Examples of criteria are:
 - i) selected range: when outside, then excluded from reception and removed from the storage;
 - ii) selected by sub-layers (see Annex J): when de-selected, then excluded from reception and removed from the storage;
 - iii) selected by source (MMSI of source): when de-selected, then excluded from reception and removed from the storage;
 - iv) selected by FI: when de-selected, then excluded from reception and removed from the storage.

5.15.3 AIS ASM capacity

5.15.3.1 Requirements

If implementation of AIS ASM is provided, the equipment shall provide the capability to process and to display a minimum number of AIS ASM objects according to Table 7.

Table 7 – AIS ASM object capacity

AIS ASM object category	Minimum display capacity	Minimum processing capacity
Addressed and intended for own ship	10	10
Broadcast – Date dependent	20	20
Broadcast – Other	12	12
Storage capacities for each category should be bigger than or equal to display capacities for each category.		

The user manual shall specify the processing and display capacity of AIS ASM objects for each category. In addition, the user manual shall describe the operational consequences to the processing and display of current and new AIS ASM objects from the user point of view in the event that the capacity is at the maximum provided for each case specified in Table 7 when further AIS ASM objects are received.

For the AIS ASM categories "Addressed" and "Broadcast – Other" when reaching the capacity limit, on reception of AIS ASMs for a new AIS ASM object, the oldest AIS ASM object shall be replaced in the storage by the new AIS ASM object.

There shall be an indication, or an alert (e.g. a caution) if specified by individual equipment standards, when the AIS ASM processing or display capacity has been exceeded.

For AIS ASM objects of category "Addressed", the user shall be able to remove individual AIS ASM objects from the storage.

AIS ASM objects shall be automatically removed from the storage after reception of a cancellation message as per IMO SN.1/Circ.289.

Optionally, the functionality of the exclusion of received AIS ASMs and removal of AIS ASM objects from the storage may be provided by criteria. If provided, the user manual shall describe the functionality including details of the user selectable criteria. The functionality shall operate based on the criteria described in the user manual.

AIS ASM objects of category "Broadcast – Date dependent" shall be automatically removed from the storage after the end of validity (see 5.15.1).

AIS ASM objects of category "Broadcast – Other" shall be automatically removed from the storage after 18 min from the last received AIS ASM related to the AIS ASM object.

NOTE The nominal reporting interval is assumed to be 6 min.

EXAMPLE An area notice exists as long as reports for it are received at least once within the timeout period of 18 min and as long as it is within its specified validity period (i.e. until end of "duration" starting from "start date and time of area") and as long as it is not cancelled (i.e. "duration = 0").

5.15.3.2 Methods of test and required results

The methods of test and the required results are as follows:

- a) confirm by inspection of user manual that it specifies the processing and display capacity of AIS ASM objects and that at least the minimum capacities according to Table 7 are provided;
- b) confirm by inspection of the user manual that it describes the operational consequences to the processing and display of AIS ASM objects in the event that the capacity is at the maximum provided for each case when further AIS ASM objects are received;
- c) use the AIS simulator and confirm by observation that for AIS ASM categories "Addressed" and "Broadcast – Other" at reaching the capacity limit on reception of AIS ASMs for a new AIS ASM object the oldest AIS ASM object is replaced in the storage by the new AIS ASM object;
- d) use the AIS simulator and confirm by observation that there is an indication, or an alert (e.g. a caution) if specified by individual equipment standards, when the capacity of processing or display of AIS ASM objects has been exceeded and that the EUT operates as described in the user manual;
- e) use the AIS simulator and confirm by observation that AIS ASM objects of the AIS ASM category "Addressed" can be removed from the storage by user selection of individual AIS ASM object;
- f) use the AIS simulator and confirm by observation that AIS ASM objects are automatically removed from the storage after reception of a cancellation message as per IMO SN.1/Circ.289;
- g) if provided, confirm by inspection of the user manual that it describes the functionality of the exclusion of received AIS ASMs and removal of AIS ASM objects from the storage including details of the user selectable criteria;
- h) if provided, use the AIS simulator and confirm by observation that the functionality of exclusion of received AIS ASMs and removal of AIS ASM objects from the storage operate based on the user selectable criteria as described in the user manual and does not operate based on individual AIS ASM objects;
- i) use the AIS simulator and select display of all provided cases and confirm by observation that AIS ASM objects of the AIS ASM category "Broadcast – Date dependent" are removed after the end of validity;
- j) use the AIS simulator and select display of all provided cases and confirm by observation that AIS ASM objects of AIS ASM category "Broadcast – Other" are automatically removed after 18 min from the last received AIS ASM related to the AIS ASM object.

5.15.4 AIS ASM display

5.15.4.1 Requirement

Presentation on case-by-case basis for each AIS ASM Functional Identifier and display sub-layer (see Table J.1) may be provided.

If implementation of AIS ASM is provided, the user manual shall specify which AIS ASM Functional Identifiers and display sub-layers are supported (see Table J.1).

It shall be possible to add or remove AIS ASM objects from the display by layer or sublayer as defined in Table J.1, but not as individual objects.

Optionally, the equipment may allow the user to select by criteria which AIS ASM objects are displayed. Examples of criteria are:

- a) selected range: when outside, then not displayed;
- b) selected by source (MMSI of source): when de-selected, then not displayed;
- c) selected time since reception: when time passed, then not displayed.

AIS ASM objects shall be presented by means of an appropriate symbol or symbols displayed using the reported position. For selection of appropriate symbols, see Annex J. The shape of the symbol shall be as defined in Annex A.

NOTE Some AIS ASM objects require more than one symbol to present the information therein.

Where the user settings cause multiple different AIS ASM point symbols to be presented in the same position, a symbol shall be presented to represent all the AIS ASM point symbols at that position as follows:

- when the multiple different AIS ASM point symbols only include two or more of the symbols 5.6 (tidal and water level info), 5.7 (signal station) and/or 5.13 (environmental report) in Table A.5, the representing symbol shall be 5.13 (without optional addition of symbol 3.4 (tidal stream));
- when the multiple different AIS ASM point symbols include two or more different symbols including at least one symbol that is not symbol 5.6, 5.7 or 5.13, the representing symbol shall be symbol 5.18 (co-located AIS ASM objects).

Selection of an AIS ASM object for display of its alphanumeric information shall be possible from a list of available AIS ASM objects and by selecting the related symbol of the AIS ASM object.

When selecting the single symbol that represents multiple AIS ASM objects, the details of all the represented AIS ASM objects shall be provided to the user.

An AIS ASM object selected for display of its alphanumeric information shall be identified for point geometry objects by the symbol 2.12 given in Annex A and for line and area geometry objects the user manual shall describe the method used to identify the selection.

For each AIS ASM object selected for the display of its alphanumeric information, the values of the applicable and available fields contained in Table J.1 and Source ID (i.e. MMSI) shall be presented at least in alphanumeric form. The field of text description shall only be shown if content is available.

The alphanumeric presentation of the reason of an AIS ASM "Area Notice" (FI = 22 or 23) is based on "Notice Description". For values 0 to 125 of the "Notice Description", the alphanumeric presentation is the standardized text from the table in IMO SN.1/Circ.289. For value 127 of the "Notice Description", the alphanumeric presentation is the content of the "Associated Text".

The viewing date or viewing date range shall determine which date dependent objects are displayed. The viewing date or viewing date range shall be user selectable. When charted information is present, then the viewing date or viewing data range shall be common with charted information (for example S-57 ENC charts). If a date dependent AIS ASM object does not provide a start of validity information, it shall be considered valid up to the end of the validity.

There shall be a permanent indication when the viewing date or viewing date range does not include the current date. When an equivalent indication is required for charted information, a single, common, indication shall be presented.

AIS ASM objects that include the "end of validity" concept shall only be presented graphically when the viewing date or viewing date range overlaps the validity period.

AIS ASM objects shall not initiate any alerts.

5.15.4.2 Methods of test and required results

Confirm by inspection of user manual that it specifies which AIS ASM Functional Identifiers and display sub-layers are supported (see Table J.1).

If the equipment allows the user to select by criteria which AIS ASM objects are displayed, use the AIS simulator and confirm by observation that the selected criteria are used for the display of AIS ASM objects.

Use the AIS simulator and confirm by observation that the user can add and remove AIS ASM objects from the presentation by layers or sublayers as defined in Table J.1, but not as individual objects.

Use the AIS simulator and confirm by observation for each case supported and available in Table J.1 that AIS ASM objects are displayed at the reported position and that the symbol is as defined in Annex J and that the shape of the symbols is as defined in Annex A.

Use the AIS simulator to create cases of multiple point AIS ASM objects that are supported and that are in the same position (at least, where supported, the cases of: Air Gap + Berthing data; Wind + Weather; Wind + Water level; Tidal window + Water level) and confirm by observation for each case that symbol 5.13 or 5.18 is displayed as required in 5.15.4.1.

Use the AIS simulator and confirm by observation that it is possible to select an AIS ASM object for display of its alphanumeric information from the list of available AIS ASM objects and by selecting the related symbol of the AIS ASM object.

Use the AIS simulator and confirm by observation that, when selecting a single symbol that represent multiple AIS ASM objects, the details of all the represented AIS ASM objects are available to the user.

Use the AIS simulator and confirm by observation that an AIS ASM object selected for the display of its alphanumeric information is identified for point geometry objects by the symbol 2.12 given in Annex A and for line and area geometry objects by the method described in the user manual.

Use the AIS simulator and confirm by observation that, for each AIS ASM object selected for the display of its alphanumeric information, the values of the applicable and available fields contained in Table J.1 and Source ID (i.e. MMSI) are presented and that the field of text description is only shown if content is available.

Use the AIS simulator and confirm by observation that, for each AIS ASM "Area Notice" (FI = 22 or 23), the reason is based on "Notice Description" and that, for values 0 to 125 of the "Notice Description", the alphanumeric presentation is the standardized text from IMO SN.1/Circ.289 and that, for value 127 of the "Notice Description", the alphanumeric presentation is the content of the "Associated Text".

Confirm by observation that the viewing date and viewing date range are user selectable and that, when charted information is present, then the viewing date or viewing data range is common with charted information.

Confirm by observation that there is a permanent indication when viewing date or viewing date range does not include current date and that, when charted information is present, this indication is common with the indicator for the charted information.

Use the AIS simulator and confirm by observation that graphical presentation of AIS ASM objects which include the "end of validity" concept are only presented graphically when the viewing date or viewing date range overlaps the validity period.

Use the AIS simulator and confirm by observation that AIS ASM objects do not initiate any alerts.

5.16 Presentation of AIS synthetic target

5.16.1 Requirement

Presentation of AIS synthetic targets may be provided. If presentation of AIS synthetic targets is provided:

- a) the user manual shall specify the processing and display capacity of AIS synthetic targets. The processing capacity shall be at least 40 AIS synthetic targets and the display capacity shall be at least 20 AIS synthetic targets;
- b) it shall be possible to add or remove AIS synthetic targets from the display as a single layer, but not as individual objects;
- c) means may be provided to filter displayed AIS synthetic targets, for example based on range, speed, course if the information is available;
- d) AIS synthetic targets shall be displayed at the predicted position. The symbol shall be as defined in Annex A;

NOTE 1 FI = 17 VTS-generated/synthetic message includes velocity information. FI = 22 or FI = 23 Area Notices do not include velocity information.

- e) an AIS synthetic target selected for the display of its alphanumeric information shall be identified by the relevant symbol given in Annex A;
- f) for each AIS synthetic target selected for the display of its alphanumeric information, the following information shall be presented:
 - 1) when FI = 17, target identifier;
 - 2) reported position;
 - 3) calculated range from own ship to AIS synthetic target;
 - 4) calculated bearing from own ship to AIS synthetic target;
 - 5) when FI = 17, reported COG (or calculated CTW if the display is sea stabilised). In sea stabilized display, the reported COG shall at least be available on demand;
 - 6) when FI = 17, reported SOG (or calculated STW if the display is sea stabilised). In sea stabilized display, the reported SOG shall at least be available on demand;
 - 7) additional information, where available, shall be provided to the user on request;

If the received AIS synthetic target information is incomplete, then the absent information shall be clearly indicated in the related data field as missing.

The information for a selected AIS synthetic target shall be displayed and continually updated, until another target, AIS data report, AIS locating device or AIS synthetic target is selected for information display or, if applicable, until the user dialogue area is closed.

NOTE 2 Information can be displayed in a separate user dialogue area.

- g) AIS synthetic targets shall be automatically removed after 18 min from the last received report;

NOTE 3 Assumed nominal reporting interval is 6 min.

- h) if applicable, AIS synthetic targets shall be automatically removed after the end date and time specified or after receiving a cancellation message;
- i) AIS synthetic targets shall not initiate any alerts;
- j) there shall be an indication, or an alert (e.g. a caution) if specified by individual equipment standards, when the processing or display capacity for AIS synthetic targets has been exceeded.

5.16.2 Methods of test and required results

Where presentation of AIS synthetic targets is provided:

- a) confirm by observation that the user manual specifies the processing and display capacity of AIS synthetic targets and that at least the minimum capacities are provided;
- b) use the AIS simulator and confirm by observation that it is possible to add or remove AIS synthetic targets from the display as a single layer, but not as individual objects;
- c) if provided, use the AIS simulator and confirm by observation that means are provided to filter displayed AIS synthetic targets, for example based on range, speed, course;
- d) use the AIS simulator and confirm by observation that an AIS synthetic target is displayed at the predicted position and that the AIS synthetic target is not capable of being processed, for example updated by dead reckoning. Confirm by observation that the symbol is as defined in Annex A;
- e) use the AIS simulator and confirm by observation that an AIS synthetic target selected for the display of its alphanumeric information is identified by the relevant symbol given in Annex A;
- f) use the AIS simulator and confirm by observation that, for each selected AIS synthetic target, the following information is presented in alphanumeric form:
 - 1) when FI = 17, target identifier;
 - 2) reported position;
 - 3) calculated range from own ship to AIS synthetic target;
 - 4) calculated bearing from own ship to AIS synthetic target;
 - 5) when FI = 17, reported COG (or calculated CTW if the display is sea stabilised). In sea stabilized display, the reported COG is at least be available on demand;
 - 6) when FI = 17, reported SOG (or calculated STW if the display is sea stabilised). In sea stabilized display, the reported SOG is at least be available on demand;
 - 7) additional information, where available on user's request;

Confirm by observation that there is a clear indication of absent information in the related data field.

Confirm by observation that information displayed for a selected AIS synthetic target is continually updated and that the information displayed for a selected AIS synthetic target remains displayed until another target, AIS data report, AIS locating device or AIS synthetic target is selected or the user dialogue is closed;

- g) use the AIS simulator and confirm by observation that an AIS synthetic target is automatically removed after 18 min from the last received report;

- h) use the AIS simulator and confirm by observation that, if applicable, an AIS synthetic target is automatically removed after the end date and time specified or after receiving a cancellation message;
- i) use the AIS simulator and confirm by observation that AIS synthetic targets do not initiate any alerts;
- j) use the AIS simulator and confirm by observation that there is an indication, or an alert (e.g. a caution) if specified by individual equipment standards, when the processing or display capacity for AIS synthetic targets has been exceeded.

5.17 Presentation of association of DSC received call with a displayed AIS object

5.17.1 Requirement

Presentation of DSC received call associations may be provided. If presentation of DSC received call associations is provided:

- a) DSC received calls shall be associated with an AIS object based on MMSI. If the equipment has no AIS object with the same MMSI, then the DSC received call shall not be presented graphically;

NOTE 1 Typical AIS objects for this association include AIS targets, AIS locating devices and AIS synthetic targets.

- b) the user manual shall specify the processing and display capacity of associations of DSC received calls. The processing capacity shall be at least 40 associations of DSC received calls and the display capacity shall be at least 20 associations of DSC received calls;
- c) it may be possible to add or remove DSC received calls from the display as a single layer, but not as individual objects;
- d) if an AIS object, for which an association of a DSC received call is available, is displayed and, where applicable, if the layer of association of DSC received calls is enabled, then the appropriate symbol 5.16 given in Annex A shall be displayed;
- e) if an AIS object, for which an association of a DSC received call is available, is selected for the display of its alphanumeric information, then the information received for the association of the DSC received call shall be readily available;

NOTE 2 The AIS object associated with the DSC received call contains itself a lot of up-to-date information which is available from the selected AIS object itself.

NOTE 3 Some examples of alphanumeric information available from DSC, DSE, ECI sentences include: type of DSC call, category of distress call, nature of distress, time of reception.

- f) it shall be possible for the user to remove an association of a DSC received call from the database;
- g) an association of a DSC received call shall be automatically removed from the database after 8 h from the last received report;

NOTE 4 The above requirement assumes reporting is just a single report.

- h) association of DSC received calls with an AIS object shall not initiate any alerts;
- i) there shall be an indication, or an alert without audible announcement (i.e. a caution) if specified by individual equipment standards, when the processing or display capacity for association of DSC received calls has been exceeded.

5.17.2 Methods of test and required results

Where presentation of association of DSC received calls is provided:

- a) use the DSC simulator and the AIS simulator to provide DSC received calls and confirm by observation that an association of DSC received call is connected to an AIS object based on MMSI. Use the simulator arrangement and confirm by observation that, if the equipment has no AIS object with same MMSI, then the association of DSC received call is ignored;
- b) confirm by observation that the user manual specifies the processing and display capacity of association of DSC received calls and that at least the minimum capacities are provided;

- c) use the DSC simulator and the AIS simulator to provide DSC received calls and confirm by observation that, if applicable, it is possible to add or remove association of DSC received calls from the display as a single layer, but not as individual objects;
- d) use the DSC simulator and the AIS simulator to provide a DSC received call and confirm by observation that if an AIS object, for which an association of DSC received call is available, is displayed and if the layer of association of DSC received call is enabled, then the symbol 5.16 given in Annex A is displayed;
- e) use the DSC simulator and the AIS simulator to provide a DSC received call and confirm by observation that, if a target for which the association of DSC received call is available, is selected for the display of its alphanumeric information, then the information received for the association of DSC received call is readily available;
- f) use the DSC simulator and the AIS simulator to provide a DSC received call and confirm by observation that user can remove the association of DSC received call from the database;
- g) use the DSC simulator and the AIS simulator to provide a DSC received call and confirm by observation that the association of DSC received call is automatically removed after 8 h from the last received report;
- h) use the DSC simulator and the AIS simulator to provide DSC received calls and confirm by observation that association of DSC received calls do not initiate any alerts;
- i) use the DSC simulator and the AIS simulator to provide DSC received calls and confirm by observation that there is an indication, or an alert without audible announcement (i.e. a caution) if specified by individual equipment standards, when the processing or display capacity for association of DSC received calls has been exceeded.

5.18 AIS ASM information extending reported AIS target information

5.18.1.1 Requirement

Presentation of AIS ASM information extending reported AIS target information may be provided. Table 8 specifies the reported AIS target information extended by AIS ASM messages and the function identifiers (FI) of AIS ASM messages which extends the reported AIS target information (see 5.5.11).

If presentation of AIS ASM information extending reported AIS target information is provided, the extended reported AIS target information of Table 8 shall be linked to the reported AIS target information (see 5.5.11) and shall be available on demand in alphanumeric form.

NOTE AIS ASM (DAC = 001, FI = 16 or FI = 24) are available to be sent by AIS equipment by internal decision or by external request. The assumed reporting rate is every 6 min.

Table 8 – Extended reported AIS target information from AIS ASM

Reported AIS target extended information (IMO SN.1/Circ.289)	AIS ASM source FI
Last Port of Call	24
Next Port of Call	24
Air Draught	24
Diesel	24
Gross tonnage	24
Heavy fuel oil	24
Ice class	24
Laden or Ballast	24
Light fuel oil	24
Lloyd's Ship type	24
Number of Persons	16,24

Reported AIS target extended information	AIS ASM
Second Port of call	24
Shaft Horse power	24
SOLAS Equipment status	24
Total amount of bunker oil in tonnes	24
VHF Working channel	24

5.18.1.2 Methods of test and required results

Where presentation of AIS ASM information extending reported AIS target information is provided, use the AIS simulation to provide each item of reported AIS target information in Table 8 and confirm by observation that the information is available on demand.

5.19 Received AIS safety related messages

5.19.1 Requirements

Presentation of received AIS safety related messages may be provided. If provided, these requirements apply unless otherwise specified by an individual equipment standard.

The received AIS safety related messages consist of AIS safety related messages sent by AIS targets, AIS base stations and AIS SAR aircraft. The presentation of AIS safety related messages is independent of the graphical presentation of the AIS target, AIS base station, or AIS SAR aircraft.

The user shall be able to tag individual safety related messages for permanent retention (retained). These messages shall not be overwritten by new messages. When no longer required, or when the storage capacity available for retained messages has been reached, the user shall be able to remove the tag on these messages which may then be overwritten in normal course.

The user manual shall specify the processing capacity of received AIS safety related messages. The processing capacity shall be at least 60 AIS safety related messages sub-divided as last 20 addressed, last 20 broadcast and 20 retained by user. AIS safety related messages sent by AIS locating devices and AIS AtoNs are processed and managed separately, see 5.14 and 5.13.

Received AIS safety related messages shall be linked to a source based on MMSI.

If an AIS target, AIS base station or AIS SAR aircraft for which an unread received AIS safety related message is available or if the content of a received AIS safety related message is selected for display is displayed, then the appropriate symbol given in Annex A (symbol 5.16) shall be displayed based on user selection. It shall not be possible to remove individual symbols associated with the received AIS safety related message sources from the presentation.

In this document, there are no requirements for synchronization of this functionality between individual equipment (e.g. between AIS and Radar).

Users shall have means (for example a list of received messages) to retrieve and individually view the field "safety related text" and the UTC time, if available, of receipt by the display equipment of at least the last 20 addressed and last 20 broadcast AIS safety related messages received and at least 20 received AIS safety related messages retained by the user. Using these means, the user shall be able to select the related AIS object based on MMSI for alphanumeric presentation of information.

Users shall have means to remove any individual or all received AIS safety related messages. After changing a single or all received AIS safety related messages in the storage to "retained" or "read" or after manual or automatic removal of a single or all unread received AIS safety related messages, the related symbol 5.16 given in Annex A shall no longer be displayed.

Received AIS safety related messages having identical source and content shall replace existing messages that they duplicate and shall maintain the status of the received AIS safety related message, retained, read or unread, as it was before. The time of receipt shall be set based on the newly received AIS safety related message.

The oldest not retained received AIS safety related message shall be automatically removed when the storage capacity for the last received messages is fully occupied and a new AIS safety related message is received.

An indication that there are unread received AIS safety related messages available shall be provided.

An indication of which received AIS safety related-messages are unread or retained shall be provided.

5.19.2 Methods of test and required results

If presentation of received AIS safety related messages from AIS targets, AIS base stations and AIS SAR aircraft is provided, apply the following tests, unless otherwise specified by an individual equipment standard:

- a) confirm by observation that the user manual specifies the processing capacity of received AIS safety related messages and that at least the minimum capacities are provided;
- b) use the AIS simulator to send the storage capacity of the equipment plus one received AIS safety related message and confirm by observation that:
 - the storage capacity for AIS safety related messages is at least the last 20 addressed and the last 20 broadcast received messages plus at least 20 retained messages;
 - the oldest received message has been automatically removed;
 - each received AIS safety related message is initially in the state of "unread";
 - there is an indication that there are "unread" received AIS safety related messages available;
 - received AIS safety related messages are linked to the sources based on MMSI;
 - duplicate received AIS safety related message having identical source and content replace existing message and maintain the status, retained, read or unread, as it was before;
 - when enabled by the user, AIS targets, AIS base stations and/or AIS SAR aircraft with linked and unread received AIS safety related messages are indicated by appropriate symbols in connection to the displayed AIS target, AIS base station and/or AIS SAR aircraft symbols;
 - when enabled by the user, an AIS target, AIS base station or AIS SAR aircraft for which the content of a received AIS safety related message is selected for display is indicated by an appropriate symbol in connection to the displayed symbol of AIS target, AIS base station or AIS SAR aircraft;
 - it is not possible to remove received AIS safety related message symbols from AIS targets, AIS base stations and AIS SAR aircraft based on individual received AIS safety related messages;
- c) confirm by observation that it is possible to remove any individual or all received AIS safety related messages;

- d) confirm by observation that a duplicate AIS safety related message replaces the existing message maintaining the status of the existing message retained, read or unread, as it was before and that the time of receipt is set based on the newly received AIS safety related message;
- e) confirm by observation that the alphanumeric content and the time of receipt of each received AIS safety related message is available for viewing together with the state (unread/read/retained) indication applicable for the individual received AIS safety related message;
- f) confirm by observation that, after changing all received AIS safety related messages in the storage to "read" or "retained", the indication of unread received AIS safety related messages available is no longer displayed;
- g) confirm by observation that, using the means provided, the user is able to select the related AIS object based on MMSI for alphanumeric presentation of information;
- h) confirm by observation that, after changing a single or all received AIS safety related messages in the storage to "retained" or "read" or after manual or automatic removal of a single or all unread received AIS safety related messages, the related symbols (5.16, see Annex A) are no longer displayed.

5.20 Sent AIS safety related messages

5.20.1 Requirements

Facilities to send AIS safety related messages may be provided. If provided, these requirements apply unless otherwise specified by an individual equipment standard.

It shall not be possible to send AIS addressed safety related messages to AIS targets which have reported the DTE indicator = 1 (not available).

NOTE The purpose of the data terminal equipment (DTE) indicator is to indicate to an application on the receiving side that, if set to available, the transmitting station conforms at least to the minimum keyboard and display requirements.

5.20.2 Methods of test and required results

If facilities to send AIS safety related messages are provided and unless otherwise specified by an individual equipment standard, confirm by observation that, when a safety related message is sent to an AIS target and the state of the addressed AIS target is DTE = 1, an indication is given that the sent AIS safety related message may not be displayed at the recipient.

6 INS, radar and chart displays

6.1 General

6.1.1 Application

NOTE See IEC 62388 for equivalent tests for Clause 6 for radar equipment.

The provisions of this Clause 6 are applicable to stand-alone displays, associated with radar systems or responsible for the presentation of electronic chart information (for example, ECDIS) and multifunction display equipment when providing a radar or chart display.

6.1.2 Multifunction displays

6.1.2.1 Requirement

(MSC191/7.1.1) *If the display equipment is capable of supporting the presentation of multiple functions or operational modes, then there shall be a clear indication of the primary function supported by the presentation (for example, radar, chart, etc.). It shall be possible to select the presentation associated with the primary function, for example, the radar presentation (see 6.2) or the chart presentation (for example, ECDIS) (see 6.3), by a simple operator action.*

6.1.2.2 Methods of test and required results

Where display equipment is capable of supporting the presentation of multiple functions:

- a) confirm by observation that the primary function of the display equipment is clearly indicated;
- b) confirm by observation that the presentation associated with the primary function can be selected by a simple operator action.

6.1.3 Simultaneous display of radar and chart data

6.1.3.1 Requirement

(MSC191/7.1.2) *If a radar video image and electronic chart information are displayed together, the chart and the radar video image shall use the same reference system and co-ordinate criteria, including, as applicable, datum, CCRP, and stabilisation mode, and shall match in scale, projection and orientation. Any user-entered offset, in addition to installation alignment (for example, to CCRP and/or heading reference), shall be indicated. The details of the offset shall be readily available to the user.*

NOTE The Performance Standards for individual navigational systems and equipment provide functional requirements for offsets.

6.1.3.2 Methods of test and required results

Where a radar video image and electronic chart information are displayed together:

- a) confirm by observation that they use the same reference system and co-ordinate criteria;
- b) confirm by observation that they use the same stabilisation mode;
- c) confirm by observation that they match in scale, projection and orientation;
- d) confirm by observation that an indication is provided for any user-entered offset to the presentation of either the radar video image or the electronic chart information;
- e) confirm by observation that the details of the user-entered offset are readily available.

6.1.4 Range scales

6.1.4.1 Requirement

(MSC191/7.1.3) *If a radar video image is displayed, range scales of 0,25, 0,5, 0,75, 1,5, 3, 6, 12 and 24 nautical miles shall be provided. Additional range scales are permitted below 0,25 NM and/or above 24 NM. The selected range scale shall be clearly and permanently or persistently indicated, as appropriate for the application.*

Metric units may also be provided. (See also 5.10.2.)

6.1.4.2 Methods of test and required results

Where a radar video image is displayed:

- a) confirm by observation that range scales of 0,25, 0,5, 0,75, 1,5, 3, 6, 12 and 24 NM are provided for user selection;
- b) where additional range scales are provided, confirm by observation that they are below 0,25 NM and/or above 24 NM;
- c) confirm by observation that the selected range scale is clearly indicated and remains visible while the radar video image is displayed.

6.1.5 Operational display area

6.1.5.1 Requirement

(MSC191/7.1.5) *No part of the operational display area shall be permanently used for the presentation of information that is not part of the navigational presentation (for example, pop up displays, drop down menus and information windows). Temporary, limited and relevant alphanumeric data, information and text may be displayed adjacent to a selected symbol, graphic or target within the operational display area.*

Any windows containing text, diagrams, etc. superimposed on the operational display area shall be temporary and movable (for example, to a less important part of the display, such as on land).

Note that display equipment should avoid the use of dialogue boxes using white backgrounds, or provide a means or method of automatically changing the background of dialogue boxes which appear on displays set for use in dusk or dark conditions.

6.1.5.2 Methods of test and required results

The methods of test and the required results are as follows:

- a) confirm by observation that any information that is not part of the navigational presentation but is superimposed on the operational display area is presented only in response to an explicit user action (for example, a menu selection, hyperlink, hot key, etc.);
- b) confirm by observation that any windows containing text, diagrams, etc. superimposed on the operational display area are movable within the operational display area or can be removed from the operational display area.

6.1.6 Motion display modes

6.1.6.1 Requirement

A clear indication of the motion mode in use shall be provided. (See also 4.10.1)

6.1.6.2 Methods of test and required results

Verify that a clear indication of the display mode in use is provided in accordance with 4.10.1.

6.1.7 Orientation modes

6.1.7.1 Requirement

A north up orientation mode shall be provided for radar and chart presentations.

A course up orientation mode shall be provided for radar presentations and may be provided for chart presentations.

A head up orientation mode may be provided for both radar and chart presentations.

A clear indication of the orientation mode in use shall be provided. (See also 4.10.1)

It shall always be possible to display the SENC information in a north-up orientation. Other orientations are permitted. When such orientations are displayed, the orientation shall be altered in steps large enough to avoid unstable display of the chart information.

6.1.7.2 Methods of test and required results

The methods of test and the required results are as follows:

- a) confirm by observation that a north up orientation mode is provided;
- b) for radar displays, confirm by observation that a course up orientation mode is provided;
- c) verify that a clear indication of the orientation mode in use is provided in accordance with 4.10.1;
- d) for each bearing stabilised orientation that may be provided, confirm by analytical evaluation that, for rates of turn between 0°/s and 20°/s, the displayed chart symbols and text in the operational display area do not re-orient more often than twice per second and remain legible.

6.1.8 Off-centring

6.1.8.1 Requirement

If a radar video image is displayed, manual off-centring shall be provided to locate the selected antenna position (i.e. the centre of the radar video image) at any point within at least 50 % and not more than 75 % of the radius, measured from the centre of the operational display area. This limitation is only applicable for Radar or Radar-mode available in the equipment (for example, this limitation is not valid for radar overlay in an ECDIS).

If a radar video image is displayed, and an off-centred display is selected, the selected antenna position shall be capable of being located to any point on the display up to at least 50 %, and not more than 75 %, of the radius from the centre of the operational display area. A facility for automatically positioning own ship for the maximum view ahead may be provided. This limitation is only applicable for Radar or Radar-mode available in the equipment (for example, this limitation is not valid for radar overlay in an ECDIS).

If a radar video image is displayed, and an off-centred display and true motion display mode are selected, the selected antenna position shall automatically reset at least 50 %, and not more than 75 %, of the radius from the centre of the operational display area to a location giving the maximum view along own ship's course. Provision for an early reset of the selected antenna position shall be provided. This limitation is only applicable for Radar or Radar-mode available in the equipment (for example, this limitation is not valid for radar overlay in an ECDIS).

6.1.8.2 Methods of test and required results

Where a radar video image is displayed in a Radar or Radar-mode (not, for example, as a radar overlay on ECDIS):

- a) confirm by observation that manual off-centring is provided;
- b) confirm by observation that manual off-centring provides the capability to locate the selected radar antenna position at any point in the operational display area at least 50 % and not more than 75 % of the radius measured from the centre;
- c) where an off-centred display and true motion display mode is selected,
 - 1) confirm by observation that the selected radar antenna position is automatically reset at least 50 %, and not more than 75 %, of the radius from the centre of the operational display area,
 - 2) confirm by observation that the user may manually reset the selected radar antenna position.

6.1.9 Stabilisation modes

6.1.9.1 Requirement

If electronic chart information is displayed, then a ground stabilisation mode shall be provided.

Where radar information is displayed, both ground and sea stabilisation modes shall be provided.

The stabilisation mode and stabilisation source (i.e. velocity or speed source) shall be clearly indicated. (See also 4.10.1.)

NOTE Ground stabilisation requires a ground-referenced velocity (i.e. COG/SOG) from an external sensor capable of providing own ship speed measured over the ground (for example, an EPFS). Sea stabilisation requires a water-referenced velocity (i.e. CTW/STW or HDG/SPD) from an external sensor capable of providing own ship speed measured through the water (for example, an SDME).

6.1.9.2 Methods of test and required results

The methods of test and the required results are as follows:

- a) where electronic chart information is displayed, confirm by observation that a ground stabilisation mode is provided;
- b) where a radar information is displayed, confirm by observation that both ground and sea stabilisation modes are provided;
- c) confirm by observation that a clear indication of the stabilisation mode selected and its source are provided.

6.2 Radar displays

6.2.1 Application

The provisions of 6.2 are applicable to stand-alone displays associated with radar systems and multifunction displays when providing a radar display.

NOTE The functional requirements for radar are defined in the performance standards set forth in IMO Resolution MSC.192(79) and further specified in IEC 62388. The presentation requirements for radar information are defined in the performance standards for presentation set forth in IMO Resolution MSC.191(79) and further specified in this document.

6.2.2 Radar video image

6.2.2.1 Requirement

(MSC191/7.2.1.1) The *radar video image* (i.e. echoes), *tracked radar targets* and *reported AIS targets* shall *not be substantially degraded, masked or obscured by other presented information*. (See also 5.4.1.)

(MSC191/7.2.1.2) *It shall be possible to temporarily suppress all graphical information from the display, retaining only the radar video image and target trails.*

6.2.2.2 Methods of test and required results

The methods of test and the required results are as follows:

- a) confirm by analytical evaluation that the presentation of the radar video image, tracked radar targets and reported AIS targets is not degraded, masked or obscured by other presented information;
- b) confirm by observation that the user can suppress the presentation of all graphical information so that only the radar video image and target trails remain.

6.2.3 Brightness of radar information

6.2.3.1 Requirement

(MSC191/7.2.1.3) *The brightness of the radar video image (i.e. echoes) and associated graphic symbols for tracked radar targets shall be variable. It shall be possible to control the brightness of all displayed radar information. There shall be independent means to adjust the brightness of groups of displayed graphics and alphanumeric data, information and text (for example, tracked radar targets, navigation tools, etc.). The brilliance (i.e. brightness) of the heading line shall not be variable to extinction.*

6.2.3.2 Methods of test and required results

The methods of test and the required results are as follows:

- a) confirm by observation that a means or method to adjust the brightness of the radar video image is provided;
- b) confirm by observation that a separate independent means or method to adjust the brightness of tracked radar target symbols is provided;
- c) confirm by observation that a separate independent means or method to adjust the brightness of groups of other displayed graphics and alphanumeric data, information and text is also provided;
- d) confirm by observation that the brightness of the heading line cannot be adjusted to the point of extinction.

6.2.4 Display of chart information on radar

6.2.4.1 Requirement

(MSC191/7.2.2.1) *Vector format electronic chart information may be presented on a radar display. This shall be accomplished using layers (i.e. of charted objects or elements) selected from an electronic chart database. As a minimum, the elements of the ECDIS Standard Display (see IEC 61174) shall be available for individual selection by IMO display category or layer (for example, by IHO suggested viewing group, see IHO S-52), but not as individual objects. As far as practical, electronic chart information shall be presented in accordance with this document (see 4.5.1, 4.6.2 and 5.5.1) and with the ECDIS Performance Standards (IEC 61174). Raster navigational charts are not permitted for chart radar applications.*

NOTE IEC 62388 requires a subset of the ECDIS standard display, called the primary chart information set, to be made available by a primary control function.

(MSC191/7.2.2.3) *If electronic chart information is displayed on a radar presentation, then there shall be a permanent or persistent indication of its status (for example, on/off, official/unofficial data, overscale/underscale, etc.), as appropriate for the application. The source and update information shall also be available to the user on demand.*

Note that the overscale area pattern addressed in the relevant IHO standards, for example IHO S-52 and IHO ECDIS Presentation Library, may obscure or degrade the presentation of the radar video image. An alternative means or method of overscale indication (for example, the display of an overscale factor) is an acceptable alternative.

If electronic chart information is presented on a radar display, it shall be possible to temporarily remove it by a single operator action and also to switch charts on and off.

6.2.4.2 Methods of test and required results

When vector format electronic chart information is presented on a radar display:

- a) confirm by observation that the content of the electronic chart database includes all of the elements specified by the IMO for the ECDIS standard display (see IEC 61174);

- b) confirm by observation that elements of the standard display are available for selection (i.e. for display) by IMO display category and/or by layer, but not as individual chart objects;
- c) verify the presentation of vector format electronic chart information in accordance with 4.5.1, 4.6.2 and 5.5.1;
- d) confirm by observation that raster format electronic chart information cannot be presented when the radar is displayed;
- e) where electronic chart information is presented in shades of grey, confirm that they are distinguishable between respective chart features;
- f) confirm by observation that a permanent indication of the status (official/unofficial data and overscale/underscale) of the electronic chart information is provided;
- g) confirm by observation that the source of the electronic chart information and its update information are available to the user on demand;
- h) confirm by observation that the user may temporarily remove electronic chart information from the display by a single operator action and that there is a facility to switch charts on and off. The temporarily removed function may be combined with other functions;
- i) confirm by document inspection that the user manual describes all available chart functionalities;
- j) confirm by document inspection that the EUT has no functionality to use raster navigational charts;
- k) verify the testing of colours and intensity in accordance with the test methods and required results of the Annex G.

6.2.5 Priority of radar information

6.2.5.1 Requirement

(MSC191/7.2.2.2) *If electronic chart information is presented within the operational display area, the presentation of radar information (for example, the radar video image, target trails, etc.) shall have priority. The electronic chart information shall be clearly perceptible as such. The electronic chart information shall not substantially degrade, mask or obscure the radar video image, tracked radar targets or reported AIS targets.*

6.2.5.2 Methods of test and required results

When electronic chart information is presented on a radar display:

- a) confirm by observation that the radar video image and target trails have display priority over the electronic chart information;
- b) confirm by analytical evaluation that the presentation of electronic chart information cannot be confused with the display of any other information (for example radar information or AIS information);
- c) confirm by analytical evaluation that the presentation of the electronic chart information does not substantially degrade, mask or obscure the presentation of radar information in accordance with 6.2.2.

6.2.6 Display of map graphics

6.2.6.1 Requirement

(MSC191/7.2.3) User generated radar *map graphics* including monitored and/or additional planned routes *may be* presented on a radar display, *but shall not substantially degrade, mask or obscure the radar video image, target trails, tracked radar targets, reported AIS targets, or electronic chart information.*

Where a radar system provides map graphics for monitored and/or planned routes, it shall comply with the relevant clauses of IEC 61174.

Map graphics may be referenced to own ship or to a geographical position. It shall be possible to remove the display of map graphics by a simple operator action.

Map graphics may consist of lines, symbols and reference points.

The appearance and colours of map graphic lines and symbols are set forth in Annex A.

6.2.6.2 Methods of test and required results

When user generated map graphics are displayed on a radar presentation:

- a) confirm by analytical evaluation that map graphics do not substantially degrade, mask or obscure the radar video image, target trails, tracked radar targets, reported AIS targets or electronic chart information;
- b) confirm by observation that map graphics can be referenced to own ship or to a geographic position;
- c) confirm by observation that the user may remove the display of map graphics by a simple operator action;
- d) confirm by observation that the appearance and colour of the map graphics lines, symbols and reference points are in accordance with Annex A;
- e) where a radar system provides map graphics for monitored and/or planned routes, confirm by documented evidence that it complies with the relevant clauses of IEC 61174.

6.3 Chart displays

6.3.1 Application

The provisions of 6.3 are applicable to stand-alone displays responsible for the presentation of electronic chart information and multifunction displays when providing a chart display.

NOTE The functional requirements for ECDIS are defined in the performance standards set forth in IMO Resolution MSC.232(82) and further specified in IEC 61174. The presentation requirements for electronic chart information are defined in the performance standards for presentation, set forth in IMO Resolution MSC.191(79) and further specified in this document.

6.3.2 Display of chart information

6.3.2.1 Requirement

(MSC191/7.3.1.1) Electronic chart information *and all updates to it* shall be presented *without any degradation of information content*.

(MSC191/7.3.1.2) Electronic *chart information* shall *not be substantially degraded, masked or obscured by other presented information* (for example, a radar video image, tracked and/or reported targets, etc.).

6.3.2.2 Methods of test and required results

The methods of test and the required results are as follows:

- a) verify the presentation of electronic chart information in accordance with 4.5.1, 4.6.2 and 5.5.1;
- b) confirm by analytical evaluation that the electronic chart information is not substantially degraded, masked or obscured by other presented information.

6.3.3 IMO ECDIS display categories

6.3.3.1 Requirement

(MSC191/7.3.1.3) *It shall be possible to temporarily suppress all supplemental (e.g. radar, AIS and other overlays) information from the chart display, retaining only chart related information contained in the ECDIS Display Base.* This function is not required to be of single or simple operator action.

It shall be possible to remove radar information, AIS information and other navigational information including all non-charted information from the chart display by a single operator action. Chart display consists of chart itself and all automatic and manual updates for it. This removal may be permanent or momentary.

ENC and other vector format electronic chart information available for presentation on a chart display during route planning and route monitoring shall be subdivided into the following three IMO display categories:

- ECDIS display base;
- ECDIS standard display; and
- all other information.

It shall be possible to present the ECDIS standard display at any time by a single operator action. This single operator action shall not change any non-chart related user settings for the display.

When a chart display is switched on following a switch off or power failure, it shall return to the most recent settings for the display.

6.3.3.2 Methods of test and required results

The methods of test and the required results are as follows:

- a) confirm by observation that the user can suppress the presentation of all graphical information so that only the electronic chart information in the ECDIS Display Base remains;
- b) confirm by observation that, by a single operator action, the user can permanently or momentarily remove the presentation of all additional information so that only the chart display including automatic and manual updates remains;
- c) verify the subdivision of vector format electronic chart information into IMO display categories in accordance with IEC 61174;
- d) verify that the user can select the ECDIS standard display at any time by a single operator action. Confirm by observation that this single operator action does not change any other display setting than the displayed layers of the electronic charts;
- e) confirm by observation that, when the chart display is switched on, the electronic chart information is presented with the most recent display settings.

6.3.4 Adding or removing information from the display

6.3.4.1 Requirement

(MSC191/7.3.1.4) *It shall be possible to add or remove information from the chart display by layer (IHO viewing group, see for example IHO S-52), but not as individual objects. It shall not be possible to remove information contained in the ECDIS Display Base (see IEC 61174) from the display.* (See also 6.3.2.)

6.3.4.2 Methods of test and required results

The methods of test and the required results are as follows:

- a) confirm by observation that the user can add and remove information from the presentation by layer but not as individual objects;
- b) confirm by observation that the user cannot remove information contained in the ECDIS display base;
- c) confirm by observation that IHO viewing groups can be individually selected for display.

6.3.5 Safety contour

6.3.5.1 Requirement

(MSC191/7.3.1.5) *It shall be possible to select a safety contour from the depth contours provided by vector format electronic chart information. The safety contour shall be emphasized over other contours on the display in accordance with the relevant IHO standards, for example IHO S-52.*

6.3.5.2 Methods of test and required results

The methods of test and the required results are as follows:

- a) confirm by observation that the user can select a safety contour from the depth contours provided in vector format electronic chart information;
- b) confirm by observation that the presentation of the safety contour is emphasised over other depth contours.

6.3.6 Safety depth

6.3.6.1 Requirement

(MSC191/7.3.1.6) *It shall be possible to specify a safety depth. Soundings equal to or less than the safety depth shall be emphasized whenever spot soundings are selected for display.*

6.3.6.2 Methods of test and required results

The methods of test and the required results are as follows:

- a) confirm by observation that the user can specify a safety depth;
- b) confirm by observation that the presentation of spot soundings less than or equal to the safety depth are emphasized over other spot soundings.

6.3.7 Chart scale

6.3.7.1 Requirement

(MSC191/7.3.1.7) *An indication shall be provided if chart information is displayed at a larger scale than contained in the electronic chart database, or if own ship's position is covered by electronic chart information at a larger scale than the presentation.*

(MSC191/7.3.1.8) *Overscaled areas presented on the chart display shall be identified as defined in the relevant IHO standards, for example IHO ECDIS Presentation Library in IHO S-52 and its Appendices.*

6.3.7.2 Methods of test and required results

The methods of test and the required results are as follows:

- a) confirm by observation that an indication is provided when chart information is presented at a larger scale than in the electronic chart database;

- b) confirm by observation that an indication is provided when own ship's position is covered by electronic chart information at a larger scale than the presentation;
- c) confirm by observation that overscaled areas presented on the display are identified.

6.3.8 Display of radar and target information

6.3.8.1 Requirement

(MSC191/7.3.2.1) A radar video image, tracked radar and reported AIS target information may be presented on a chart display but shall not substantially degrade, mask or obscure the presentation of electronic chart information. As far as practical, the radar video image and target information shall be presented in accordance with the radar Performance Standards (see IEC 62388) and with the presentation standards set forth in this document.

(MSC191/7.3.2.2) A radar video image, tracked radar and reported AIS target information shall be clearly distinguishable from the electronic chart information. It shall be possible to remove radar and target information by a simple operator action.

6.3.8.2 Methods of test and required results

The methods of test and the required results are as follows:

- a) verify that the radar video image is presented in accordance with 5.4.1 and 5.4.2, as applicable;
- b) verify that targets are presented in accordance with 5.5.8;
- c) verify that radar and target information are clearly distinguishable from chart information in accordance with 6.3.2;
- d) confirm by observation that radar and target information can be removed from the presentation by a simple operator action.

6.3.9 Display of additional information

6.3.9.1 Requirement

(MSC191/7.3.3.1) Information from additional sources may be displayed on ECDIS but shall not substantially degrade, mask or obscure the chart information.

(MSC191/7.3.3.2) Additional information (including information for route planning, route monitoring, information overlays and supplementary navigation tasks) shall be clearly distinguishable from the electronic chart information. It shall be possible to remove additional information by a simple operator action.

6.3.9.2 Methods of test and required results

The methods of test and the required results are as follows:

- a) verify the presentation of additional information in accordance with 4.6.2;
- b) verify that the presentation of electronic chart information is not degraded, masked or obscured by the presentation of additional information in accordance with 6.3.2;
- c) verify that additional navigation-related information is clearly distinguishable from chart information in accordance with 6.3.3;
- d) confirm by observation that additional navigation-related information can be removed from the presentation by a simple operator action.

6.4 Composite task-oriented presentations

6.4.1 User-configured presentations

6.4.1.1 Requirement

(MSC191/7.4.1) *The user may configure a presentation for a specific task-at-hand. The presentation may include radar and/or electronic chart information, in combination with other navigation or ship related data or information. When not fully compliant with the relevant Performance Standards, such a presentation shall be identified as an auxiliary presentation.*

6.4.1.2 Methods of test and required results

The methods of test and the required results are as follows:

- a) if the user can configure presentations for the task-at-hand, confirm by inspection of documented evidence that all tasks configurable are noted in the manual;
- b) confirm by analytical evaluation that, for all tasks listed in the user documentation, the relevant related data and information are displayed;
- c) confirm that the display is fully compliant with the relevant performance standards either by analytical evaluation or inspection of the relevant test reports related to the task-at-hand for which test standards exists.

If the display is not fully compliant with the relevant performance standards, confirm by observation that a clear indication as an auxiliary presentation is provided.

6.4.2 Information associated with the task-at-hand

6.4.2.1 Requirement

(MSC191/7.4.2) *As far as practical, the presentation of any radar and/or chart related functions shall be compliant with the requirements of the relevant Performance Standards and of the presentation standards set forth in this document, with the exception of size requirements for the operational display area. Windows of chart or radar information may be presented along with other information associated with the task-at-hand.*

6.4.2.2 Methods of test and required results

The methods of test and the required results are as follows:

- a) confirm by inspection of test reports that the Radar and/or chart related functions are compliant with the relevant Performance Standards;
- b) confirm by analytical evaluation or inspection of the relevant test reports that the content and the physical display are compliant with the relevant parts of the presentation standards. Document the size of the operational display in use;
- c) confirm by analytical evaluation that the presentation of chart and radar information along with other information associated with the task-at-hand, if available, is in line with this document.

6.5 Single and simple operator actions

6.5.1 Applicability

The requirements of this Subclause 6.5 are from a recommendatory source for ECDIS, radar and INS. The implementation of this recommendation is optional. Manufacturers shall declare if these requirements have been implemented. The following requirements are applicable, if the manufacturer has declared implementation of Appendix 4 of MSC.1/Circ.1609.

6.5.2 Requirement

(MSC.1/Circ.1609/Appendix 4/3) *The inclusion of non-mandatory functions in the tables of Annex H does not make such functions 'mandatory' to provide. Where the functions in the tables of Annex H are included within navigation equipment, such functions shall comply with the criteria listed in the tables of Annex H.*

(MSC.1/Circ.1609/Appendix 4/1) *Where the equipment provides the functions listed in the tables of Annex H, access shall be as defined as in the tables of Annex H except where conformance is mandated by individual equipment standards. A requirement for information to be presented on single operator action may alternatively be met by a permanent indication.*

(MSC.1/Circ.1609/Appendix 4/2) *Care will need to be taken when adding single and simple operator action buttons to displays. The manufacturer/operator shall consider keeping the display area for the main function of the equipment as much as possible for user operability. It may be more useful to contain shortcut buttons under one setting menu rather than add many icons to the desktop.*

NOTE Single operator action functions available from physical controls outside of the display area are not part of the above requirements.

Manufacturers shall declare all functions available in the display area for single operator action and not listed as such in Annex H. The manufacturer's declaration shall include reasons why such functions are available as single operator action.

6.5.3 Methods of test and required results

The methods of test and the required results are as follows:

- a) confirm by observation that, if provided, functions listed in Annex H have been implemented as single or simple operator action according to Annex H;
- b) refer to manufacturer's declaration and confirm by analytical evaluation that any additional single operator action function, if available in the display area, is appropriate for being available in the highest level of the user interface.

6.6 User and default settings

6.6.1 General

The requirements of this Subclause 6.6 are from a recommendatory source for ECDIS, radar and INS. The implementation of these recommendations is optional. Manufacturers shall declare if these requirements have been implemented.

6.6.2 User-settings

6.6.2.1 Requirement

(MSC.1/Circ.1609/Appendix 5/1) *A facility shall be provided to store and recall user-specific settings to suit the conditions at hand. At least two such configurations shall be available to be stored for recall. Selection for recalling a stored configuration shall be followed by an action to confirm the selection.*

User specific settings shall include at least all settings specified for default settings, see Annex I. Manufacturers may include additional settings into the user specific settings. All settings shall be documented in the user manual.

6.6.2.2 Methods of test and required results

The methods of test and the required results are as follows:

- a) confirm by observation that user specific settings include at least all default settings, see Annex I;
- b) confirm by inspection of the user manual that all settings included into user specific settings are part of the documentation;
- c) confirm by observation that it is possible to store and recall at least two user specific settings;
- d) confirm by observation that the recall of user specific settings requires the user to confirm the selection before application of the settings.

6.6.3 Default settings

6.6.3.1 Requirement

(MSC.1/Circ.1609/Appendix 5/2) *A facility shall be provided to apply a set of default settings to return the equipment to a known default state, see Annex I. The default settings are intended to provide a basic and minimal mode of operation for the system or equipment that can be built upon by the user.*

(MSC.1/Circ.1609/Appendix 5/3) *Default settings are not intended to provide a redundant setting in the event of an equipment failure or loss of input.*

6.6.3.2 Methods of test and required results

Confirm by observation that the default settings include all settings specified in Annex I.

7 Physical requirements

7.1 General

The provisions of this Clause 7 are applicable to the physical displays associated with all navigational systems and equipment on the bridge of a ship. The equipment manufacturer may provide documented evidence to show compliance with the requirements specified in Clause 7.

Display equipment shall comply with the applicable requirements of IEC 60945. (See 4.2.2.1.)

7.2 Display adjustment

7.2.1 Contrast and brightness

7.2.1.1 Requirement

(MSC191/8.1.1) *It shall be possible to adjust the contrast and brightness of the display, as applicable to the display technology. It shall be possible to dim the display. The range of control shall permit the display to be legible under all ambient light conditions likely to be experienced on the bridge of a ship (for example, day, dusk and night). The range of adjustment shall be sufficient to maintain the user's dark adaptation at night. (See also 4.4.1.)*

(MSC191/8.1.2) *It shall be possible for the user to reset the values of contrast and/or brightness to a preset or default condition.* The manufacturer's documentation shall identify the default conditions.

If the brightness adjustment is set for night, then means shall be provided to return to such a brightness level that it is possible to continue control under daylight.

If display equipment is intended to present electronic chart information (see 4.6.2), then it shall

- provide the user with the capability to reset the values of brightness and/or contrast to a calibrated colour performance reference setting for each of the ambient light conditions defined in Table 1, and
- prevent inadvertent adjustments by the user by restricting access to controls that may cause degradation of colour performance, such as gamma and colour temperature adjustments.

7.2.1.2 Methods of test and required results

The setup for measurements of contrast, luminance and colour shall be conducted in accordance with the guidelines of IEC 61966-4 or the VESA Flat Panel Display Measurement (FPDM) standard (see VESA-2001-6). Before measurements are taken, display equipment shall be powered up and allowed to stabilize for a period identified by the manufacturer. (See also Annex G.)

The following verifications are required:

- a) confirm by observation that a manual contrast control is provided, if applicable (for example, for CRT technology);
- b) confirm by observation that a manual brightness control is provided;
- c) confirm by observation that, after dimming the equipment for use at night, when daylight ambient conditions are applied, there are means to readjust for operation under daylight;
- d) verify the adjustment of contrast and brightness in accordance with 4.4.1: (See 4.4.1.2)
 - 1) confirm by observation that the contrast and brightness controls can be reset to their default values;
 - 2) where display equipment is intended to display chart information, confirm by measurement of luminance that a means or method is provided to return the contrast and brightness controls to their calibrated setting for each ambient light condition in accordance with Table 1. (See 4.4.1)
- e) confirm by inspection of documented evidence that the default conditions for contrast and brightness controls are identified.

7.2.2 Magnetic interference

7.2.2.1 Requirement

(MSC191/8.1.3) *If magnetic fields degrade the presentation of navigation-related information, then a means or method to neutralise the effects of magnetic fields shall be provided.*

7.2.2.2 Methods of test and required results

Confirm by inspection of documented evidence that a means or method to neutralise the effects of magnetic fields is provided if magnetic fields degrade the presentation of navigation-related information.

7.2.3 Temporal stability

7.2.3.1 Requirement

Display equipment shall be perceptually "flicker" free in direct and peripheral vision at the nominal viewing distance identified in the manufacturer's documentation in accordance with the perception thresholds, as defined in Clause G.2.

NOTE The perception threshold of "flicker" is known to vary for observers, depending on such factors as age, fatigue, ambient lighting conditions, frequencies, the displayed image size, image brightness and image content.

7.2.3.2 Methods of test and required results

Establish by inspection of documented evidence whether the luminance persistence (response time) of the display equipment is less than or more than 1 ms. The test methods are then as follows:

- a) for display equipment with a luminance persistence of 1 ms or more (for example, CRT, LCDs, etc.), confirm by analytical evaluation or measurement that the display equipment emits less energy in the temporal frequencies than an observer will detect as "flicker" (i.e. the predicted "flicker" threshold) according to G.2.3.1 under each ambient light condition specified in Table 1;
- b) for display equipment based on technologies which have a luminance persistence much less than 1 ms (for example, EL (electro luminescent), plasma, light emitting diodes (LED), etc.), confirm by analytical evaluation or measurement that the display equipment emits less energy in the temporal frequencies than an observer will detect as "flicker" according to G.2.3.2 under each ambient light test condition specified in Table 1.

7.2.4 Physical controls and status indicators

7.2.4.1 General

Physical controls for display equipment shall be locatable by visual or tactile means. If the display equipment has more than three adjacent controls (for example, knobs or switches), then labels with adjustable illumination shall be provided for identification of these controls. Labels shall comply with the legibility/readability requirements contained in 4.4.2 and 4.4.3.

Any illuminated status indicators separate from the main display (for example, built-in to the front panel of the monitor) shall be locatable by visual means. Adjustable illumination provided for labels and status indicators shall be suitable for all ambient light conditions likely to be experienced on the bridge of a ship (day, dusk and night) and with due consideration to the night vision of the officer of the watch.

Illumination shall be dimmable to produce a maximum brightness of not more than 1 cd/m² and may be extinguishable below that point.

7.2.4.2 Method of test and required results

The methods of test and the required results are as follows:

- a) confirm by observation that physical controls for display equipment, if available, are locatable by visual or tactile means;
- b) where more than three adjacent control knobs or switches exist, confirm by observation that they have labels with adjustable illumination and that the illuminated labels comply with the legibility/readability requirements contained in 4.4.2 and 4.4.3;
- c) where illuminated status indicators exist separate from the main display, confirm by observation that they are locatable by visual means;
- d) where adjustable illumination is provided, confirm by observation that illumination is dimmable to not more than 1 cd/m² and may be extinguishable below that point;
- e) confirm by observation that a visual indication of the presence of power to the display equipment is provided;
- f) confirm by observation that a visual indication of the presence of video signals to the display equipment is provided.

7.3 Screen size

7.3.1 Requirement

(MSC191/8.2.1) *Display equipment shall be of sufficient size to support the requirements of the relevant IMO Performance Standards.*

(MSC191/8.2.2) For ECDIS, *the operational display area of the chart presentation for route monitoring shall be at least 270 mm × 270 mm.*

For ECDIS back-up arrangements, the effective size of the chart presentation shall be not less than 250 mm × 250 mm or 250 mm diameter.

(MSC191/8.2.3) For radar display equipment, *the operational display area of the radar presentation shall be at least a circle of diameter of:*

- 180 mm for ships smaller than 500 gross tonnage;
- 250 mm for ships larger than 500 gross tonnage and HSC less than 10 000 gross tonnage;
- 320 mm for ships larger than 10 000 gross tonnage.

The manufacturer's documentation shall identify the intended size of the operational display area.

7.3.2 Method of test and required results

The methods of test and the required results are as follows:

- a) for ECDIS, confirm by measurement that the dimensions of the operational display area are at least 270 mm × 270 mm;
- b) for ECDIS back-up arrangements, confirm by measurement that the dimensions of the operational display area are at least 250 mm × 250 mm, or 250 mm in diameter;
- c) for radar display equipment, confirm by measurement that the diameter of the operational display area is at least a circle of diameter of the intended size specified in the manufacturer's documentation.

7.4 Multicoloured display equipment

7.4.1 Requirement

(MSC191/8.3.1) *Multicoloured display equipment shall be used except where monochrome displays are permitted within individual IMO Performance Standards.*

(MSC191/8.3.2) *Multicoloured operational displays including multifunction displays (for example, conning displays) shall provide a minimum of 64 colours except where permitted or not required by the IMO, or when used for a single specific purpose (for example, speed log, echo-sounder).*

Monochrome displays may be provided when used for a single specific purpose (for example, speed log, echo-sounder) except where multicoloured displays are required by IMO performance standards or Code on Alerts and Indicators.

7.4.2 Method of test and required results

For multicoloured display, verify the result in accordance with Clause 4.

For monochrome display, verify the result in accordance with Clause 4 except the colour-related requirements specified in 4.5.1, 4.7.1, 4.7.2, 4.7.3 and 4.8.2.

For monochrome display, confirm by inspection of documented evidence that the manufacturer has noted the limitation of usage of the display to a single specific purpose or noted relevant IMO Performance Standard permitting use of monochrome display.

7.5 Screen resolution

7.5.1 Requirement

(MSC191/8.4) *Operational display equipment including multifunction displays (for example, conning displays) shall provide a minimum screen resolution of 1 280 pixels × 1 024 pixels, or equivalent for a different aspect ratio, except where permitted or not required by the IMO, or when used for a single specific purpose (for example, speed log, echo-sounder) or 180 mm diameter radar. For 180 mm diameter radar, a minimum screen resolution of 1 024 pixels × 768 pixels, or equivalent for a different aspect ratio, shall be provided.*

Display equipment intended to support the presentation of electronic chart information shall provide a maximum pixel pitch of 0,29 mm/m of nominal viewing distance (1 min of arc), for example, 0,36 mm at 1 237 mm viewing distance.

The manufacturer's documentation shall describe the screen resolution, pixel format and viewing distance (i.e. for measurement of pixel pitch).

7.5.2 Method of test and required results

The methods of test and the required results are as follows:

- a) confirm by inspection of documented evidence that for radar displays larger than 180 mm diameter the display equipment supports a screen resolution of at least 1 280 × 1 024 or equivalent resolution if the equipment uses a different aspect ratio. For radar displays of 180 mm or smaller diameter the requirement is at least 1 024 × 768 or equivalent resolution if the equipment uses a different aspect ratio;
alternatively, confirm by inspection of documented evidence that the display equipment supports the minimum screen resolution permitted by the applicable Performance Standards;
alternatively, if the display equipment is used for a single specific purpose (for example, speed log, echo-sounder, etc.), confirm by inspection of documented evidence that it is not required to support a minimum screen resolution;
- b) confirm by inspection of documented evidence that the display equipment provides a maximum pixel pitch of not more than 1 min of arc;
alternatively, if the display equipment is used for a single specific purpose (for example, speed log, echo-sounder, etc.), confirm by inspection of documented evidence that it is not required to support a maximum pixel pitch;
- c) confirm by inspection of documented evidence that the screen resolution, pixel format and the viewing distance used for the measurement of pixel pitch are identified.

7.6 Screen viewing angle

7.6.1 Requirement

(MSC191/8.5) *The display equipment shall support the reading of information under all ambient light conditions, simultaneously, by at least two users, from standing and sitting user positions likely to be found on the bridge of a ship.*

7.6.2 Methods of test and required results

Verify in accordance with 4.4.1.2 a) that readability requirements are satisfied from a position at the side of the operator.

Annex A (normative)

Presentation colours and symbols

A.1 Overview

Annex A specifies the harmonised symbols to be used for the presentation of navigation related information on all shipborne navigational systems and equipment in conformance with guidelines published by the IMO and provided in SN/Circ.243.

All text in Annex A whose wording is identical to text contained in IMO SN/Circ.243 is printed in *italics*. The IMO reference is made up of two parts; a prefix representing the IMO instrument, followed by the paragraph number, displayed as, for example: (SN243/1).

A.2 Purpose

(SN243/1/1) *The purpose of Annex A is to provide guidance on the appropriate use of navigation-related symbols and the use of colour to achieve a harmonized and consistent presentation on all shipborne navigational systems and equipment.*

A.3 Use

(SN243/1/2) *The use of these guidelines will ensure that the symbols used for the display of navigation-related information on all shipborne navigational systems and equipment are presented in a consistent and uniform manner.*

A.4 Application

(SN243/1/3) *The symbols listed in Table A.1 through Table A.5 shall replace symbols which are currently in existing Performance Standards for navigational systems and equipment. Where a standard symbol is not available, another symbol may be used, but this symbol shall not conflict with the symbols listed in Annex A.*

A.5 Navigation-related symbols

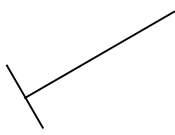
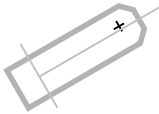
For the application of the symbols in Table A.1 through Table A.5, the following shall be considered:

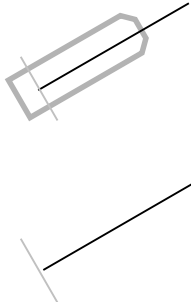
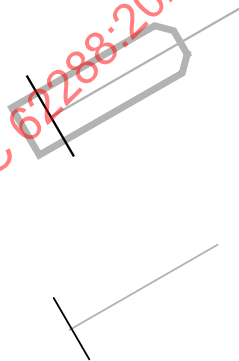
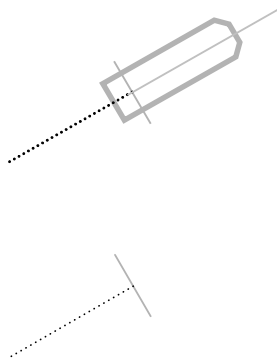
- colours are not standardised except where explicitly stated;
- colours used for the presentation of tracked radar targets and reported AIS targets (symbols from 2.1 a to symbol 2.9) shall be the same;
- colours used for the presentation of own ship symbols shall be identifiable from colours used for the presentation of targets;
- colours used for the presentation of operational information shall be discriminated from the colours used for the presentation of the radar image, target trails, additional processed radar information and electronic chart information;
- colours recommended for symbols assume that the presentation provides for lighter foreground information against a dark background;
- sizes specified for symbols assume a nominal viewing distance of 1 m (see 4.6.1.1 for requirements with viewing distances other than 1 m);

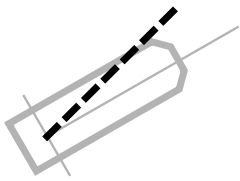
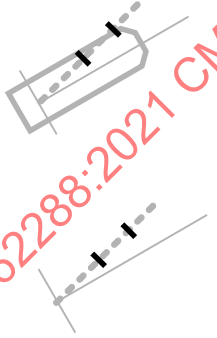
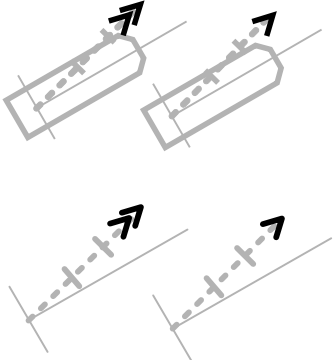
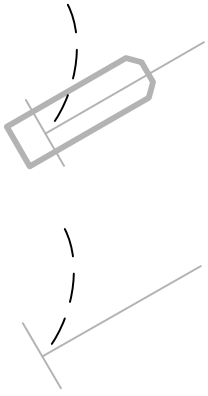
- weights specified for line styles assume that the "thick" line style is at least twice the thickness of the "thin" line style.

An example of a possible colour scheme that may be used is given in Table A.6.

Table A.1 – Own ship symbols

	Symbol name and description	Symbol graphic(s)
1.1 a	Own ship – True scaled outline The user may select to present own ship as a true scaled outline oriented in the direction of heading relative to CCRP and drawn using a thick solid line style with the same basic colour used for own ship symbols. A more detailed true scaled outline symbol, representing the physical shape of the own ship, is permitted as an alternative to the standardized symbol specified in this document. Automatic selection of the true scaled outline is permitted (see 5.2.1). The true scaled outline shall not be used when heading is unknown in a gyro/THD-stabilised mode, or when the beam of the outline is less than 3 mm. Note that a loss of heading will force the radar into head-up mode (see IEC 62388); in this case, the true scaled outline is still permitted.	 (SN243)
1.1 b	Own ship – Simplified symbol If a navigation display presents the chart mode (with or without the radar image), a simplified symbol may be used for own ship. The simplified symbol may be combined with the minimised symbol (see symbol 1.1 c). A simplified symbol shall be used when a chart is displayed in north-up presentation, without a radar image and in the absence of heading information. The outer circle shall be 6 mm in diameter. The inner circle shall be 3 mm in diameter. The circles shall be drawn using a thick solid line style, with the same basic colour used for own ship symbols. Note that for a radar mode, the simplified symbol should not be used as the symbol does not permit the minimum range requirements in IEC 62388.	 (SN243)
1.1 c	Own ship – Minimised symbol If a navigation display presents the radar mode, own ship shall be presented as a minimised symbol. The minimised symbol is comprised of the heading line (see symbol 1.3) and the beam line (see symbol 1.4). Where appropriate, the minimised symbol shall be combined with the true scaled outline of own ship. Note that a loss of heading will force the radar into head-up mode (see IEC 62388) whereby the minimised symbol should be used.	 (SN243)
1.2	Radar antenna position If a radar image is displayed and own ship is displayed as a true scaled outline, the user may select to present the radar antenna position as crossed lines centred at the physical location of the radar antenna (the source of the displayed radar image). The total extent of the crossed lines shall be at least 1 mm but not more than 2 mm in length. They shall be drawn using a thin solid line style with the same basic colour used for own ship symbols.	 (SN243)

	Symbol name and description	Symbol graphic(s)
1.3	Own ship heading line The heading line shall always be indicated (except when temporarily suppressed by the user), originating at CCRP and extending in the direction of own ship heading to the bearing scale. The line shall be drawn using a thin solid line style with the same basic colour used for own ship symbols. The heading line shall always be shown together with the beam line (see symbol 1.4).	 (SN243)
1.4	Beam line The beam line forms part of the own ship minimised symbol. Own ship beam line shall be presented as a single line, perpendicular to the heading line, passing through the CCRP and extending a minimum of 5 mm each side of the CCRP. The line shall be drawn as a thin solid line style with the same basic colour used for own ship symbols.	 (SN243)
1.5	Stern line Optionally, the user may select a stern line that shall originate at CCRP and shall extend, in the direction 180° from the heading, to the bearing scale. The line shall be drawn using a thin dotted line style with the same basic colour used for own ship symbols.	

	Symbol name and description	Symbol graphic(s)
1.6 a	Velocity vector Optionally, the user may also select to present a velocity vector originating at CCRP and extending in the direction of COG or CTW, as appropriate, for a length representing the distance own ship will travel in a user-selected time interval. The vector shall be drawn using a thick short-dashed line style with the same basic colour as used for own ship symbols. An option to select other colours may be provided, but these colours shall conform to the rules given in Clause A.5.	 (SN243)
1.6 b	Velocity vector – Time increments Optionally, the user may also select to present time increments along the velocity vector perpendicular to the vector with their midpoint on it and extending not more than 1,5 mm on either side. They shall be spaced along the vector to represent the distance own ship will travel in a user-selected increment of the time interval used for the velocity vector. The increments shall be drawn using a thick solid line style with the same basic colour used for own ship velocity vector.	 (SN243)
1.6 c	Velocity vector – Stabilisation indicator Optionally, the user may select to present a stabilisation indicator, positioned at the end of the velocity vector. The ground stabilisation indicator shall be presented as a double arrowhead. The water stabilisation indicator shall be presented as a single arrowhead. The arrowheads shall extend at least 1 mm but not more than 1,5 mm on either side of the vector (i.e. measured perpendicular to it). The arrowhead(s) shall be drawn using a thick solid line style with the same basic colour used for own ship velocity vector.	 (SN243)
1.6 d	Path predictor Optionally, the user may select to present a path predictor, either in place of a velocity vector or independently, as a curved line originating at CCRP and extending along the predicted path over ground that own ship will travel in the time interval used for the velocity vector. The path shall be drawn using a thin long-dashed line style with the same basic colour as used for own ship symbols. An option to select other colours may be provided, but these colours shall conform to the rules given in Clause A.5.	 (SN243)

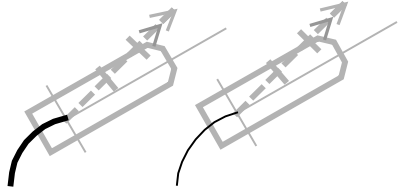
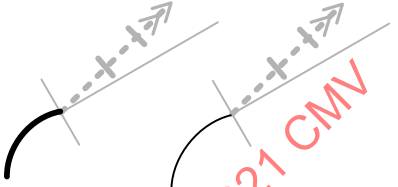
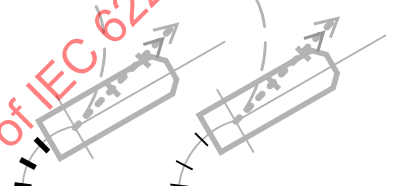
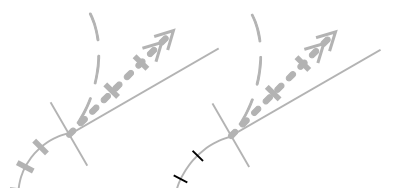
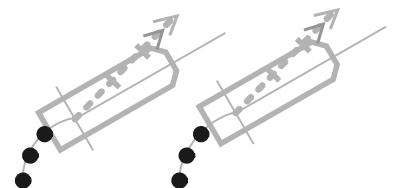
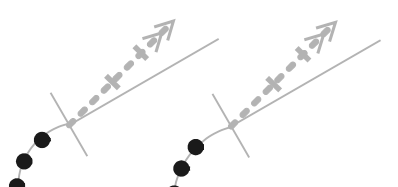
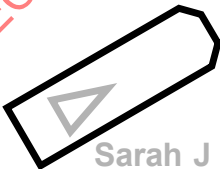
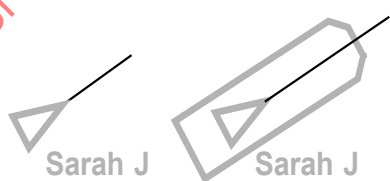
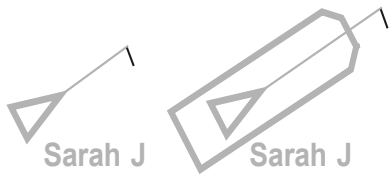
	Symbol name and description	Symbol graphic(s)
1.7 a	Past track The user may select to present a past track for the primary and/or secondary positioning sources. The past track shall be presented as line connecting own ship current and past positions. The primary past track shall be drawn using a thick solid line style with the same basic colour used for own ship symbol. The secondary past track shall be drawn using a thin solid line style with the same basic colour used for own ship symbols.	  (SN243)
1.7 b	Past track – Time increments Optionally, time increments along the past track may be shown. The time increments shall be presented as single lines perpendicular to the past track with their midpoint on it and extending at least 1 mm but not more than 1,5 mm on either side. They shall be spaced along the past track to represent the distance own ship travelled in the user-selected increment of the time interval used for the velocity vector. The time increments for the primary past track shall be drawn using a solid line style.	  (SN243)
1.7 c	Past track – Past positions Alternatively, the user may select to present past positions along the past track in place of time increments. Past positions shall be drawn as small filled circular symbols with a diameter of not more than 1,5 mm, with the same basic colour used for own ship symbols.	 
The simplified symbol (1.1 b) may be used with all examples showing the minimised symbol (1.1 c) in this table.		

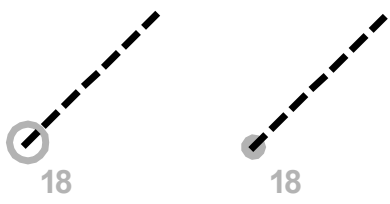
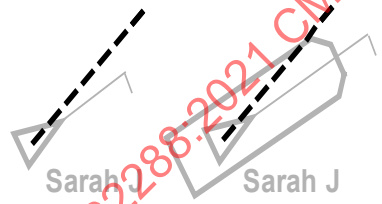
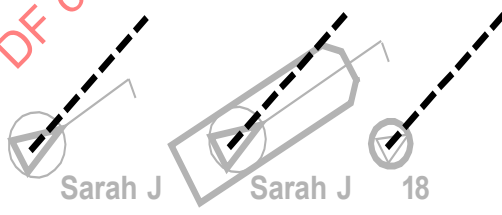
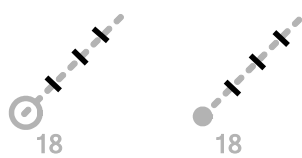
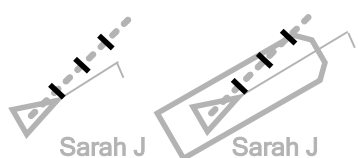
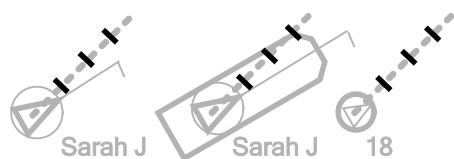
Table A.2 – Radar and AIS symbols

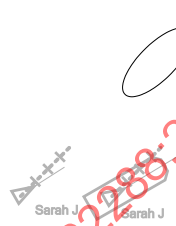
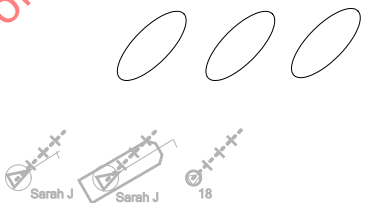
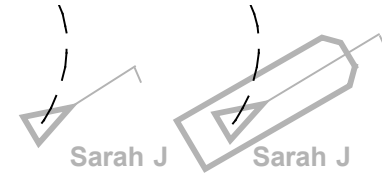
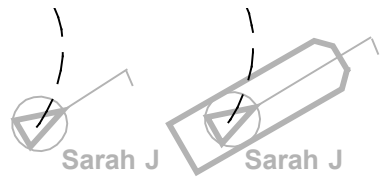
	Symbol name and description	Symbol graphic(s)
2.1 a	Radar targets in acquisition state A symbol drawn around radar targets in acquisition state shall be presented as a broken circle centred at the position of target acquisition. The circles shall be a 5 mm in diameter and shall be drawn using a thin dashed line style with the same basic colour used for target symbols.	 (SN243)
2.1 b	Radar targets in acquisition state – Automatically detected A symbol drawn around radar targets in acquisition state that are automatically detected inside an acquisition area, shall be a 5 mm in diameter and using a thick dashed line style, with the required colour red. The symbols shall flash until acknowledged by the user. Once acknowledged, the symbols shall cease flashing (even when they remain inside the acquisition area) and unless considered as dangerous, shall be drawn as a normal radar target in an acquisition state (i.e. detected outside an acquisition area) with the basic colour of other non-dangerous target symbols.	 (SN243)
2.2 a	Tracked radar targets Tracked radar targets shall be presented as circles centred at the targets' tracked position. The circles shall be 3 mm in diameter and shall be drawn using a thick solid line style. Tracked radar targets generated from a target automatically detected in an acquisition area that have not been acknowledged shall be the required red basic colour and shall continue to flash until acknowledged by the user (even when they move outside the acquisition area). Once acknowledged, the symbols shall cease flashing and unless considered as dangerous, shall be drawn as a normal radar target in an acquisition state (i.e. detected outside an acquisition area) with the basic colour of other non-dangerous target symbols. Tracked radar targets may be labelled. Alphanumeric text used to label radar targets shall be drawn with the same basic colour used for target symbols.	 (SN243)
2.2 b	Tracked radar targets – Alternative Alternatively, tracked radar targets may be presented as filled circles of not more than 2 mm in diameter.	 (SN243)

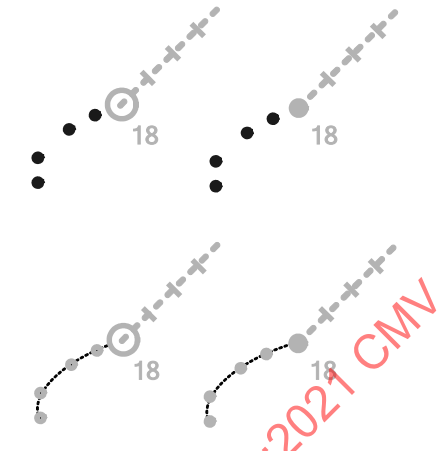
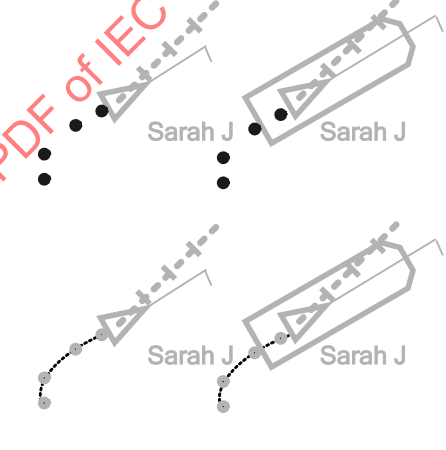
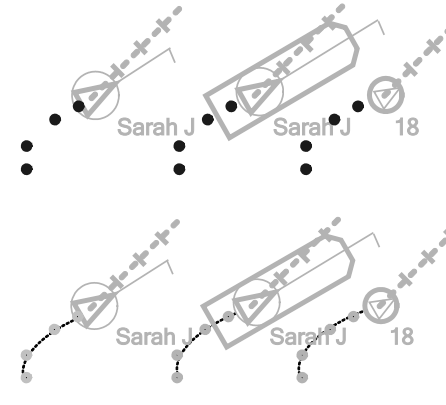
	Symbol name and description	Symbol graphic(s)
2.2 c	Tracked radar targets – Dangerous targets Tracked radar targets designated as dangerous targets may be presented using 5 mm diameter circles, and shall flash until acknowledged by the user. The required colour shall be red. Once acknowledged, the symbols shall cease flashing, but shall still be drawn with the required colour red until the target(s) cease to be a danger.	 (SN243)
2.3	Reference targets Tracked radar targets designated as reference targets shall be labelled with the letter "R" adjacent to the symbol. <i>Multiple reference targets shall be numbered as "R1", "R2", "R3", etc.</i> The reference target labels shall be drawn with the same basic colour used for target symbols.	 (SN243)
2.4	Sleeping AIS targets Sleeping AIS targets shall be presented as acute isosceles triangles oriented to the targets' reported heading (or COG if heading is not reported) and centred at the targets' predicted position. The base of the triangles shall be 3 mm and the height shall be 4,5 mm. The triangles shall be drawn using a thick solid line style with the same basic colour used for target symbols. A sleeping AIS target <i>with neither a reported heading nor COG</i> shall be <i>oriented toward the top of the operational display area</i> and shall include <i>one diagonal line crossed through the symbol</i>. The line shall be drawn using a thick solid line style with the basic colour used for target symbols.	 (SN243)
		Sleeping AIS target with neither reported heading nor COG:  (SN243)

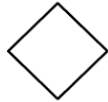
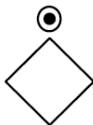
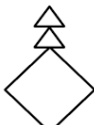
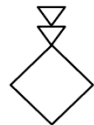
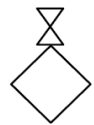
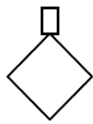
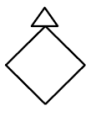
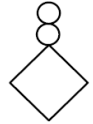
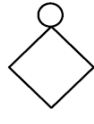
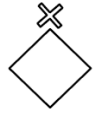
	Symbol name and description	Symbol graphic(s)
2.5 a	Activated AIS targets Activated AIS targets shall be presented as acute isosceles triangles oriented to the targets' reported heading (or COG if heading is not reported) and centred at the targets' predicted position. The base of the triangles shall be 4 mm and the height shall be 6 mm. The triangles shall be drawn using a thick solid line style with the basic colour used for target symbols. <i>An activated AIS target with neither a reported heading nor COG shall be oriented toward the top of the operational display area and shall include one diagonal line crossed through the symbol. The line shall be drawn using a thick solid line style with the basic colour used for target symbols.</i> Activated AIS targets may be labelled. Alphanumeric text used to label AIS targets shall be drawn with the same basic colour as used for target symbols.	 (SN243)
		Activated AIS target with neither reported heading nor COG:  (SN243)
2.5 b	Activated AIS targets – True scaled outlines Alternatively, when own ship is presented as a true scaled outline, the user may select to add true scaled outlines to activated AIS target symbols. True scaled outlines for activated AIS targets shall be drawn around the AIS target symbol triangles relative to the targets' predicted position according to the offsets, beam and length. The outline shall be drawn using a thick solid line style. True scaled outlines for activated AIS targets shall be drawn with the same basic colour used for target symbols. True scaled outlines for individual activated AIS targets shall not be used when a target's heading is not reported, or when the beam of the outline is less than 3 mm.	 (SN243)
2.5 c	Activated AIS targets – Dangerous targets Activated AIS targets designated as dangerous targets may be presented with larger triangles, with a base of 5 mm and a height of 7,5 mm, shall be the required colour red, drawn with a thick solid line and shall flash until acknowledged by the user. Activated AIS targets designated as dangerous targets with neither a reported heading nor COG shall be oriented toward the top of the operational display area and shall include one diagonal line crossed through the symbol. The line shall be drawn using a thick solid line style with the colour red. Once acknowledged, the symbols shall cease flashing but shall still be presented using the required colour red until no longer considered to be a dangerous target. Activated AIS targets designated as dangerous targets may be labelled. Alphanumeric text used to label AIS targets shall be drawn with the colour red, as used for target symbols. The label shall not flash – see IEC 60945:2002, 6.1.5 t).	  (SN243)
		Activated dangerous AIS target with neither a reported heading nor COG:  (SN243)

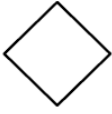
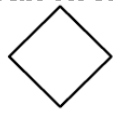
	Symbol name and description	Symbol graphic(s)
2.6	Associated targets – Alternative The user may select to present associated targets (i.e. activated AIS targets associated with tracked radar targets) as either activated AIS target symbols (see symbol 2.5) or tracked radar target symbols (see symbol 2.2). Alternatively, activated AIS target symbols representing associated targets may be modified by circumscribing a circle around the symbols' isosceles triangle. Tracked radar target symbols representing associated targets may be presented with larger diameter circles (up to 5 mm), modified by inscribing an isosceles triangle inside the symbols' circle. The circumscribed circle and inscribed triangle shall be drawn using a thin solid line style with the same basic colour used for target symbols. Associated targets may be labelled. Alphanumeric text used to label associated targets shall be drawn with the same basic colour as used for target symbols.	Associated targets represented by AIS target symbols:  (SN243) Associated targets represented by radar target symbols:  (SN243)
2.7 a	Heading lines Heading lines shall be selected for display for activated AIS targets and associated targets, represented by AIS target symbols. Heading lines shall originate at the apex of the AIS triangle and shall extend not less than 4 mm and at least 4 mm beyond the bow of the true scaled outline when it is used. They shall be drawn using a thin solid line style with the same basic colour as used for target symbols. Heading lines for dangerous AIS targets shall flash with their base symbol until acknowledged by the user. An activated target without a reported heading shall be orientated to the top of the operational display area (see 2.5 a) and when AIS heading is enabled shall not include a heading line.	 (SN243)
2.7 b	Heading lines – Turn indicators The user shall select to display turn indicators for activated AIS targets and associated targets represented by AIS target symbols. Turn indicators shall be presented as a single line extending at least 1 mm but not more than 2 mm perpendicular to the heading line in the direction of turn. The indicator shall be drawn using a thin solid line style with the same basic colour as used for their target symbols. Turn indicators for dangerous targets shall be the required colour red (until no longer dangerous) and shall flash with their symbol until acknowledged by the user.	 (SN243)

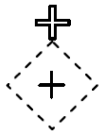
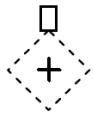
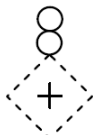
	Symbol name and description	Symbol graphic(s)
2.8 a	Velocity vectors Velocity vectors for targets shall be selected for display. Velocity vectors shall be presented as single lines originating at the targets' tracked/predicted position and extending in the direction of course CTW or COG, as appropriate, for a length representing the distance the target will travel in the time interval used for own ship's velocity vector. Vectors shall be drawn using a thick short-dashed line style with the same basic colour used for target symbols. Velocity vectors for dangerous targets shall be the required red colour and shall flash with their base target symbols until acknowledged by the user. Once acknowledged, the symbols shall cease flashing and unless considered as dangerous, shall assume the basic colour of other non-dangerous target symbols.	Radar target velocity vectors:  (SN243)
		AIS target velocity vectors:  (SN243)
		Associated target velocity vectors:  (SN243)
2.8 b	Velocity vectors – Time increments Time increments may be shown drawn across target velocity vectors. Time increments shall be presented as single lines perpendicular to the vectors with their midpoint on them and extending not more than 1,5 mm on either side. They shall be spaced along the vectors to represent the distance the target will travel in the time increment of the time interval used for own ship's velocity vector. The increments shall be drawn using a thick solid line style with the same basic colour as for target symbols. Time increments for dangerous targets shall be the required red colour and shall flash with their base target symbols until acknowledged by the user. Once acknowledged, the symbols shall cease flashing and unless considered as dangerous, shall use the basic colour of other non-dangerous target symbols.	Radar target time increments:  (SN243)
		AIS target time increments:  (SN243)
		Associated target time increments:  (SN243)

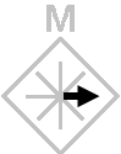
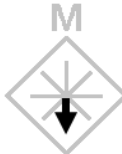
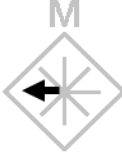
	Symbol name and description	Symbol graphic(s)
2.8 c	Predicted area of dangers Optionally, predicted area of dangers (PADs) may be shown along the path of target velocity vectors. PADs shall be presented as an outline area geographically representing a target's predicted CPA/TCPA violations. (The PAD's shape may be modified by knowledge of own ship manoeuvring characteristics, safety contour limits, etc). PADs shall be oriented in the direction of their velocity vectors. The PADs shall be drawn using a thick solid line style with the same-basic colour as their target symbols. PADs for dangerous targets shall flash with their base symbols until acknowledged by the user. When a target is selected, the associated PAD may be highlighted for identification. Note that PADs are shown as an elliptical area which is typical. Presentation of more accurate shapes is not excluded.	Radar target PADs:  Not to scale AIS target PADs:  Not to scale Associated target PADs:  Not to scale
2.8 d	Path predictor Optionally, the user may select to display a path predictor in place of a velocity vector. The <i>path predictor</i> shall be represented as a <i>curved vector</i> originating at the targets' tracked/predicted position and extending along the predicted path over the ground that the target will travel, in the time interval used for the target vector. The path shall be drawn using a thin long-dashed line style with the same basic colour used for target symbols	AIS target path predictor:  Associated target path predictor: 

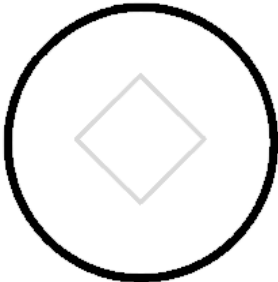
	Symbol name and description	Symbol graphic(s)
2.9	Target past positions Optionally, target past positions may be shown. Past positions shall be presented as a series of small circular symbols of 1 mm diameter. They may be connected by a line drawn from the current tracked or predicted position of the target. The line shall be drawn using a thin short-dashed line style with the same basic colour as their target symbols.	Radar target past positions:  (SN243)
		AIS target past positions:  (SN243)
		Associated target past positions:  (SN243)

	Symbol name and description	Symbol graphic(s)
2.10 a	AIS aids to navigation – Physical Source of physical AIS AtoN is: AIS Message 21, Virtual AtoN Flag = 0, except for case "Missing" MMSI identity range: 99 MID 0000 to 99 MID 9999 Physical AIS aids to navigation (AtoN) shall be presented as an open diamond centred at reported position. The sides of the diamond shall be not more than 6 mm in length. The diamond shall be drawn using a thin solid line style. The basic colour for an "on position" AIS AtoN shall not be yellow or red but may be same as for reported targets. The colour for the diamond of an "off position" AIS AtoN shall be yellow, it shall be drawn using thick solid line style and when used against light background it shall include a black one-pixel outline to improve readability. If available, on radar displays the AIS AtoN shall be drawn indicating the purpose of the AIS AtoN using the "type of aids-to navigation" from AIS Message 21. On displays containing an underlying chart, AIS AtoNs shall be drawn without indication of purpose unless the object is selected in which case, if available, the symbol shall be drawn indicating the purpose of the AIS AtoN. The purpose symbol shall be drawn using same line style and colour as the basic shape of AIS AtoN symbol. The height of the purpose symbol shall be not more than 5 mm in length. When a floating AIS AtoN is off position, this shall be indicated with the yellow text "Off Posn" (AIS AtoN Off-Position Indicator = 1) and the lights off, racon error and light error indications shall not be presented. AIS AtoNs shall indicate an extinguished light with yellow text "Unlit". AIS AtoNs shall indicate failure of Racon with yellow text "Racon err". AIS AtoNs shall indicate light error or combination of light error/off with racon error with yellow text "Error". When used against light background, the yellow text shall include a black one-pixel outline to improve readability. In case there is an indication of purpose, the error text shall be above the indication of purpose. A Synthetic AtoN physically exists, but AIS data information for it is provided remotely. An AtoN is a Synthetic AtoN when "virtual AtoN flag = 0" and "repeat indicator > 0". The absence of a physical AtoN, a state known as "Missing", may be communicated as a combined state of "virtual AtoN flag = 1" and "off position indicator = 1". This shall be indicated with yellow text "Missing" above the diamond using colour yellow. This symbol shall have no crosshair at the position centre. When used against light background the yellow text shall include a black one-pixel outline to improve readability. AIS AtoNs may be labelled with the AtoN name. Alphanumeric text used to label an AIS AtoN shall be the same basic colour as the AIS AtoN symbol. It may be user selectable for the label to include full textual content of the AtoN name or truncated version of the AtoN name, for example only last 3 characters of the AtoN name.	Physical AIS AtoN and related AIS Type of aids-to navigation code and AIS Status bits in parenthesis, where applicable:  Basic shape Default, type not specified (0); Reference point (1); Fixed structure offshore/obstruction (3); Light, without sectors (5); Light, with sectors (6); Leading light front (7); Leading light rear (8); Light vessel/LANBY/Rigs (31)  Racon (2)  Emergency wreck mark (4)  Beacon, Cardinal N (9); Floating, Cardinal Mark N (20)  Beacon, Cardinal E (10); Floating, Cardinal Mark E (21)  Beacon, Cardinal S (11); Floating, Cardinal Mark S (22)  Beacon, Cardinal W (12); Floating, Cardinal Mark W (23)  Beacon, Port hand (13); Beacon, Preferred Channel Port hand (15); Port hand mark (24); Preferred channel port hand (26)  Beacon, Starboard hand (14); Beacon, Preferred Channel Starboard hand (16); Starboard hand mark (25); Preferred channel Starboard hand (27)  Beacon, Isolated danger (17); Isolated danger (28)  Beacon, Safe water (18); Safe water (29)  Beacon, Special mark (19); Special mark (30)

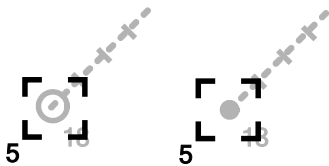
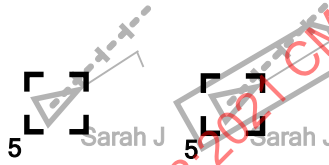
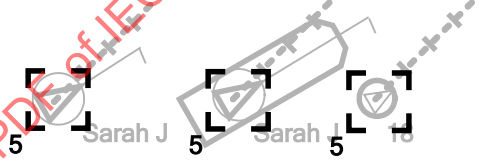
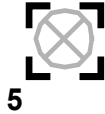
	Symbol name and description	Symbol graphic(s)		
		Off Posn  Off position including any combinations with Lights off/error and/or Racon error	Unlit  Light off (bits 11100101 or 11101101 or 11110101)	Racon err  Racon error (bits 11111001 or 11111011 or 11111111) (SN243)
			Error  Light error or combination of light error/off with racon error (bits 11100110 or 11101110 or 11110110 or 11111101)	
			Missing  Charted AtoN is missing (off position indicator = 1)	(SN243)

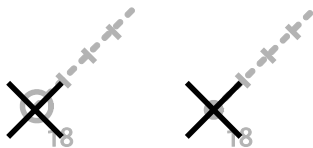
	Symbol name and description	Symbol graphic(s)
2.10 b	AIS aids to navigation – Virtual Source of virtual AIS AtoN is: AIS Message 21, Virtual AtoN Flag = 1, except for case "Missing" MMSI identity range: 99 MID 0000 to 99 MID 9999 Virtual AIS aids to navigation (AtoN) shall be presented as an open diamond with crosshair centred at reported position. The sides of the diamond shall be not more than 6 mm in length. The diamond shall be drawn using a thin dashed line style. The basic colour for a Virtual AIS AtoN is as used for the physical AIS AtoN symbols. If available, the AIS AtoN shall be drawn indicating the purpose of the AtoN using the "type of aids-to navigation" from the AIS Message 21. The purpose symbol shall be drawn using same line style and colour as the basic shape of the AIS AtoN symbol. The height of the purpose symbol shall be not more than 5 mm. AIS AtoN may be labelled with the AtoN name. Alphanumeric text used to label an AIS AtoN shall be the same basic colour as the AIS AtoN symbol. It may be user selectable for the label to include full textual content of the AtoN name or truncated version of the AtoN name, for example only last 3 characters of the AtoN name.	Virtual AIS AtoN and related AIS Type of aids-to navigation code in parenthesis:  Basic shape Default, type not specified (0); Reference point (1); Light, without sectors (5); Light, with sectors (6); Leading light front (7); Leading light rear (8)   Emergency wreck mark (4) Beacon, Cardinal N (9); Floating, Cardinal Mark N (20)    Beacon, Cardinal E (10); Floating, Cardinal Mark E (21) Beacon, Cardinal S (11); Floating, Cardinal Mark S (22) Beacon, Cardinal W (12); Floating, Cardinal Mark W (23)   Beacon, Port hand (13); Beacon, Preferred Channel Port hand (15); Port hand mark (24); Preferred channel port hand (26) Beacon, Starboard hand (14); Beacon, Preferred Channel Starboard hand (16); Starboard hand mark (25); Preferred channel Starboard hand (27)    Beacon, Isolated danger (17); Isolated danger (28) Beacon, Safe water (18); Safe water (29) Beacon, Special mark (19); Special mark (30)

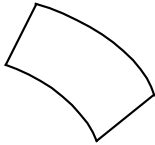
	Symbol name and description	Symbol graphic(s)
2.10 c	AIS aids to navigation – Mobile Source of mobile AIS AtoN is: AIS Message 21 AtoN Status = Page ID = 101 MMSI identity range: 99 MID 8000 to 99 MID 9999 Mobile AIS aids to navigation (AtoN) shall be presented as an open diamond topped by letter "M" of not more than 2 mm in length or height and a compass rose inside centred at reported/predicted position. The sides of the diamond shall be not more than 6 mm in length. The diamond and the compass rose shall be drawn using a thin solid line style (Virtual AtoN Flag = 0) or a thin dashed line (Virtual AtoN flag = 1). The basic colour for a mobile AIS AtoN is as used for the physical AIS AtoN symbols. Mobile AIS AtoN with known direction of movement shall include an arrow originating from the compass rose centre oriented towards to the reported COG of the mobile AIS AtoN (see AIS AtoN Status bits when Page ID bits = 101 in Table L.1) adjusted to the orientation mode in use. The result from "adjusted to the orientation mode" shall be presented aligned with the closest line of the compass rose. Mobile AIS AtoNs may be labelled with the AtoN name. Alphanumeric text used to label a mobile AIS AtoN shall be the same basic colour as the mobile AIS AtoN symbol. It may be user selectable for the label to include full textual content of the AtoN name or truncated version of the AtoN name, for example only last 3 characters of the AtoN name.	Basic shapes:  Default Virtual AtoN Flag = 0  Virtual Virtual AtoN Flag = 1 Basic shapes shall use the additional qualifiers below to denote how the AtoN as propelled. Self-propelled, but direction not reported or unavailable (AtoN Status bits 1010111x):   Tethered (AtoN Status bits 1010101x):  If COG information is provided, it shall be presented with an arrow pointed in coarse direction of COG within $\pm 22,5^\circ$ sectors as defined by AtoN Status bits (see Table L.1):        

	Symbol name and description	Symbol graphic(s)
2.10 d	AIS AtoN dimensions – True scaled outline The user may select to present dimensions of physical AIS AtoN type = 3 (Fixed structure offshore/obstruction) and type = 31 (Light vessel/LANBY/Rigs) as a true scaled outline drawn using a thick solid line style with the same basic colour used for AtoN symbols, with the A axis of the ABCD values of the AIS AtoN oriented to True North. Automatic selection of the true scaled outline is permitted (see 5.13.4). The true scaled outline shall only be presented when the largest of the ABCD values is at least 9 mm.	 Outline drawn as a circle when $A = B = C = D > 1$  Outline drawn as a rectangle when $A \neq B$ and $C \neq D$  Outline drawn as a rectangle when $A \neq B$, $C \neq 0$ and $D = 0$

	Symbol name and description	Symbol graphic(s)
2.11	AIS search and rescue transmitter and other devices using AIS burst transmission technology NOTE Also known collectively as "AIS locating devices". Sources of AIS locating devices are: • AIS-SART use MMSI identity range 970 00 0000 to 970 99 9999, • AIS MOB use MMSI identity range 972 00 0000 to 972 99 9999, • EPIRB-AIS use MMSI identity range 974 00 0000 to 974 99 9999. Valid MMSI for AIS locating devices are defined in ITU-R 585. Care should be taken to ensure that possible future expansions of the MMSI identity ranges do not affect the correct presentation, if such decision is taken by ITU. Such MMSI identity range expansion might be AIS-SART up to 971 99 9999, AIS MOB up to 973 99 9999, EPIRB-AIS up to 975 99 9999. Active AIS locating devices shall be presented as a 8 mm diameter circle with a cross inside drawn with a solid line. The symbol shall use the same basic colour as the AIS AtoN symbols. Test versions of AIS locating devices shall include label "TEST" in lower right-hand side of the symbol. The symbol and labels shall be drawn using a solid line style and shall use the same basic colour as the AIS AtoN symbols. AIS locating device symbol has no associated speed or course vector.	Active AIS locating device  (SN243) AIS locating device under test 

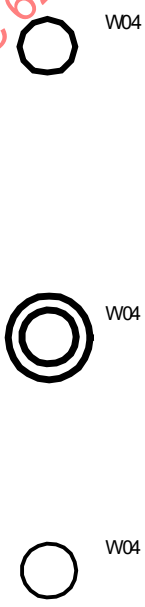
	Symbol name and description	Symbol graphic(s)
2.12	Selected object <i>Selected object symbols shall be presented as broken squares indicated by their corners, centred on the selected object symbol by the user and clearly extending beyond it. The squares shall be drawn using a dashed line.</i> If the selected symbol is presented with the addition of symbol 5.16, symbol 2.12 shall be sized to encompass both the selected symbol and symbol 5.16. Alphanumeric text used to label a selected object shall be the same basic colour as the selected object symbol. The selected object symbol can be used, for example, for selected radar targets, selected AIS targets, selected associated targets, selected AIS ATON, selected AIS locating device, selected AIS SAR aircraft, selected AIS SAR vessel, selected waypoint, etc. This selected object symbol can be used for objects based on point geometry.	Selected radar targets:  (SN243) Selected AIS targets:  (SN243) Selected associated targets:  (SN243) Selected AIS ATON:  (SN243) Selected AIS locating device:  (SN243)

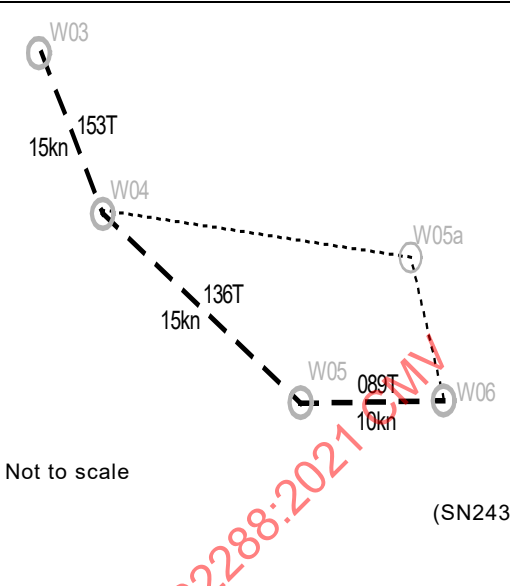
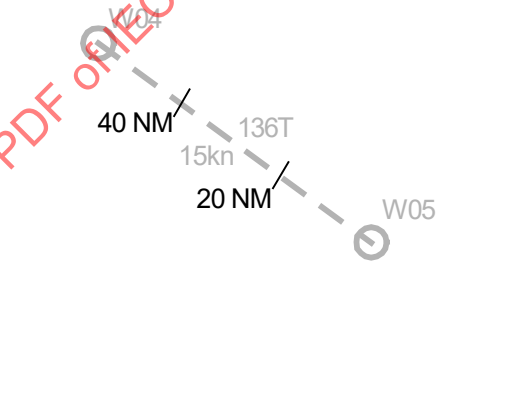
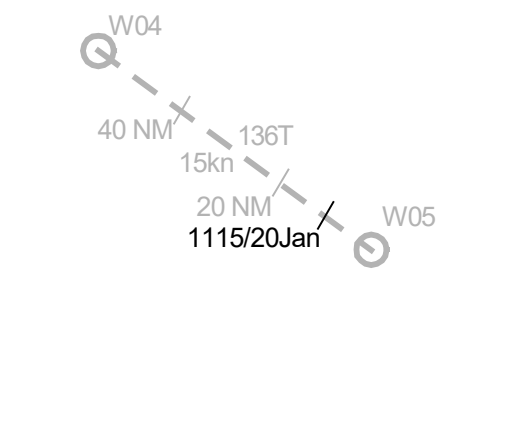
	Symbol name and description	Symbol graphic(s)
2.13	Lost targets, AIS SAR vessels, AIS ATONs and AIS locating devices <i>Lost target, AIS SAR vessel, AIS ATON and AIS locating device symbols shall be presented as crossed lines centred on the target symbol and extending at least 2 mm but not more than 3 mm beyond the symbol. The cross shall have a fixed orientation. The lines shall be drawn using a thick solid line style and shall flash with the required colour red until acknowledged by the user. The triangle of AIS target symbol shall be oriented per last known value. The lost target shall be displayed without vector, heading and rate of turn indication.</i> Once acknowledged, the lost target, AIS SAR vessel, AIS AtoN or AIS locating device symbol and its target, AIS SAR vessel, AIS AtoN or AIS locating device symbol shall be removed from the display.	Lost radar targets:  (SN243)
		Lost AIS targets:  (SN243)
		Lost associated targets:  (SN243)
		Lost AIS ATON:  (SN243)
		Lost AIS locating device:  (SN243)

	Symbol name and description	Symbol graphic(s)
2.14	Target acquisition area/zone The user may select to display radar target acquisition areas and/or AIS target activation areas. Target acquisition areas shall be presented as a series of lines bounding a geographic area designated for radar target acquisition and/or AIS target activation. The lines shall be drawn using a thin solid line style with the same basic colour used for target symbols. Another colour may be used when in edit mode. The area may be filled providing the colour of the fill does not degrade the visibility of the radar image and target symbols. Area fill shall be transparent and shall be the same basic colour as the area boundary.	 (SN243)
2.15 a	AIS SAR aircraft – fixed wing Source of AIS SAR aircraft – fixed wing is: AIS Message 9 MMSI identity range: 111 MID 100 to 111 MID 499 <i>An AIS SAR aircraft – fixed wing shall be drawn with a thin solid outline with the same basic colour as used for target symbols. The symbol shall be oriented in the direction of the COG. The length of the symbol shall be 6 mm.</i>	 (SN243)
2.15 b	AIS SAR aircraft – helicopter Source of AIS SAR aircraft – helicopter is: AIS Message 9 MMSI identity range: 111 MID 500 to 111 MID 999 <i>An AIS SAR aircraft – helicopter shall be drawn with a thin solid outline with the same basic colour as used for target symbols. The symbol shall be oriented in the direction of the COG. The length of the symbol shall be 6 mm.</i>	
2.16	AIS SAR vessel Source of AIS SAR vessel is: Message 5 and Message 24B contains ship type 51 is SAR. <i>If provided, a search and rescue vessel shall be presented by having a circle with cross drawn with a solid line inside the standard activated AIS vessel symbol (see 2.5 a and 2.5 b)</i>	 (SN243)
2.17	Target exclusion zone The user may select to display radar target acquisition exclusion zone and/or AIS target exclusion zone. Target exclusion zones shall be presented as a series of lines bounding a geographic area designated for radar target acquisition exclusion and/or AIS target activation exclusion. The lines shall be drawn using a solid line style with the same basic colour used for target symbols. The area shall include solid thin diagonal lines. Another colour may be used when in edit mode.	

	Symbol name and description	Symbol graphic(s)
2.18	Autonomous Marine Radio (Group B) Device (AMRD B) Source of AMRD B device is: AIS message as specified in ITU-R M.2135 on Ch. 2006. NOTE Details of AIS messages related to AMRD B and MMSI Identity range for AMRD B are under discussion in ITU (see newest edition of ITU-R M.2135). An AMRD B shall be drawn as hexagon with a thin solid outline with the same basic colour as used for target symbols. The height of the symbol shall be 4 mm.	

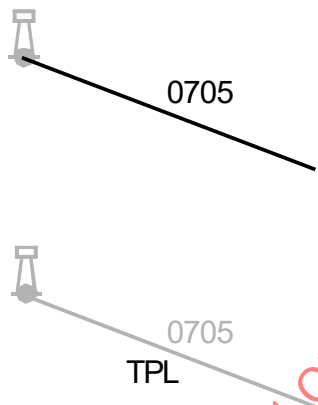
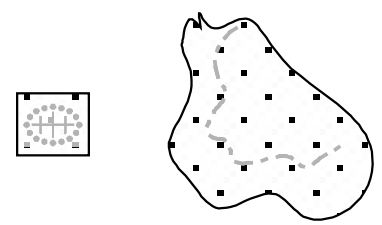
Table A.3 – Navigation symbols

	Description	Symbol
3.1 a	Waypoint Waypoints shall be presented as circles centred at the position of the waypoint. The circles shall be at least 4 mm but not more than 6 mm in diameter. Circles representing waypoints on the monitored route shall be drawn using a thick solid line style with the same basic colour used for the route. Alternatively, the next waypoint on the monitored route may be presented as a set of two concentric circles. The outer circle shall be 6 mm in diameter. The inner circle shall be 4 mm in diameter. Circles representing waypoints on the alternate planned route shall be drawn using a thin solid line style. Optionally, waypoints may be labelled adjacent to their symbol. The label shall be offset by at least 2 mm from the symbol and shall not interfere with text used to label the track leg. Alphanumeric text used to label a waypoint shall be the same basic colour as the waypoint symbol.	 (SN243)

	Description	Symbol
3.1 b	Routes A route is as a series of waypoints connected by one or more legs. Leg lines on the monitored route shall be drawn using a bold long-dashed line style. Leg lines on an alternate or a planned route shall be drawn using a thin dotted line style. The IHO's specified colour for leg lines on the monitored route is red. Leg lines on the monitored route may be labelled adjacent to their line with their course and planned speed, ideally on opposite sides. The label shall be offset by at least 2 mm from the line and shall not interfere with text used to label the waypoint. Note that the IHO recommends drawing a box around the planned speed. Alphanumeric text used to label a leg line shall be the same colour as the leg line. The alternate planned route shall be presented as a series of track legs connecting a series of waypoints.	 Not to scale (SN243)
3.1 c	Distance to run Leg lines on the monitored route may be marked with distance to run. These marks shall be presented as single lines perpendicular to the leg line with their midpoint on it and extending at least 2 mm but not more than 3 mm on either side. They shall be located along the leg line to represent the distance to the next waypoint. The marks shall be drawn using a thin solid line style with the same colour as the leg line. Distance to run may be labelled adjacent to the marks. The label shall be offset by at least 2 mm from the mark and shall not interfere with other text used to label the leg line or waypoints. Alphanumeric text used to label distance to run shall be the same colour as the mark.	
3.1 d	Planned position Optionally, track legs may be marked with a planned position. These marks shall be presented as single lines perpendicular to the track leg with their midpoint on the line and extending at least 2 mm but not more than 3 mm on either side. They shall be located along the track leg to represent the distance from the previous waypoint. The marks shall be drawn using a thin solid line style. Planned position may be labelled adjacent to the mark with the date and time of planned arrival. The label shall be offset by at least 2 mm from the mark and shall not interfere with other labels. Alphanumeric text used to label planned position shall be the same basic colour as the mark.	

	Description	Symbol
3.1 e	Visual limit of lights Leg lines on the monitored route may be marked with the visual limits of lights (i.e. rising/dipping range). The visual limit shall be presented as an arc centred on the light and extending across the track leg at least 10 mm on either side. The arc shall be drawn using a thin solid line with the same basic colour as the leg line. The visual limit may be labelled adjacent to the arc with the rising/dipping range and information about the light. Alphanumeric text used to label visual limits shall be the same basic colour as the arc.	
3.1 f	Wheel-over line Track leg lines on the monitored route may be marked with a wheel-over line. The wheel-over line shall be presented as single line centred on the current leg line, parallel to the next leg line and extending at least 5 mm on either side of the current leg line. The line shall be drawn using a thin solid line with the same colour as the leg line. A second perpendicular line to the current leg line may be presented. This second line shall not extend more than 5 mm on either side of the current leg line. The second line shall be drawn using a thin solid line with the same colour as the leg line. The wheel-over line may be labelled adjacent to the line with the planned rudder angle and time of wheel-over. Alphanumeric text used to label wheel-over position shall be the same basic colour as the wheel-over line.	
3.2	Plotted position <i>A plotted position (Fix, EP, and DR) shall be presented as a circle with crossed lines centred at the position. The circle shall be 5 mm in diameter. The length of the crossed lines shall be the diameter of the circle.</i> The circle and crossed lines shall be drawn using a thin solid line style. <i>The position shall be labelled with time and an indication of its source for example GNSS, L (Loran), R (Radar range), V (Visual bearing), VR (Visual bearing and Radar range). If the position is an estimated position, it shall also be labelled with the letters "EP". If the position is a dead reckoned position, it shall also be labelled with the letters "DR".</i> Alphanumeric text used to label the position shall be the same basic colour as the symbol.	

(SN243)

	Description	Symbol
3.3	Line of position <i>A line of position (LOP) shall be presented as a single line originating from a charted object and extending towards own ship. The bearing of the LOP shall be referenced to the CCRP.</i> <i>The LOP shall be drawn using a thin solid line style.</i> <i>The LOP shall be labelled with time. If the LOP is transferred, it may also be labelled with the letters "TPL" for transferred position line.</i> <i>Alphanumeric text used to label LOP shall be the same basic colour as the line.</i> <i>A LOP range observation will be an arc.</i>	 Examples show the default symbol for a water tower. (SN243)
3.4	Tidal stream <i>A tidal stream shall be presented as a single line with three arrowheads. The line shall originate from the charted position for which a tidal stream table (or tidal stream data) is available and shall extend no more than 15 mm in length. The triple arrowhead shall extend no more than 2 mm on either side (perpendicular to the line).</i> <i>The line for an actual tidal stream shall be drawn using a thin solid line style.</i> <i>The line for a predicted tidal stream shall be drawn using a thin long dashed line style.</i> <i>The arrowheads for a tidal stream shall be drawn using a thin solid line style.</i> <i>The tidal stream shall be labelled adjacent to the line with the effective strength and time, ideally on opposite sides. The label shall be offset by at least 2 mm from the line.</i> <i>Alphanumeric text used to label the tidal stream shall be the same basic colour as the line.</i>	 Examples show the default symbol for a point or area for which a tidal stream table is available. (SN243)
3.5 a	Mariner entered danger <i>A danger highlighted by a mariner shall be presented as a polygon bounding a geographic area designated as dangerous to navigation, or as a poly-line creating a boundary around such an area. The boundary of the polygon, or poly-line, shall be drawn using a thick solid line style. Recommended colour: red.</i> <i>The polygon, or bounded area shall be filled with a transparent fill using the same colour as the polygon or poly-line.</i>	 Examples show the default symbol for a mariner entered danger highlight of a dangerous wreck at an unknown depth bounded by a rectangular danger highlight and an outcropping of land bounded by a user-entered danger highlight. (SN243)

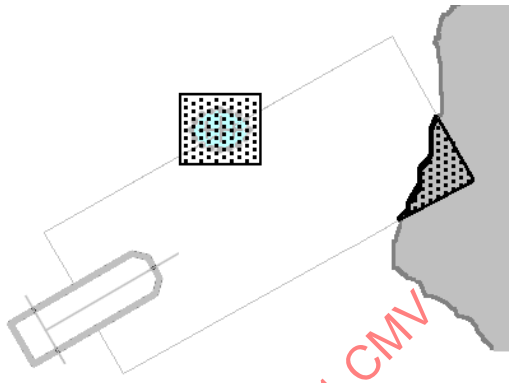
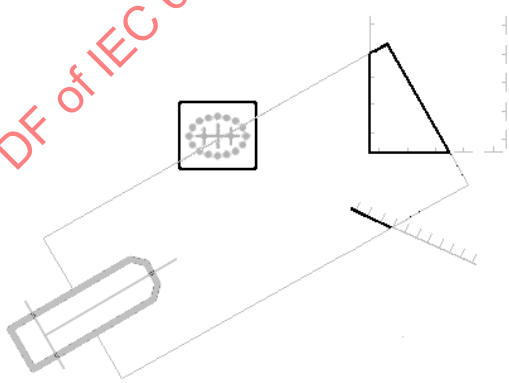
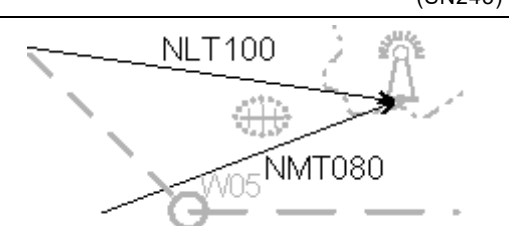
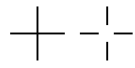
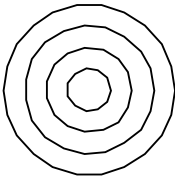
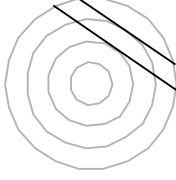
	Description	Symbol
3.5 b	Look-ahead alarm highlight <i>The graphical indication in the chart area of an alarm condition (see MSC.232(82)/A 11.4.4 and 11.4.6) shall be presented as a polygon or poly-line on the boundary of the area or point object causing the condition. The polygon or poly-line shall be drawn using a thick solid line style with recommended colour red. The bounded area shall have a transparent fill of the same colour.</i>	 The example shows a depth area shallower than safety contour and a dangerous wreck within the look-ahead safety check area. (SN243)
3.5 c	Look-ahead indication highlight <i>The graphical indication in the chart area of warning or caution conditions (see MSC.232(82)/A 11.4.4 and 11.4.6) shall be presented as a polygon or poly-line on the boundary of the area or point object causing the condition. The polygon or poly-line shall be drawn using a thick solid line style with recommended colour yellow and adjacent thin lines of black on either side for visibility against a white (Day) background. The bounded area shall not be filled.</i>	 Examples show point (wreck), restricted area and line (fish stakes). (SN243)
3.6	Danger bearing <i>A danger bearing or clearing line shall be presented as a single line with an arrowhead directed at the base of a charted object. The line shall extend at least 20 mm in length and ideally through or across the monitored route.</i> <i>The line shall be drawn using a thin solid line style with the required colour red.</i> <i>A danger bearing shall be labelled with its bearing. The letters "NMT" shall be used to indicate "not more than". The letters "NLT" to indicate "not less than".</i> <i>Alphanumeric text used to label the danger bearing shall be the same basic colour as the line.</i>	 The drawing is not to scale. The example shows the default symbols for a light and a dangerous wreck at an unknown depth. (SN243)
3.7	Event marker An event marker shall be presented as a 5 mm x 8 mm rectangle with a diagonal line inscribed. The symbol shall be drawn using a solid line style. An event marker shall be labelled. Multiple event markers may be numbered. Alphanumeric text used to label an event marker shall be the same basic colour as the symbol.	 (SN243)

Table A.4 – Navigation tools

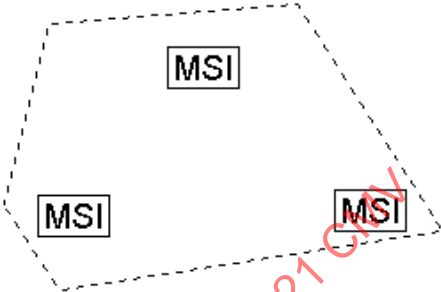
	Description	Symbol(s)
4.1	User cursor The user cursor shall be presented as crossed lines perpendicular to each other extending at least 3 mm from the centre on all sides. The cursor shall be drawn in a thick solid line style. Optionally, the centre of the cursor may be open. Either symbol may be used.	 (SN243)
4.2	Electronic bearing line (EBL) Electronic bearing lines (EBL) shall be presented as a single line originating from CCRP, from a position offset from CCRP, or from a geographically fixed position. An EBL shall be drawn as a <i>dashed line</i> style. Each <i>additional EBL</i> shall be distinguished by different styles of dashed lines and/or colours. If an EBL is offset, the EBL may be combined with a VRM to form an ERBL (electronic range and bearing line). The range shall be presented as a small arc across the EBL and referenced from the origin of the EBL. The arc shall use the same colour as the EBL.	 (SN243)
4.3	Variable range marker (VRM) Variable range markers (VRM) shall be presented as a <i>circle</i>. The VRM shall be drawn as a dashed line style. Each <i>additional VRM</i> shall be distinguished by different styles of dashed lines and/or colours.	 (SN243)
4.4	Range rings If selected, a set of fixed range rings shall be presented as an appropriate number of equally spaced concentric circles centred at the CCRP. Spacing between range rings is dependent on the range scale (i.e. range rings represent logical subdivisions of the range scale). The circles shall be drawn as a thin solid line style.	 (SN243)
4.5	(parallel) Index lines Parallel index lines shall be presented as a series of lines aligned to a set bearing, and spaced at a series of beam ranges (for example at the range ring spacing). No line style is specified for (parallel) index lines, however, they shall be distinguishable from each other and from EBLs. Index lines set at other bearings may be used. A series of index lines at other positions may be used.	

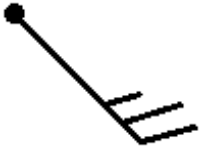
For the application of the symbols in Table A.5, the following shall be considered:

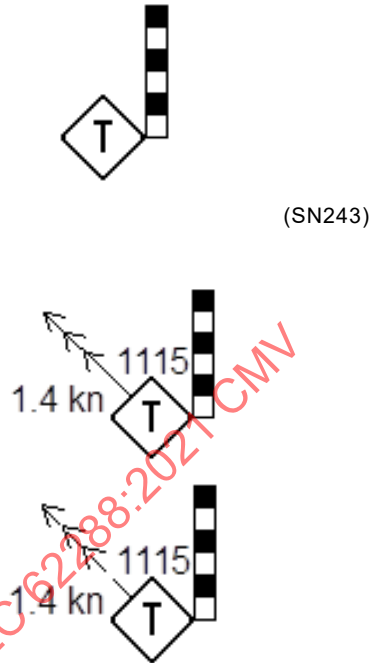
- multiple symbols may be co-located;
- a minimum means shall be provided to prevent co-located symbols from obscuring each other, for example by user selection, by type of information.

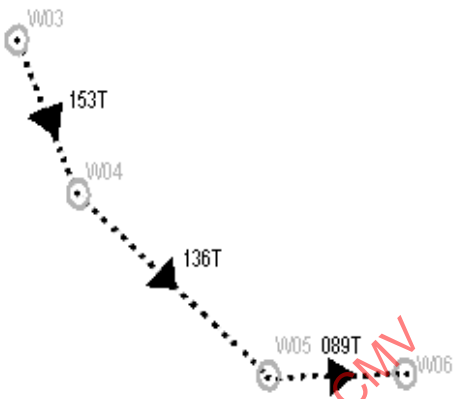
Table A.5 – Other symbols

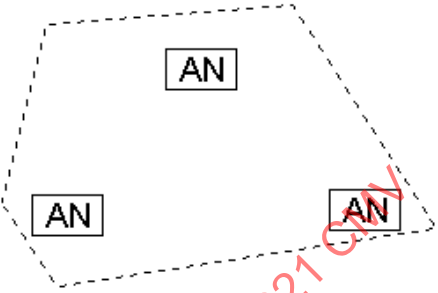
	Description	Symbol(s)
5.1	Trial manoeuvre When a trial manoeuvre function is enabled, it shall be indicated by the presentation of a large letter "T" in a conspicuous location in the operational display area.	T (SN243)
5.2	Simulation mode When a simulation mode is enabled, it shall be indicated by the presentation of a large letter "S" in a conspicuous location in the operational display area.	S (SN243)
5.3	Radar test target When an internally generated test target is enabled, it shall be indicated by the presentation of the large letter "X" adjacent to the target with the basic colour used for the target symbol. In addition, a bold "X" shall be shown in a conspicuous location in the operational display area.	X (SN243)

	Description	Symbol(s)
5.4	Maritime Safety Information, MSI <i>MSI point symbol shall be presented as box with the "MSI" inscribed inside it. The box shall be centred at the position derived from MSI message. The box shall not be more than 6 mm in height, drawn using a thick solid line style.</i> <i>MSI area symbol shall be presented as a series of lines bounding a geographic area designated as "caution" to navigation. Connecting lines shall be drawn using thin dashed line style and using same basic colour as the symbol itself. The area shall be filled with a sparse pattern of MSI point symbols separated by 50 mm.</i> MSI symbols shall be in a separate user selectable layer or group, removable by single operator action. The removal may be connected to generic removal functionality of non-chart object layers. The user dialog area shall have an indication if MSI notices are available in the area currently displayed, but the MSI layer is not automatically selected for display. MSI symbols may be connected to a date range and in such case each MSI notice symbol shall be displayed only when user selected date is within data range. It shall be possible to cursor pick an MSI symbol for further details. When presentation of MSI point and area symbols are provided as overlay on chart or radar, then means shall be provided for cursor pick of the symbol to provide further information in the user dialog area of the display. <i>Note that the source of MSI may be NAVTEX, EGC, AIS ASM function identifier 22 or 23 (SN.1/Circ.289), etc.</i> Note that sub-components of MSI, for example Navigational Warnings (S-124) may have their own symbology.	Example of point symbol  Example of area symbol 

	Description	Symbol(s)
5.5	Meteorological information <i>Meteorological information symbols consist of two parts:</i> – the weather station symbol or reference point; and – the wind shaft. <i>The weather station symbol shall be presented as a circle with "W" inscribed inside it. The circle shall be centred at the position derived from the site location report binary message. The circle shall not be more than 6 mm in diameter, drawn using a thin solid line style and using the same basic colour as AIS AtoN.</i> <i>The reference point symbol shall be presented as a dot. The dot shall not be more than 1 mm in diameter, drawn using solid fill and using the same basic colour as AIS AtoN.</i> <i>Alphanumeric text may be used to label the weather station.</i> <i>The optional wind shaft shall be used to represent actual wind (i.e. not forecast) force and direction as defined by WMO No.485, Appendix II-4, the surface plotting model. If actual wind force and direction is not available then there shall be no wind shaft. The wind shaft shall be not more than 3 times the diameter of the weather station symbol. The length of barbs and pennants shall not exceed the diameter of the weather station symbol. The wind shaft shall be drawn using a thick solid line style and using the same basic colour as AIS AtoN.</i> <i>The wind shaft is directed along the axis of the wind towards the centre of the station circle and stops at its circumference. Wind is represented by barbs and solid pennants. The full barbs representing 5 m s^{-1} or 10 kn, the half barbs representing $2,5 \text{ m s}^{-1}$ or 5 kn and the solid pennant representing 25 m s^{-1} or 50 kn. All pennants and barbs lie to the left (clockwise) of the wind shaft in the northern hemisphere and to the right (counter clockwise) of the wind shaft in the southern hemisphere. Barbs are at an angle of 110° to 130° from the wind shaft. Pennants are triangles with their bases on the wind shaft. A calm shall be indicated by a circle drawn around the weather station circle: Missing wind speed shall be indicated by placing an "x" at the end of the wind shaft in lieu of the wind barbs.</i> Other meteorological or hydrographic information such as visibility, temperature, salinity, etc., if available, shall be available on demand. <i>Note that the source of meteorological information may be AIS ASM function identifier 26 or 31 (SN.1/Circ.289), etc.</i>	Dover  (WMO) (SN243) Example of weather station Dover  (WMO) (SN243) Example of weather station with optional wind shaft in southern hemisphere  (SN243) Example of reference point with optional wind shaft in southern hemisphere

	Description	Symbol(s)
5.6	Tidal and water level information <i>Tidal and water level information symbol consist of two parts: the tidal symbol and the tidal gauge symbol.</i> <i>The tidal symbol shall be presented as a diamond with "T" inscribed inside it. The diamond shall be centred at the position derived from the site location report binary message. The sides of the diamond shall not be more than 6 mm in length, drawn using a thin solid line style and using the same basic colour as AIS AtoN.</i> <i>The optional tidal flow part of the symbol shall be used to represent tidal speed and direction. If tidal speed and direction is not available then there shall be no tidal flow symbol. The tidal flow symbol (see symbol 3.4) shall be drawn to the direction of the tidal current and using the same basic colour as AIS AtoN.</i> <i>The optional tidal gauge part of the symbol shall be used to represent availability of water level information. If water level is not available then there shall be no tidal gauge symbol. The tidal gauge symbol shall not be more than 10 mm in length, drawn using a thick solid line style, transparent fill and using the same basic colour as AIS AtoN.</i> If selected, the details of water level shall be presented in the associated AIS object dialog. If both the tidal gauge and the tidal flow symbol are presented, the tidal gauge symbol shall be presented to the right-hand or left-hand side of the tidal symbol such that overlapping of the tidal flow vector and the tidal gauge symbols does not occur. <i>Note that the source of tidal information may be AIS ASM function identifier 31 (SN.1/Circ.289), etc.</i>	 (SN243) Examples of combinations of symbols 5.6 and 3.4
5.7	Signal station <i>Signal station shall be presented as a diamond centred at the reported position of the signal station. The sides of the diamond shall be not more than 6 mm in length, drawn using a thin solid line style and shall be the same basic colour as the AIS AtoN symbol.</i> <i>The symbol shall be labelled with text "SS" centred in the diamond and the colour of the label shall be the same colour as the symbol.</i> Other information from signal station, if available, shall be available on demand. <i>Note that a signal station is a station capable of transmitting marine traffic signals. The source of signal station may be AIS ASM function identifier 19 (SN.1/Circ.289), etc.</i>	 (SN243)

	Description	Symbol(s)
5.8	Route information received <i>Route information is as a series of waypoints connected by one or more legs.</i> <i>Leg lines on the route information shall be drawn using a thin dotted line style. They shall have a centred solid triangle with equal length of each side of not more than 4 mm and shall be the same basic colour as the AIS AtoN symbol. Solid triangle is centred on visible part of each leg.</i> <i>Leg lines on the route information may be labelled adjacent to their line with their course. The label shall be offset by at least 2 mm from the line and shall not interfere with text used to label the waypoint.</i> <i>Alphanumeric text used to label a leg line shall be the same colour as the leg line.</i> <i>The colour of route type "mandatory route" shall be different from other route types and symbol 3.1 b. Note that the source of route information may be AIS ASM function identifier 27 or 28 (SN.1/Circ.289), etc.</i>	 NOTE Not to scale (SN243)
5.9	Berthing data <i>Berthing assignment shall be presented as a box with the "BERTH" inscribed inside it. The box shall be centred at the position derived from the berthing data message. The box shall not be more than 6 mm in height, drawn using a thick solid line style and shall be the same basic colour as the AIS AtoN symbol.</i> <i>Other information from berthing data, if available, shall be available on demand.</i> <i>Note that the source of berthing data may be AIS ASM function identifier 20 (SN.1/Circ.289), etc.</i>	 (SN243)
5.10	Clearance time to enter port <i>Clearance time to enter port shall be presented as a box with the "CTE" inscribed inside it. The box shall be centred at the position derived from clearance time to enter port data message. The box shall not be more than 6 mm in height, drawn using a thick solid line style and shall be the same basic colour as the AIS AtoN symbol.</i> <i>Other information from clearance time to enter, if available, shall be available on demand.</i> <i>Note that the source of clearance to enter port may be AIS ASM function identifier 18, 22 or 23 (SN.1/Circ.289), etc.</i>	 (SN243)

	Description	Symbol(s)
5.11	Area notice <i>Area notice point symbol shall be presented as box with the "AN" inscribed inside it. The box shall be centred at the position derived from Area notice message. The box shall not be more than 6 mm in height, drawn using a thick solid line style and shall be the same basic colour as the AIS AtoN symbol.</i> <i>Area notice area symbol shall be presented as a series of lines bounding a geographic area. Connecting lines shall be drawn using the thin dashed line style and using the same basic colour as the symbol itself. The area shall be filled with a sparse pattern of Area notice point symbols separated by 50 mm.</i> <i>Drawing priority of Area notice symbol is below Maritime Safety Information MSI, see symbol 5.4.</i> Area notice symbols shall be in a separate user selectable layer, which is removable by single operator action. The removal may be connected to generic removal functionality of non-chart object layers. The user dialog area shall have an indication if area notices are available in the area currently displayed, but the area notice layer is not selected for display. Area notice symbols may be connected to a date range and in such case each area notice symbol shall be displayed only when user selected date is within data range. It shall be possible to cursor pick an Area notice symbol for further details. <i>Note that the source of the area notice may be AIS ASM function identifier 22 or 23 (SN.1/Circ.289), etc.</i>	Example of point symbol  Example of area symbol  (SN243)
5.12	Air gap <i>Air gap symbols consist of two parts: the air gap symbol and the air gap gauge symbol.</i> <i>The air gap symbol shall be presented as a diamond with "A" inscribed inside it. The diamond shall be centred at the position derived from the site location report binary message. The sides of the diamond shall not be more than 6 mm, drawn using a thin solid line style and using the same basic colour as AIS AtoN.</i> <i>The air gap gauge part of the symbol shall be used to represent availability of air gap information. If air gap is not available then there shall be no air gap gauge symbol. The air gap gauge symbol shall not be more than 10 mm in length, drawn using a thick solid line style, transparent fill and using the same basic colour as AIS AtoN.</i> Air gap relative to the water surface in metres with one decimal and other air gap information, if available, shall be available on demand. <i>Note that the source of the air gap/air draught information may be AIS ASM function identifier 26 (SN.1/Circ.289), etc.</i>	 (SN243)

	Description	Symbol(s)
5.13	Environmental report <i>The environmental report symbol shall be presented as a diamond with "ENV" inscribed inside it. The diamond shall be centred at the position derived from the site location report binary message. The sides of the diamond shall not be more than 6 mm, drawn using a thin solid line style and using the same basic colour as AIS AtoN.</i> All available details of environmental information shall be displayable on demand. The tidal flow/current may optionally be represented by symbol 3.4 (tidal stream). If tidal/current speed and direction is not available then there shall be no tidal flow symbol. The tidal flow symbol shall use the same basic colour as AIS AtoN. If selected, the details of tidal flow/current shall be presented in the associated AIS object dialog using one decimal. <i>Note that the source of environmental information may be AIS ASM function identifier 26 or 31 (SN.1/Circ.289), etc.</i>	 (SN243)
5.14	Fairway closure The fairway closure symbol shall be presented as crossed lines centred on a fairway symbol (two converging dashed lines) plus a box around the symbol, drawn using a thin solid line style and using the same basic colour as AIS AtoN. All available details of fairway closure shall be displayable on demand.	
5.15 a	AIS synthetic target – Distress AIS synthetic targets for which the source is AIS ASM when FI = 22 or FI = 23 Area Notice with "Sub-areas" set to "0" circle or point and "Area shape" set to "0" and "Radius" set to "0" and "Notice Description" set to a value range from 64 to 74 shall be presented as a quadrilateral and centred at the predicted position and oriented to the top of the operational display area and shall include a diagonal line across the quadrilateral. The shorter sides of the quadrilateral shall be 4 mm and the longer sides shall be 6 mm. The symbol shall be drawn using a thick solid line style with yellow colour and when used against a light background it shall include a black one-pixel outline to improve readability. Quadrilaterals may be labelled. Alphanumeric text used to label quadrilaterals shall be drawn with the same basic colour as used for AIS AtoN.	 Sarah J
5.15 b	AIS synthetic target AIS synthetic targets for which the source is AIS ASM when FI = 17 VTS generated/synthetic target shall be presented as quadrilaterals oriented to the reported COG and centred at the targets' predicted position. The shorter sides of the quadrilateral shall be 4 mm and the longer sides shall be 6 mm. The quadrilaterals shall be drawn using a thick solid line style and using the same basic colour as AIS AtoN. An AIS synthetic target without a reported COG shall be oriented toward the top of the operational display area and shall include a diagonal line across the quadrilateral. Quadrilaterals may be labelled. Alphanumeric text used to label quadrilaterals shall be drawn with the same basic colour as used for AIS AtoN	 Sarah J AIS synthetic target without COG  Sarah J

	Description	Symbol(s)
5.16	Source of a received call or unread message Received call or unread message shall be presented by having two increasing centred 1/8 arcs drawn using a thin solid line at upper right-hand side of the AIS target symbol. The received call or unread message symbol may be presented to the upper left-hand side of the AIS symbol, centred on the symbol position, if required to avoid overlapping.	Some examples of the use of symbol 5.16 together with other symbols With AIS target  With AIS AtoN physical  With Base station 
5.17	AIS base station AIS base station shall be presented as a diamond at the reported position of the base station. The sides of the diamond shall be not more than 6 mm in length, drawn using a thin solid line style and shall be the same basic colour as the AIS AtoN symbol. The symbol shall be labelled with text "BS" centred in the diamond and the colour of the label shall be the same colour as the symbol The AIS base station has no associated velocity vector.	 Basic shape
5.18	Co-located AIS ASM objects Co-located AIS ASM objects shall be presented as a diamond at the reported position of the AIS ASM objects. The sides of the diamond shall be not more than 6 mm in length, drawn using a thin solid line style and shall be the same basic colour as the AIS AtoN symbol. The symbol shall be labelled with text "INFO" centred in the diamond and the colour of the label shall be the same colour as the symbol.	
5.19	Weather observation report from ship The weather observation report from ship symbol shall be presented as a diamond with "WX" inscribed inside it. The diamond shall be centred at the position derived from the reported position of observation. The sides of the diamond shall not be more than 6 mm, drawn using a thin solid line style and using the same basic colour as AIS AtoN. Note that the source of ship weather information may be AIS ASM function identifier 21 when type of weather report = 0 (SN.1/Circ.289).	

Table A.6 – Example of possible colour scheme

Symbol	Colour white background/ dark background	Colour token (IHO S-52)
1.1 a, 1.1 b	Black/White	SHIPS
1.7 a	Black/White	PSTRK
2.1 a, 2.4, 2.5 a, 2.15, 2.16	Blue-green	ARPAT
2.10, 2.11, 5.5, 5.6, 5.7	Blue	RESBL
2.12, 4.1, 4.2, 4.3, 4.4, 4.5	Orange	CURSR
2.14, 3.7, 5.4	Orange	NINFO
3.1 a	Red	PLRTE
3.1 a	Orange	APLRT

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Annex B (normative)

Guidelines for the presentation of navigation-related terminology and abbreviations

B.1 Overview

Annex B specifies the terminology and abbreviations to be used for the presentation of navigation related information in conformance with guidelines published by IMO and provided in SN/Circ.243. All text in this document whose wording is identical to that in the IMO guidelines is printed in *italics*, and the referenced paragraph number is indicated in brackets with the abbreviated prefix, for example (SN243/2).

B.2 Purpose

(SN243/2/1) *The purpose of Annex B is to provide guidelines on the use of appropriate navigation-related terminology and abbreviations intended for presentation on all shipborne navigational systems and equipment. These are based on terminology and abbreviations used in existing navigation references.*

B.3 Use of these guidelines

(SN243/2/2) *These guidelines will ensure that the terminology and abbreviations used for the presentation of navigation-related information on all shipborne navigational systems and equipment are presented in a consistent and uniform manner.*

B.4 Application

(SN243/2/3) *These guidelines apply to all shipborne navigational systems and equipment when navigation-related information is presented as text, the standard terminology or abbreviations listed in Table B.1 and Table B.2 shall be used in place of terminology and abbreviations which are currently contained in existing Performance Standards for navigational systems and equipment. Where standard terminology or a standard abbreviation is not available, another may be used. This shall provide a clear meaning and shall not conflict with the standard terminology or abbreviations listed in Table B.1 and Table B.2. Standard marine terminology shall be used for this purpose. When the meaning is not clear from its context, it shall not be abbreviated. When another terminology or abbreviation is used, it shall be explained in the operating manual.*

(SN243/2/3) *Unless otherwise specified, standard terms shall be presented in lower case while abbreviations shall be presented in upper case.*

B.5 Navigation related terminology and abbreviations

For the application of the standard terminology and abbreviations listed in Table B.1 and the standard units of measurement and abbreviations listed in Table B.2, the following shall be considered:

- *terms and abbreviations used in nautical charts are published in relevant IHO publications and are not listed here;*
- *in general, terms should be presented using lower case text with upper case first character for each separate word and abbreviations should be presented using upper case text. Those abbreviations that may be presented using lower case text are identified in Table B.2;*

- *abbreviations may be combined, for example, "CPA LIM" or "T CRS". When the abbreviation for the standard terminology "Relative" is combined with another abbreviation, the abbreviation "R" should be used instead of "REL", for example, "R CRS" (see footnote b to Table B.1);*
- *the use of the abbreviations "SIM" and "TRIAL" are not intended to replace the appropriate symbols listed in Table A.5 (see footnote c to Table B.1);*
- *The term "Course Made Good" has been used in the past to describe "Track Made Good". This is a misnomer in that "courses" are directions steered or intended to be steered with respect to a reference meridian. "Track Made Good" is preferred over the use of "Course Made Good", where applicable (see footnote d to Table B.1);*
- *Where other information is presented using SI units, the respective abbreviations shall be used (see Table B.2).*

Table B.1 – List of standard terms and abbreviations

Term	Abbreviation	Term	Abbreviation
Acknowledge	ACK	Bearing Waypoint To Waypoint	BWW
Acquire, Acquisition	ACQ	Bow Crossing Range	BCR
Acquisition Zone	AZ	Bow Crossing Time	BCT
Additional Military Layer	AML	Built in Test Equipment	BITE
Adjust, Adjustment	ADJ	Calibrate	CAL
Aft	AFT	Cancel	CNCL
Alarm	ALARM	Cancel All	CNCL ALL
Alert Setting	ALERT SET	Carried (for example, carried EBL origin)	C
Altitude	ALT	Central Processing Unit	CPU
Amplitude Modulation	AM	Centre	CENT
Anchor Watch	ANCH	Change	CHG
Antenna	ANT	Chart Display Settings	CHT DISP SET
Anti Clutter Rain	RAIN	Chart Management	CHT MGMT
Anti Clutter Sea	SEA	Chart Safety Settings	CHT SF SET
April	APR	Circularly Polarised	CP
Audible	AUD	Clear	CLR
August	AUG	Closest Point of Approach	CPA
Automatic	AUTO	Compact Disk Read Only Memory	CDROM
Automatic Frequency Control	AFC	Conning	CONN
Automatic Gain Control	AGC	Consistent Common Reference Point	CCRP
Automatic Identification System	AIS	Consistent Common Reference System	CCRS
Automatic Identification System – Search and Rescue Transmitter	AIS-SART	Contrast	CONT
Automatic Radar Plotting Aid	ARPA	Coordinated Universal Time	UTC
Autopilot	AP	Correction	CORR
Auxiliary System/Function	AUX	Course	CRS
Available	AVAIL	Course Over the Ground	COG
Azimuth Indicator	AZI	Course Through the Water	CTW
Background	BKGND	Course To Steer	CTS
BeiDou Navigation Satellite System	BDS	Course Up	C UP ^a
Bearing	BRG		

Term	Abbreviation	Term	Abbreviation
Cross Track Distance	XTD	Emergency Position Indicating Radio Beacon	EPIRB
Cross Track Limit	XTL	Emergency Position Indicating Radio Beacon – AIS	EPIRB-AIS
Cursor	CURS	ENC Management Report	ENC MGMT REP
Dangerous Goods	DG	ENC Update Status Report	ENC UPD STATUS
Date	DATE	Enhance	ENH
Dated Objects	Dated Objects	Enter	ENT
Day	DAY	Equipment	EQUIP
Day/Night	DAY/NT	Error	ERR
Dead Reckoning, Dead Reckoned Position	DR	Estimated Position	EP
December	DEC	Estimated Time of Arrival	ETA
Decrease	DECR	Estimated Time of Departure	ETD
Default Settings	DFLT SET	European Geo-Stationary Navigational Overlay System	EGNOS
Delay	DELAY	Event	EVENT
Delete	DEL	Exclusion Zone	EZ
Departure	DEP	Export Route	ROUTE EXP
Depth	DPTH	External	EXT
Destination	DEST	F-Band (applies to radar)	F-Band
Deviation	DEV	February	FEB
Differential BDS	DBDS	Foreword	FWD
Differential Galileo	DGAL ^a	Fishing Vessel	FISH
Differential GLONASS	DGLONASS ^a	Fix	FIX
Differential GNSS	DGNSS ^a	Forward	FWD
Differential GPS	DGPS ^a	Frequency	FREQ
Digital Selective Calling	DSC	Frequency Modulation	FM
Display	DISP	Full	FULL
Display Brilliance	BRILL	Gain	GAIN
Distance	DIST	Geographics	GEOG
Distance Root Mean Square	DRMS ^a	Geometric Dilution Of Precision	GDOP
Distance To Go	DTG	Global Maritime Distress and Safety System	GMDSS
Down	DN	Global Navigation Satellite System	GNSS
Drift	DRIFT	Global Orbiting Navigation Satellite System	GLONASS
Dropped (for example, dropped EBL origin)	D	Global Positioning System	GPS
East	E	Great Circle	GC
Echo Reference	REF	Grid	GRID
Electronic Bearing Line	EBL	Ground	GND
Electronic Chart Display and Information System	ECDIS	Grounding Avoidance System	GAS
Electronic Chart System	ECS	Group Repetition Interval	GRI
Electronic Navigational Chart	ENC	Guard Zone	GZ
Electronic Position Fixing System	EPFS	Gyro	GYRO
Electronic Range and Bearing Line	ERBL		

Term	Abbreviation	Term	Abbreviation
Harmful Substances (applies to AIS)	HS	Magnetic	MAG
Head Up	H UP ^a	Man Overboard	MOB
Heading	HDG	Manoeuvre	MVR
Heading Control System	HCS	Manual	MAN
Heading Line	HL	Manual Update	MAN UPD
Heading Line Off	HL OFF	Map(s)	MAP
High Frequency	HF	March	MAR
High Speed Craft	HSC	Maritime Mobile Services Identity number	MMSI
Horizontal Dilution Of Precision	HDOP	Maritime Polluant (applies to AIS)	MP
Identification	ID	Maritime Safety Information	MSI
Import Chart	IMPORT CHT	Marker	MKR
Import Route	ROUTE IMP	Master	MSTR
In	IN	Maximum	MAX
Increase	INCR	May	MAY
Indication	IND	Medium Frequency	MF
Information	INFO	Medium Pulse	MP
Information Report	INFO REPORT	Menu	MENU
Infrared	INF RED	Minimum	MIN
Initialisation	INIT	Missing	MISSING
Input	INP	Mute	MUTE
Input/Output	I/O	Navigation	NAV
Integrated Navigation System	INS	Night	NT
Integrated Radio Communication System	IRCS	Normal	NORM
Interference Rejection	IR	North	N
Interswitch	ISW	North Up	N UP ^a
Interval	INT	Not Less Than	NLT
January	JAN	Not More Than	NMT
July	JUL	Not Under Command	NUC
June	JUN	November	NOV
Label	LBL	October	OCT
Latitude	LAT	Off	OFF
Latitude/Longitude	L/L	Off centred	OFF CENT
Leeway	LWY	Officer of the Watch	OOW
Limit	LIM	Offset	OFFSET
Line Of Position	LOP	On	ON
Log	LOG	Out/Output	OUT
Long Pulse	LP	Own Ship	OS
Long Range	LR	Own Ship Look-Ahead	LOOK AHEAD
Longitude	LON	Panel Illumination	PANEL
Loran	LORAN	Parallel Index Line	PI
Lost Target	LOST TGT	Past Positions	PAST POSN
Low Frequency	LF	Passenger Vessel (applies to AIS)	PASSV

Term	Abbreviation	Term	Abbreviation
Performance Monitor	MON	Route Monitoring	ROUTE MON
Permanent	PERM	Route Plan	ROUTE PLAN
Person Overboard	POB	Safety Contour	SF CNT
Personal Identification Number	PIN	Sailing Vessel	SAIL
Pilot Vessel	PILOT	Satellite	SAT
Port/Portside	PORT	Satellite Based Augmentation System	SBAS
Position	POSN	Save User Settings	SAVE USR
Positional Dilution Of Precision	PDOP	S-Band (applies to Radar)	S-BAND
Power	PWR	Scan to Scan	SC/SC
Predicted	PRED	Search And Rescue	SAR
Predicted Area of Danger	PAD	Search And Rescue Transponder	SART
Predicted Point of Collision	PPC	Search And Rescue Vessel	SARV
Pulse Length	PL	Select	SEL
Pulse Modulation	PM	Select User Settings	USR SEL
Pulse Repetition Frequency	PRF	September	SEP
Pulse Repetition Rate	PRR	Sequence	SEQ
Pulses Per Revolution	PPR	Set (i.e., set and drift, or setting a value)	SET
Racon	RACON	Ship's Time	TIME
Radar	RADAR	Short Pulse	SP
Radar Overlay	RADAR OVR	Signal to Noise Ratio	SNR
Radar Settings	RADAR SET	Silence	SLNC
Radar Plotting	RP	Simulation	SIM ^c
Radar Transponder	TPR	Slave	SLAVE
Radius	RAD	South	S
Rain	RAIN	Speed	SPD
Range	RNG	Speed and Distance Measuring Equipment	SDME
Range Rings	RR	Speed Over the Ground	SOG
Raster Chart Display System	RCDS	Speed Through the Water	STW
Raster Navigational Chart	RNC	Stabilized	STAB
Rate Of Turn	ROT	Standard Display	STND DISP
Real-time Kinematic	RTK	Standby	STBY
Receiver	RX ^a	Starboard/Starboard Side	STBD
Receiver Autonomous Integrity Monitoring	RAIM	Station	STN
Reference	REF	Status and Data	STAT DISP
Relative	REL ^b	Symbol(s)	SYM
Relative Motion	RM	Synchronization	SYNC
Revolutions per Minute	RPM	System Electronic Navigational Chart	SENC
Rhumb Line	RL	Target	TGT
Roll On/Roll Off Vessel (applies to AIS)	RoRo	Target Tracking	TT
Root Mean Square	RMS	Test	TEST
Route	ROUTE	Time	TIME

Term	Abbreviation	Term	Abbreviation
Time Difference	TD	Vector	VECT
Time Dilution Of Precision	TDOP	Very High Frequency	VHF
Time Of Arrival	TOA	Very Low Frequency	VLF
Time Of Departure	TOD	Vessel Aground (applies to AIS)	GRND
Time to CPA	TCPA	Vessel at Anchor (applies to AIS)	ANCH
Time To Go	TTG	Vessel Constrained by Draught (applies to AIS)	VCD
Time to Wheel Over Line	TWOL	Vessel Engaged in Diving Operations	DIVE
Track	TRK	Vessel Engaged in Dredging or Underwater Operations (applies to AIS)	DRG
Track Control System	TCS	Vessel Engaged in Towing Operations (applies to AIS)	TOW
Tracking	TRKG	Vessel Not Under Command (applies to AIS)	NUC
Track Made Good	TMG ^d	Vessel Restricted in Manoeuvrability (applies to AIS)	RIM
Trail(s)	TRAIL	Vessel Traffic Service	VTs
Transceiver	TXRX ^a	Vessel Underway Using Engine (applies to AIS)	UWE
Transferred Line Of Position	TPL	Video	VID
Transmitter	TX ^a	Visual Display Unit	VDU
Transmitting Heading Device	THD	Voyage	VOY
Trial	TRIAL ^c	Voyage Data Recorder	VDR
Trial Settings	TRIAL SET	Warning	WARNING
Trigger Pulse	TRIG	Water	WAT
True	T	Waypoint	WPT
True Motion	TM	Waypoint Closure Velocity	WCV
Tune	TUNE	West	W
Ultrahigh Frequency	UHF	Wheel Over Line	WOL
Uninterruptible Power Supply	UPS	Wheel Over Point	WOP
Universal Time, Coordinated	UTC	Wheel Over Time	WOT
Universal Transverse Mercator	UTM	World Geodetic System	WGS
Unstabilised	UNSTAB	X-Band (applies to Radar)	X-BAND
Update Log	UPD LOG		
Update Review	UPD REV		
User Chart	USR CHT		
Variable Range Marker	VRM		
Variation	VAR		

^a In general, terms should be presented using lower case text and abbreviations should be presented using upper case text. Those abbreviations that may be presented using lower case text are identified in the table, for example, "dGNSS", "Rx".

^b Abbreviations may be combined, e.g. "CPA LIM" or "T CRS". When the abbreviation for "Relative" is combined with another abbreviation, the abbreviation "R" should be used instead of "REL", for example "R CRS".

^c The use of abbreviations "SIM" and "TRIAL" are not intended to replace the appropriate symbols listed in Table A.5.

^d The term "Course Made Good" has been used in the past to describe "Track Made Good". This is a misnomer in that "courses" are directions steered or intended to be steered with respect to a reference meridian. "Track Made Good" is preferred over the use of "Course Made Good", where applicable.

Table B.2 – List of standard units of measurement and abbreviations

Unit	Abbreviation
<i>cable length</i>	<i>cbl</i>
centimetre	cm
<i>cycles per second</i>	<i>cps</i>
<i>degree(s)</i>	<i>deg or °</i>
<i>fathom(s)</i>	<i>fm</i>
<i>feet/foot</i>	<i>ft</i>
<i>gigahertz</i>	<i>GHz</i>
<i>hectopascal</i>	<i>hPa</i>
<i>hertz</i>	<i>Hz</i>
<i>hour(s)</i>	<i>hr(s)</i>
inch	in
<i>kilohertz</i>	<i>kHz</i>
<i>kilometre</i>	<i>km</i>
<i>kilopascal</i>	<i>kPa</i>
<i>knot(s)</i>	<i>kn</i>
<i>megahertz</i>	<i>MHz</i>
<i>metre</i>	<i>m</i>
<i>minute(s)</i>	<i>min or ' </i>
<i>Nautical Mile(s)</i>	<i>NM</i>
<i>second(s)</i>	<i>s or " </i>

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Annex C (informative)

Guidance on display and dialogue design in IMO MSC/Circ.982

C.1 Overview

Annex C lists the guidelines in IMO MSC/Circ.982 that are related to presentation, and their association with the presentation-related requirements provided in IEC 60945 and this document.

C.2 General

IMO MSC/Circ.982 provides guidelines on ergonomic criteria for bridge equipment and layout with the objective of improving the reliability and efficiency of navigation. These guidelines contain additional, relevant and useful information that may be applied to the design of computer-based displays for navigational systems and equipment.

C.3 Requirements in IMO MSC/Circ.982 related to the display design

Some of the paragraphs in IMO MSC/Circ.982 can be associated with the general requirements for shipborne navigational systems and equipment in IEC 60945:2002, particularly those related to display equipment or displays. Others are wholly or partially related to display design. Table C.1 through Table C.3 list those paragraphs.

Table C.1 – Paragraphs in MSC/Circ.982 associated with IEC 60945 requirements

IEC 60945:2002 Subclause		MSC/Circ.982 Paragraph	
4.2.1	Ergonomics and HMI		
4.2.1.3	Operation	5.3.2.6	Control/indicator discernability
		5.5	Input devices
		5.7	General user input guidelines
4.2.1.4	Identification	5.3.2.4	Control and display location
		5.2.2.5	Simultaneous use
4.2.1.5	Screen displays and indications	5.3.5.1	Function labelling
		5.3.5.2	Label terminology
		5.6.3.3	Background colour (Conflicts with Paragraph 7)
		5.7	General user input guidelines (Paragraph g))
4.2.2	Hardware		
4.2.2.2	Alarms and indicators	5.4.1.1	Alarm acknowledgement

Table C.2 – Other paragraphs in MSC/Circ.982 related to display design

MSC/Circ.982 Paragraph	
5.3.2.7	High priority displays
5.3.3.5	Spacing between controls
5.4.1.4	Sensor input failure
5.4.1.8	Alarm Minimization
5.4.1.12	Presentation of Alarms
5.4.2	Visual Alarms (all 6 sub-criteria)
5.6.1.1	Lack of ambiguity
5.6.1.2	Use of digital displays
5.6.1.3	Digital readout
5.6.1.10	Display fields for the display of important information
5.6.2.3	Demarcation of Groups
5.6.3.8	Flicker
5.6.3.9	Image continuity
5.6.3.10	CRT image linearity
5.6.5.2	Meaningful abbreviations
5.6.5.3	Units of measurement
5.6.5.7	Highlighting
5.6.5.8	Scaling in standards intervals
5.6.5.10	Unobtrusive grids

Table C.3 – Other paragraphs in MSC/Circ.982 partially related to display design

MSC/Circ.982 Paragraph	
5.3.2.4	Control and display location
5.3.2.5	Simultaneous use
5.3.3.4	Consistent arrangement
5.3.3.5	Simultaneous use
5.4.1.3	Failure or reduction of power supply
5.4.1.13	Modes of alarms
5.4.3	Audible alarms (all 6 sub-criteria)

Annex D **(informative)**

Guidance on testing

D.1 Methods of test

D.1.1 General

The methods of test in this document do not identify specific processes, approaches or facilities. Rather, they are intended to provide guidance to accredited testing laboratories for the development of test plans and test procedures that evaluate compliance with the requirements specified.

D.1.2 Observation

The test method "observation" refers to simple examination of the presentation of information to confirm that a particular observable condition has been met. The phrase "confirm by observation" is used.

Observations may be made by any person with the necessary skill to understand the presentation of information to determine if a statement concerning an observable property has been correctly applied. It is used when suitably trained individuals with a broad range of education and/or experience can be confidently expected to reach the same conclusion about a property of presented information or the performance of display equipment.

Compliance is determined by comparing the observed property to the requirement. Some observations may be made directly from the presentation. Other observations may require simulation of input from sensors or other sources. Typical confirmations by observation include:

- existence of functions or features;
- use of symbols or a defined range of words;
- a system output in response to a defined input.

D.1.3 Inspection of documented evidence

The test method "inspection of documented evidence" refers to examination of relevant documents to confirm that a particular presentation or display requirement has been met. The phrase "confirm by inspection of documented evidence" is used.

Documented evidence may include manuals, system requirements, design justification, industry conventions, etc. Inspections may be made by a suitably qualified person who has the necessary education, skill and/or experience to apply the documentation to the system's presentation or display equipment. It is used when performance of a system's presentation or display equipment is not directly observable or measurable. It may also be used when observation would be excessively repetitious, time consuming, or expensive.

Compliance is determined by comparing the documented property to the requirement. Typical confirmations by inspection of documented evidence include:

- conformance to a standard or other documented evidence;
- existence of optional features or functions;
- design and/or operation of algorithms.

D.1.4 Measurement

The test method "measurement" refers to measuring or calculating a value or variable for comparison to a specified value to determine that a particular presentation or display requirement has been met. The phrase "confirm by measurement" is used.

Measurements may require the use of test facilities and equipment. Measurements may be made by any person with the necessary skill to measure and/or calculate the value and compare it against a requirement, standard or other documented evidence.

Compliance is determined by comparing the measured or calculated value or variable to the requirement. Typical confirmations by measurement include:

- assessing whether the end users of a display will be able to read characters from the intended viewing distance;
- differences between displayed colours or absolute levels of display brightness;
- achievement of a level of availability or dependability.

D.1.5 Analytical evaluation

The test method "analytical evaluation" refers to detailed examination of the presentation of information to confirm that a particular condition has been met. The phrase "confirm by analytical evaluation" is used.

Analytical evaluations may be made by a relevant expert with the necessary education, skills and/or experience to make an informed and reliable judgement concerning the presentation of information, its appropriateness and usability. It is used for the evaluation of properties which can be judged only in the context of other information or knowledge which requires the tester to make an informed assessment of the likely performance of a typical user of the presentation.

Compliance is determined by comparing the observed property to the requirement. Typical confirmations by analytical evaluation include:

- the largest amount of information that can be presented to a user on a single display;
- the smallest difference in size, colour or line thickness that will be distinguished by a user on a particular display;
- consistency and clarity in presentation of information.

D.2 Application of IEC 60945

D.2.1 Display equipment category

The manufacturer should categorize their display equipment according to IEC 60945:2002, 4.4.

D.2.2 Technical performance

A performance test should be used to confirm compliance with the requirements specifying parameters.

A performance check should be used to confirm that the equipment operates.

The testing laboratory should use the appropriate measure of technical performance (i.e. performance test or performance check) for each test in the test plan.

The equipment should operate in accordance with this document during each performance test or performance check.

D.2.3 Pre-conditioning for environmental tests

The manufacturer should specify any mechanical or electrical preconditioning required for environmental tests. The testing laboratory should inspect the display equipment and perform any preconditioning specified by the manufacturer.

The testing laboratory should carry out environmental tests with display equipment in its normal operational configuration, including mounting and supports, and with all mechanical arrangements secure.

D.2.4 Methods of test applied for IEC 60945

Many requirements for the presentation of information are of a nature that may be tested by simple observation. Other requirements are, however, of a more complex nature and may require informed judgement in the context of other information or knowledge by an expert with the necessary education, skills and/or experience. This is particularly the case in assessing conditions of appropriateness, usability or the likely performance of a typical user.

These considerations are reflected in the guidance on test methods provided by Clause D.1, and in the structure of this document in general, where the test method to be applied is specified test by test.

IEC 60945:2002 simply specifies that each requirement should be "checked", without further guidance. Table D.1 gives appropriate test methods.

Table D.1 – Methods of test applied for IEC 60945

IEC 60945:2002 subclause	Original test method	Appropriate test method
6.1.2 a)	Check	Analytical evaluation
6.1.2 b)	Check	Analytical evaluation
6.1.2 c)	Check	Measurement
6.1.2 d)	Check	Analytical evaluation
6.1.2 e)	Check	Observation
6.1.2 f)	Check	Observation
6.1.2 g)	Check	Observation
6.1.2 h)	Check	Analytical evaluation
6.1.3 a)	Check	Analytical evaluation
6.1.3 b)	Check	Analytical evaluation
6.1.3 c)	Check	Observation
6.1.3 d)	Check	Analytical evaluation
6.1.4 a)	Check	Observation
6.1.4 b)	Check	Observation
6.1.4 c)	Check	Observation
6.1.4 d)	Check	Analytical evaluation
6.1.5 a)	Check	Analytical evaluation
6.1.5 b)	Check	Observation
6.1.5 c)	Check	Analytical evaluation
6.1.5 d)	Check	Observation
6.1.5 e)	Check	Analytical evaluation
6.1.5 f)	Check	Analytical evaluation
6.1.5 g)	Check	Inspection of documented evidence
6.1.5 h)	Check	Analytical evaluation
6.1.5 i)	Check	Analytical evaluation
6.1.5 j)	Check	Analytical evaluation

IEC 60945:2002 subclause	Original test method	Appropriate test method
6.1.5 k)	Check	Analytical evaluation
6.1.5 l)	Check	Analytical evaluation
6.1.5 m)	Check	Observation
6.1.5 n)	Check	Observation
6.1.5 o)	Check	Analytical evaluation
6.1.5 p)	Check	Observation
6.1.5 q)	Check	Observation
6.1.5 r)	Check	Observation
6.1.5 s)	Check	Observation
6.1.5 t)	Check	Observation
6.1.6 a)	Check	Analytical evaluation
6.1.6 b)	Check	Observation
6.1.6 c)	Check	Observation
6.1.6 d)	Check	Observation
6.1.7 a)	Check	Analytical evaluation
6.1.7 b)	Check	Analytical evaluation
6.1.7 c)	Check	Analytical evaluation
6.1.7 d)	Check	Analytical evaluation
6.1.7 e)	Check	Analytical evaluation
6.1.8 a)	Check	Analytical evaluation
6.1.8 b)	Check	Observation
6.1.8 c)	Check	Observation
6.1.8 d)	Check	Observation
6.1.8 e)	Check	Observation
6.1.8 f)	Check	Analytical evaluation
6.2.1 a)	Check	Observation
6.2.1 b)	Check	Analytical evaluation
6.2.1 c)	Check	Analytical evaluation
6.2.1 d)	Check	Observation
6.2.2 a)	Check	Observation
6.2.2 b)	Check	Observation
6.2.2 c)	Check	Observation
6.2.3 a)	Check	Observation
6.2.3 b)	Check	Observation
6.2.3 c)	Check	Inspection of documented evidence
6.2.3 d)	Check	Observation
6.2.3 e)	Check	Observation
6.2.3 f)	Check	Analytical evaluation
6.2.3 g)	Check	Observation
6.2.3 h)	Check	Observation
6.2.3 i)	Check	Observation

D.3 Compliance with requirements

Compliance with a requirement can be established by verifying that it is implemented in accordance with another standard or with another clause or subclause within this document; or by confirming that it is implemented in accordance with the requirement(s) specified in the requirement clause/subclause.

D.4 Simulation

Some test methods require simulation. A simulator arrangement should provide the capabilities to replicate own ship navigational sensors, radar video images including individual radar echoes for the tracking of targets, reported radar targets (for example, in accordance with the IEC 61162 series), AIS data reports, AIS locating devices, AIS synthetic targets, AIS safety related messages and AIS ASMs.

IEC 62388 describes a Target Scenario Simulator (TSS), a Reported Target Simulator (RTS) and a combined TSS/RTS.

D.5 Electronic chart data

Some test methods require electronic chart data or an electronic chart test data set.

IEC 61174 describes the use of a test data set for ENC. For example, IHO S-64 contains the IHO test data sets for ECDIS using IHO S-57 ENC. The ECDIS test data sets are comprised of an ENC test data set and an RNC test data set.

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Annex E

(normative)

Operational controls and logical grouping

E.1 Overview

Operational controls for navigational systems and equipment shall be easy to identify and simple to use. Controls may be implemented through dedicated hardware, screen-accessed soft keys, or a combination of both. The primary controls for each navigational system or equipment shall be identified and provided with an associated status indication in accordance with the function it is serving.

E.2 Logical grouping of data and control functions

Data and control functions shall be divided into logical groups for the function or the task-at-hand, in accordance with 4.3.1.

Table E.1 provides logical grouping that shall be applied to radar, ECDIS and INS; and may be applied to other electronic navigation equipment and navigation sensors, where applicable.

Table E.2 provides examples of voluntary to implement top-level logical groupings of data and controls for radar and charting functionality. Specific requirements for logical grouping of data and control functions, when contained in the individual standards for navigational systems and equipment, shall also be followed. Examples of major groups:

- alerts and indications;
- own ship information;
- track monitoring data (as specified in IEC 62065);
- trial manoeuvre;
- navigational tools and readouts;
- target information;
- range/scale and mode readout;
- radar system information;
- radar signal information;
- chart database information;
- system settings.

**Table E.1 – Logical grouping for radar, ECDIS and INS applications
(based on MSC.1/Circ.1609)**

Own ship information
<i>HDG: <value> <unit> <sensor source/ status></i> <i>COG: <value> <unit> <sensor source/ status></i> <i>SOG: <value> <unit> <sensor source/ status></i> <i>STW: <value> <unit> <sensor source/ status></i> <i>Position (Optional) <LAT value> <LON value> <Sensor source and status></i>
Date and Time
<i><Date> <Time> <time reference></i> <i><Date> <Time> <UTC></i>
Target information
<i>Target Number/ Identifier <1234></i> <i>Target Name <Alphanumeric></i> <i>COG: <value> <unit></i> <i>SOG: <value> <unit></i> <i>STW: <value> <unit> ></i> <i>Closest Point of Approach (CPA): <value> <unit></i> <i>Time to Closest Point of Approach (TCPA): <value> <unit></i> <i>Bearing from Ownship: <value> <unit></i> <i>Range from Ownship: <value> <unit></i>
Measurement info
<i>EBL bearing: <value><unit></i> <i>VRM range: <value><unit></i>
Cursor location
<i>Position <LAT value> <LON value></i> <i>Bearing from Ownship: <value> <unit></i> <i>Range from Ownship: <value> <unit></i>
Route
<i>Route Name: <RTE Name></i> <i>Next Waypoint Number/ Name: <WPT name></i> <i>Distance to "TO-WPT": <value> <unit></i> <i>Bearing to "TO-WPT": <value> <unit></i> <i>Time to go to "TO-WPT": <value> <unit></i> <i>Estimate time of arrival: <value> <unit> <time reference></i> <i>Next course: <value> <unit></i> <i>Current Cross Track Distance: PORT <value> <unit> Or STBD <value> <unit></i> <i>Cross track Limit Current Leg: PORT <value> <unit> STBD <value> <unit></i>

Table E.2 – Examples of logical grouping for voluntary implementation

Scale and mode information	Chart database information
Chart scale Chart datum Orientation mode Motion mode Symbol set	ENC cell Cell edition/date Corrected through date
Radar signal information	Radar system information
Gain Rain Sea Processing (for example, target enhancement or correlation)	Standby/run Pulse length Frequency band Master/slave designation Tune
Range and mode information	
Range scale Orientation mode Stabilization mode Motion mode	

E.3 Navigation related terminology and icons for common function controls (hot keys and shortcuts)

When any of the following controls listed in Clause E.3 are used, they shall be identified in English by the relevant name or abbreviation as listed by the appropriate table. In addition, they may be identified by standard icons, described below.

General equipment controls apply to all equipment and are defined in Table E.3. Navigation controls are defined in Table E.4. Radar specific controls are defined in Table E.5. Chart display controls are defined in Table E.6. Some chart related functions are in Table E.7. Chart database controls are defined in Table E.8. Route plan and monitoring controls are defined in Table E.9. Miscellaneous controls are defined in Table E.10.

Icons in Table E.6 shall be implemented using the specified colours based on IHO colour scheme or similar. For all other icons, the manufacturer shall select appropriate colours within the requirements of this document.

All icons in the tables are examples of the shape and to be adjusted for space available for an icon in the target equipment.

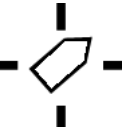
The following code of practice shall be used when marking equipment controls with optional icons:

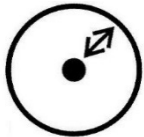
- the minimum dimension of a symbol shall be not less than 9 mm;
- the distance between the centres of two adjacent symbols shall be not less than 1,1 times the size of the larger symbol;
- switch function symbols shall be linked by a line. A linked line infers controlled action;
- variable control function symbols shall be linked by a line, preferably an arc. The direction of increase shall be indicated;
- icons shall be presented with a high contrast against their background;
- the various elements of a symbol shall have a fixed ratio one to another;
- multiple functions of controls and switch positions may be indicated by a combined symbol;
- where concentric controls or switches are fitted, the outer of the symbols should refer to the larger diameter control.

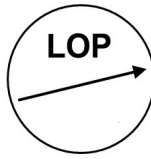
Table E.3 – General controls

Explanation	Term	Abbreviation	Icon (hot key)
To identify the "off" position of the control or switch	OFF	OFF	
To identify the "Radar on" position of the switch or alternatively To identify the "on" position of the control or switch The relative size of the dot with respect to the circle may vary as long as it is easily distinguishable.	ON	ON	 or 
To identify the "on/off" alternate control or switch	ON/OFF	ON/OFF	
To identify the standby alternate control or switch and To identify the combined "on/off" plus standby alternate control or switch Table E.5 specifies this symbol for Radar. A radar may use this symbol or the symbol specified in Table E.5.	STANDBY	STBY	
To activate system menu	Menu	MENU	
To perform Undo	Undo	UNDO	
To perform Redo	Redo	REDO	
To return to Colour calibrated display	Colour calibrated	COLCAL	
To perform Print screen	Print screen	PRT SC	

Table E.4 – General navigation functions (based on MSC.1/Circ.1609)

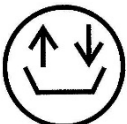
Explanation	Term	Abbreviation	Icon (hot key)
To set panel illumination	Panel illumination	PANEL	
To set display brilliance	Display brilliance	BRILL	
To select ECDIS mode (for multifunction displays)	ECDIS	ECDIS	
To select Radar mode (for multifunction displays)	Radar	RADAR	
To select Conning display or to select 'navigation control data' task of the INS (for multifunction displays)	Conning	CONN NAV CTRL	
To select CAM-HMI as defined in Bridge Alert Management (BAM) (for example as required by INS)	CAM-HMI	CAM	
To select North Up display	North Up	N UP	N UP
To select Head Up display	Head Up	H UP	H UP
To select Course Up display	Course Up	C UP	C UP
To select True Motion mode	True Motion	TM	TM
To select Relative Motion mode	Relative Motion	RM	RM
To select ship centred Mode	Centred	CENT	
To select ship off centred Mode	Off centred	OFF CENT	
To perform True Motion reset	TM reset	TM RESET	TM RESET

Explanation	Term	Abbreviation	Icon (hot key)
To select range	Range	RANGE	
To perform Range up (for example, from 3 nm to 6 nm)	Up	+	
To perform Range down (for example, from 6 nm to 3 nm)	Down	-	
To identify the "heading line" off position	Heading Line Off	HL OFF	
To toggle Range Rings on and off	Range Rings	RR	
To set Variable Range Marker	Variable Range Marker	VRM	
To set Electronic Bearing Line	Electronic Bearing Line	EBL	
To control simultaneous measurement of range and bearing	Electronic Range and Bearing Line	ERBL	
To perform Target Acquire	Acquire	ACQ	
To perform selection (for example, target or chart object)	Select	SEL	
To call up the information associated with an object by cursor selection on its symbol	Info report	INFO REPORT	
To perform target cancellation	Cancel	CNCL	
To perform cancellation of all targets	Cancel all	CNCL ALL	
To acknowledge an alert	Acknowledge	ACK	

Explanation	Term	Abbreviation	Icon (hot key)
To temporarily silence alerts	Silence	SLNC	
To record or log an event or occurrence	Record Event	REC EVENT	
To select default settings	Default settings	DFLT SET	
To select user settings	Select user settings	USR SET	
To save user settings	Save user settings	SAVE USR	
To select standard display for chart symbol	Standard display	STND DISP	STND DISP
To execute Trial Manoeuvre	Trial manoeuvre	TRIAL	TRIAL
To toggle Day/Night/Dusk mode	Day / Night	DAY / NT	
To plot own ship position manually	Line of Position	LOP	
To toggle True/Relative Vector mode	True/Relative Vector	T/R VECT	
To toggle On/Off AIS	Automatic Identification System contacts on/off	AIS	AIS
To toggle On/Off Automatic Identification System Application Specific Messages	AIS ASM on/off	AIS ASM	AIS ASM

Explanation	Term	Abbreviation	Icon (hot key)
To "status and data display" tasks of the INS	Status and Data	STAT DISP	STAT DISP
To activate anchor watch	Anchor watch	ANCHOR	

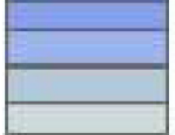
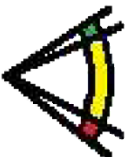
Table E.5 – Radar specific controls

Explanation	Term	Abbreviations	Symbol
To identify the "Radar stand-by" position of the switch Table E.3 specifies this case for general use. A radar may use this symbol or the symbol specified in Table E.3.	STANDBY	STBY	
To identify the "short" pulse position of the pulse length selection control	SHORT PULSE	SP	
To identify the "long" pulse position of the pulse length selection control	LONG PULSE	LP	
To identify the "tuning control"	TUNE	TUNE	
To identify the "gain" control	GAIN	GAIN	
To identify the minimum position of the "rain" control or switch	RAIN	RAIN	
To identify the minimum position of the "anti-clutter sea" control	SEA	SEA	
To identify the position of the performance monitor switch	PERFORMANCE MONITOR	PM	

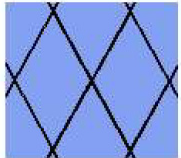
Explanation	Term	Abbreviations	Symbol
To select target association priority for radar target The circle is drawn using a thick line and triangle is drawn using a thin line			
To select target association priority for AIS target The circle is drawn using a thin line and triangle is drawn using a thick line			
NOTE The circles around the SHORT PULSE, LONG PULSE, and PERFORMANCE MONITOR icons are optional.			

Table E.6 – Control of chart display functions (based on MSC.1/Circ.1609)

Explanation	Term	Abbreviation	Icon (hot key)
To show accuracy related symbols	Accuracy	CATZOC	
Selector for viewing group layer	All isolated dangers	ISODNG	
	Archipelagic sea lanes	ALS	
	Boundaries and limits	BNDLIM	
	Buoys, beacons, aids to navigation	ATON	
	Cautionary notes	CNTNTE	
Chart boundary shown	Chart boundary	CHTBND	

Explanation	Term	Abbreviation	Icon (hot key)
Selector for viewing group layer	Chart scale boundaries	CHTSCA	
To show contour labels	Contour label	CNTLBL	
Deep contour	Deep contour	DEEPCNT	
Selector for viewing group layer	Display base	DISPBASE	
Use four shades	Four shades	4SHADES	
Selector for full light sector lines	Full light lines	FULLSEC	
Show date dependent object	Highlight date dependent	DATEDEP	
Show symbol for INFORM and NINFOM	Highlight info	INFHLT	
Show symbol for TXTDSC, NTXDS and PICREP	Highlight document	DOCHLT	

Explanation	Term	Abbreviation	Icon (hot key)
Selector for viewing group layer	Important text	IMPTXT	IMP TXT
	Other text	OTHTXT	OTH TXT
	Magnetic variation	MAGVAR	
	Miscellaneous	MISC	MISC
Show national language NOBJNM, text group 2	National language	NATLANG	
Selection for point object style	Paper chart symbols	PAPERSYM	
	Simplified symbols	SIMPSYM	
Selection for line style	Plain boundaries	PLNBND	
	Symbolized boundaries	SYMBND	

Explanation	Term	Abbreviation	Icon (hot key)
Selector for viewing group layer	Prohibited and restricted areas	PRBAREA	
	Drying line	DRYLNE	DRY LNE
To select safety contour	Safety contour	SF CNT	SAFE CNT
Shallow contour	Shallow contour	SHAL CNT	SHAL CNT
Depths in safety area shown, soundings in safe area shown	Safe depths shown	SF DPTH SHOW	DPTH SHWN
To select safety depth	Safety depth	SF DPTH	SAFE DPTH
To turn SCAMIN off	Scale min	SCAMIN	SCA MIN
Selector for viewing group layer	Seabed	SEABED	SEA BED
To show shallow pattern	Shallow pattern	SHALPAT	
To show isolated dangers in shallow waters	Shallow water dangers	SHALDNG	

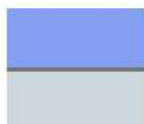
Explanation	Term	Abbreviation	Icon (hot key)
Selector for viewing group layer	<i>Ships' routeing systems and ferry routes</i>	ROUTEING	
	<i>Spot soundings</i>	SPOTSND	
	<i>Submarine cables and pipelines</i>	SUBCAB	
	<i>Tidal</i>	TIDAL	
	<i>Two shades</i>	2SHADE	
Selector for displaying unknown objects	Unknown	UNKNOWN	
To highlight objects which have undergone modification	Update review	UPD REV	
NOTE The icons can be modified in a consistent manner to provide an indication of current state (i.e. on or off).			

Table E.7 – Control of chart functionality (based on MSC.1/Circ.1609)

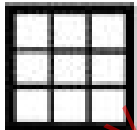
Explanation	Term	Abbreviation	Icon (hot key)
To select a date or date range for displaying all chart objects active at that date and time	Dated objects	DATE OBJ	
To toggle latitude/longitude grid	Grid	GRID	
To perform manual update	Manual update	MAN UPD	
To toggle radar overlay	Radar overlay	RADAR OVR	
To select original compilation scale of the chart or To select 1:1 chart pixel to display pixel in RCDS mode	Original scale	ORIG SCALE	1:1

Table E.8 – Database functions (based on MSC.1/Circ.1609)

Explanation	Term	Abbreviation	Icon (hot key)
To import ENC	Import Chart	IMPORT CHT	Not applicable
To review ENC updates	Update review	UPD REV	Not applicable
To view ENC update summary report	Update summary	UPD SUM	Not applicable
To view graphical index of ENC charts	Graphical index	GRAPH INDX	Not applicable
To view ENC update log	Update log	UPD LOG	Not applicable
To view ENC Update Status Report	ENC Update Status Report	ENC UPD STATUS	Not applicable
To view ENC Management Report	ENC Management Report	ENC MGMT REP	Not applicable
NOTE Some of these functions may also apply to RNC.			

Table E.9 – Route plan and monitoring functions (based on MSC.1/Circ.1609)

Explanation	Term	Abbreviation	Icon (hot key)
To export route plan	Export Route	RTE EXPORT	
To import route plan	Import Route	RTE IMPORT	
To set own-ship look ahead	Own ship look-ahead	LOOK AHEAD	Not applicable
To add WPT	Add waypoint	ADD WPT	
To edit WPT	Edit waypoint	EDIT WPT	
To delete WPT	Delete waypoint	DEL WPT	

Table E.10 – Groups of functions (based on MSC.1/Circ.1609)

Explanation	Term	Abbreviation	Icon (hot key)
To set collision avoidance limits and other target-related parameters (including CPA, TCPA, etc.)	Target settings	TGT SET	 TGT
To set radar controls (including tunings, anti-clutter, etc.)	Radar settings	RADAR SET	 RADAR
To set chart related limits and other chart-related parameters (including safety contour, safety depth, areas with special conditions, own ship check area, etc.)	Chart safety settings	CHART SET	 CHART
To set trial manoeuvre parameters	Trial Settings	TRIAL SET	 TRIAL
To add or remove information from the ECDIS display.	Chart display settings	CHART DISP SET	

Explanation	Term	Abbreviation	Icon (hot key)
To provide additional mariner's information.	User Chart	USR CHT	 USER
To access route plan functionality	Route plan	ROUTE PLAN	 PLAN
To access route monitoring functionality	Route monitoring	ROUTE MON	 MONIT
To access management chart database	Chart management	CHART MGMT	CHT MGMT
To access alert setting management	Alert Setting	ALERT SET	 ALERT
To access functionality related to MSI	Not specified in this document	Not specified in this document	
To access functionality of received messages, e.g. AIS safety related messages	Not specified in this document	Not specified in this document	

Annex F
(normative)

Icons for presentation of the state of an alert

Icons for presentation of the state of an alert shall be presented as defined in IEC 62923-1.

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Annex G (normative)

Testing for colours, intensity and flicker

G.1 Testing for colours and intensity

G.1.1 General

The IHO ECDIS Presentation Library contains colour differentiation test diagrams to enable test personnel to determine whether it is possible to discriminate features by colour.

The colours in the IHO ECDIS Presentation Library are defined using the CIE 1931 colour coordinate system (x , y and L) which specify chrominance and luminance. CIE 15 defines the following units for colour difference in terms of chrominance and luminance:

- ΔE^* as a measure of the overall discrimination including both chrominance and luminance differences;

$$\Delta E^* = \text{SQRT} [(L_2^* - L_1^*)^2 + (u_2^* - u_1^*)^2 + (v_2^* - v_1^*)^2]$$

- $\Delta(u^*, v^*)$ as a measure of the discrimination in chrominance alone.

$$\Delta(u^*, v^*) = \text{SQRT} [(u_2^* - u_1^*)^2 + (v_2^* - v_1^*)^2]$$

Tolerances for conversion from CIE 1931 colour coordinates to RGB values for display equipment are defined by three terms:

- ΔE^* between the colour coordinates resulting from the RGB values calculated for each colour and the other colours from the same colour table for each ambient light condition;
- $\Delta(u^*, v^*)$ between the defined colour coordinates and the coordinates resulting from the RGB values calculated for each colour in each colour table for each ambient light condition;
- luminance ratio ($L_{\text{measured}}/L_{\text{defined}}$) between the defined coordinates of the colours within the colour table for each ambient light condition and the coordinates resulting from the RGB values calculated for each colour.

ΔE^* should be a minimum of 10 except for colour pairs listed in IHO S-52 Table of Colour – Colour pairs that are exempt from the colour separation tolerance test, which, as defined, are very close in colour.

$\Delta(u^*, v^*)$ should be a maximum of 16 for display equipment tested as part of the navigational system or equipment (i.e. where the display screen and its source of video are tested together) or for system components between which the transfer of the video is based on a lossless method (for example DVI-D for digital transfer). $\Delta(u^*, v^*)$ should be a maximum of 8 for system components that are tested independently of each other (i.e. where the display screen equipment is not tested with the identical video source that it will be installed with aboard ship or where a computer is not tested with the identical display screen that it will be installed with aboard ship).

For each colour token within the colour table, the luminance should be within 20 % of the value specified in IHO S-52, Colour conversion tolerances and tests, for each colour table specified in the IHO S-52, for example; day, dusk and night. The colour black is an exception, which should be a maximum 0,52 cd/m² as defined in the IHO S-52, Colour conversion tolerances and tests for the day colour table.

Calculations of L^* , u^* , and v^* shall be made in reference to the chromaticity and luminance specified for the brightest white colour token in the respective colour table (Y_0 , u_0 , y_0); where Y_0 is the luminance in cd/m². It should be noted that this is not the brightest white of the monitor.

G.1.2 Test personnel

Personnel conducting tests related to the discrimination of colours should have passed the minimum colour vision and acuity tests required for users by IMO STCW Code Part B. They should also have adapted to night viewing for 10 min before conducting tests using the night display.

G.1.3 Method of test

The method of test is as follows:

- a) confirm by analytical evaluation the measurement process of the manufacturer and confirm by inspection of documented evidence provided by the manufacturer that, for each colour table, the difference between the calculated RGB values for any two colours in the table are at least 10 ΔE^* units, except for those pairs defined to have a tabular ΔE^* less than 20; as defined in the IHO S-52, Colour conversion tolerances and tests and IHO S-52, Table of Colour – Colour pairs that are exempt from the colour separation tolerance test;
- b) confirm by analytical evaluation the measurement process of the manufacturer and confirm by inspection of documented evidence provided by the manufacturer that the results of the colour calibration conversion of each specified colour (x, y, L) for each colour table into RGB values for an individual monitor are within the tolerance as defined in the IHO S-52, Calculations to achieve correct colours;
- c) colour table calibration verification measurements shall be carried out in a dark-room. Manufacturers may choose between two different methods of colour calibration. The first method is for the test of a monitor and a video source intended to be installed together as an integrated system. The second method is for the test of a monitor independent of the video source/computer with which it will be installed or, similarly, a video source tested independently of a monitor.
 - For independent test of monitors, the manufacturer shall provide a reference computer.
 - For independent test of computers, the manufacturer shall provide a reference monitor.

The test shall be performed as follows:

- 1) for the Day colour table, display a completely black image on the screen provided by the manufacturer. Confirm by measurement perpendicular to the centre of the screen that the luminance is as required (less than or equal to 0,52 cd/m² when the CHWHT is set to 80 cd/m² or more (Day colour table));
- 2) for the Day colour table, select a screen provided by the manufacturer which has a box of CHWHT (brightest white) on a black background. The box size should be at least 5 cm per side but not more than 25 % of the total screen area. Confirm by measurement perpendicular to the centre of the screen that the level of CHWHT is within the tolerances of $\Delta(u^*, v^*)$ for $\Delta(u^*, v^*) \leq 16$ for integrated units, $\Delta(u^*, v^*) \leq 8$ for independent test and L (is within 20 % of its specified value);
- 3) repeat the test for CHMGF (brightest magenta), CHYLW (brightest yellow) and BKAJ2 (darkest grey) from the Day colour table;
- 4) repeat the tests 2) and 3) for Dusk and Night colour tables and other colour tables provided, for example colour tables with black background for chart radar. Confirm by measurement that BKAJ1 (black background) luminance is 0,05 cd/m² in the night setting when the white level is dimmed down so that CHWHT is 1 cd/m²;
- d) colour table calibration verification observations shall be carried out as follows. The user's manual brightness control and contrast control, if provided, shall be set to their calibration reference settings; while the display is off, adjust the ambient light level reflected from a white paper positioned on the display screen to the appropriate ambient values specified in Table 1. For each colour table provided, under the appropriate ambient light condition, display the colour differentiation test diagram as defined in the IHO S-52 ECDIS presentation library. Confirm by observation that:
 - 1) each foreground stripe is clearly distinguished from its background;

- 2) the foreground stripes representing yellow, orange, magenta, green, blue and grey may be clearly identified;
- e) under each of the ambient light conditions defined above, display the black-adjust boxes available from ECDIS Chart 1 (see ECDIS chart 1 chart AA5C1ABO.) Select each table in turn and confirm by observation that the ECDIS colour token BKAJ2 (dark grey) is clearly distinguished against a black background (BKAJ1);
- f) confirm by observation that the procedure for on-board use of the colour differentiation test diagrams is defined in the equipment manual;
- g) confirm by observation that means are provided to return the display to the calibrated brightness and contrast settings for each ambient light condition defined above;
- h) confirm by observation that each of the mandatory colour tables provided in the IHO S-52 ECDIS presentation library may be selected by the user.

G.2 Testing for flicker

G.2.1 Overview

Clause G.2 reproduces the method originally developed in Annex B of ISO 13406-2:2001.

NOTE The actual perception of flicker is known to vary between individual observers and within an individual observer. Some of these variations are systematic. Flicker sensitivity decreases with age (between individuals) and with fatigue (for the individual). In addition, the conversion of display luminance to retinal illumination requires an assumption about the luminance that drives pupil response. In positive polarity displays, average display luminance and "adapting" luminance can be assumed to be the same. There is some evidence that this is not true for negative polarity displays. Due to cross-coupling of photo receptors in the eye, the correct value probably lies between the average and peak luminance. The average luminance is the worst case and is used in this method.

G.2.2 Analytic model

G.2.2.1 Principle

It can be predicted whether people will detect a homogeneously illuminated display appears to flicker or not by the amount of energy in the temporal frequencies of the display. The first step in the method, therefore, is to find out the amount of energy in the temporal frequencies, E_{obs} . These numbers are then compared to the amounts of energies that people will detect as flicker, the predicted flicker threshold, E_{pred} . Flat panels exhibit more diverse luminance-time functions than progressively scanned cathode ray tubes, so significant energy may exist at several different frequencies. The index, n is carried from 1, at the fundamental repetition frequency of the display (generally, 0,5 times the refreshment rate is necessary on LCD panels), in integer steps until the frequency exceeds 120 Hz. The observed energies may be calculated or measured. The energy at various frequencies is learned by examining the Fourier transform of the luminance-time function.

If $E_{\text{obs}} < E_{\text{pred}}$ at every frequency, then it is likely that people will not see flicker.

If $E_{\text{obs}} > E_{\text{pred}}$ at any frequency, then it is likely that people will see flicker.

G.2.2.2 Fourier coefficients

The average luminance of a luminance-time function, $f(t)$ is:

$$c_0 = \frac{1}{T} \int_{-\frac{T}{2}}^{\frac{T}{2}} f(t) dt$$

where

c_0 the zero Fourier coefficient, is the dark-room luminance averaged over time;

T is the repetition period of the luminance-time function. For progressively scanned cathode ray tubes, the refreshment rate is $1/T$.

NOTE When measuring $f(t)$ and using a fast Fourier transform, FFT, it is sometimes not appropriate to use $\text{FFT}(v)_0$ for c_0 since this could lead to errors depending on the specific form of FFT used.

$\text{FFT}(v)_0$, is the 0 term of the fast Fourier transform of v .

v is the list of measured samples of $f(t)$. The number of items in the list shall be a power of 2 and an integer number of repetition times shall be sampled.

The average luminance c_0 is calculated from dark-room measurements $L_R = qE_S$. In this model, the "adapting" luminance L_t used in converting cd/m^2 to trolands is $c_0 + L_R$.

The general coefficients are:

$$c_n = \frac{1}{T} \int_{-\frac{T}{2}}^{\frac{T}{2}} f(t) e^{-\frac{2n\pi t}{T}} dt$$

where

c_n is the n th Fourier coefficient;

$i = \sqrt{-1}$;

T is the repetition time of $f(t)$.

In the case where $f(t)$ is the sum of components, for example, red, green and blue, the coefficients can be obtained one at a time and added.

$$c_0 = \sum_{j=1}^m c_{0j} = L_t - L_r$$

$$c_n = \sum_{j=1}^m c_{nj}$$

$$\text{AMP}_n = \frac{2 \times |c_n|}{c_0}$$

If there are m components, then:

$$|c_n| = \sqrt{[\text{Re}(c_n)]^2 + [\text{Im}(c_n)]^2}$$

where

AMP is a value between 0 and 2.

The frequency associated with AMP_n, f_n is:

$$f_n = \frac{n}{T} \text{ for } n = 1, 2, \dots$$

while $f_n < 120$ Hz

$$AMP_n = \frac{2 \times |FFT(v)_n|}{FFT(v)_0}$$

When using the fast Fourier transform, the set of observations, v_p for $p = 0 \dots 2^z - 1$ is sampled at frequency, f_s and processed with FFT, where z is 6, 7, ... The value AMP_n has a corresponding frequency $n \times f_s/z$. The sampling frequency is $k \times 2^z/T$, where $k = 1, 2, \dots$. The period of $f(t)$ shall be determined. Generally, $k = 1$ yields the best result.

G.2.2.3 Pupil

The pupil area shall be known to convert the luminance to trolands. The expression for pupil area can be simplified:

$$A = b_0 L_t^{b_1}$$

where

$$b_0 = 12,451\ 84;$$

$$b_1 = -0,160\ 32;$$

$$L_t \text{ is the adaptation luminance} = L_{H\text{-dark}}(\theta_D, \phi_D) + q_H(\theta_D, \phi_D) E_s.$$

G.2.2.4 DC component

To calculate the amount of energy in the temporal frequencies of interest.

- Convert the screen luminance into units of retinal illuminance (trolands).
- Calculate the pupil area, A from the formula in G.2.2.3.
- The DC component is:

$$DC = A \times c_0$$

G.2.3 Decision criteria

G.2.3.1 General case

This case applies to technologies with a luminance persistence of 1 ms or more (for example, CRT, LCDs, etc.).

Energy at each frequency is:

$$E_{obs\ n} = DC \times AMP_n$$

The criteria are that the energy at every frequency satisfies:

$$E_{obs\ n} \leq E_{pred\ n}$$

where

$$E_{\text{pred } n} = ae^{\frac{nb}{T}}$$

where

a and b are as given in Table G.1.

Table G.1 – Values of predicted energy and special coefficients

Row	Screen diagonal arc degrees	Predicted energy coefficients		Special case coefficients	
		a	b	D	E
1	< 20	0,127 6	0,191 9	36,44	13,83
2	20 to 40	0,191 9	0,120 1	39,81	16,40
3	40 to 65	0,507 6	0,100 4	37,93	19,62
4	> 65	0,530	0,099 2	37,96	19,86

G.2.3.2 Simpler special case

This case applies to technologies having luminance persistence that is much less than 1 ms (for example EL, dc plasma, light-emitting diode (LED)). For such technologies, AMP = 2 for refresh rates less than 100 Hz.

Conditions:

- a) Reflected luminance of 5 cd/m² to 15 cd/m².
- b) Average dark-room luminance L_{dark} is from 10 cd/m² to 340 cd/m².

Then, the display meets the requirement if the refresh rate is greater than

$$D + E \log_{10}(L_{\text{dark}})$$

where

D and E are given in the two right-hand columns of Table G.1.

Annex H (normative)

Single and simple operator actions

H.1 General

The requirements of Table H.1, Table H.2 and Table H.3 are from a recommendatory source (IMO MSC.1/Circ.1609/Appendix 4) for ECDIS, radar and INS. The implementation of these recommendations is optional. Manufacturers shall declare if these requirements have been implemented.

H.2 Tables for single and simple operator actions

**Table H.1 – Access to functions, as defined before June 2019
(based on MSC.1/Circ.1609)**

<i>Function</i>	<i>Equipment</i>	<i>Access</i>
Select ECDIS Standard Display	ECDIS	Single operator action
Remove radar (image and tracked target), AIS and other navigational target information overlaid over the ENC chart	ECDIS	Single operator action
Select route monitoring display covering own ship's position	ECDIS	Single operator action
Select default ECDIS settings	ECDIS	Single operator action followed by an action to confirm the selection
Select AIS target information	Radar/ECDIS	Simple operator action
Remove chart data	Radar	Single operator action
Reset VRM origin to CCRP	Radar/ECDIS	Simple operator action
Reset EBL origin to CCRP	Radar/ECDIS	Simple operator action
Reset ERBL origin to CCRP	Radar	Simple operator action
Reset Parallel Index line to own ship's heading	Radar	Simple operator action
Remove user defined maps	Radar	Simple operator action
Select default radar settings	Radar	Single operator action followed by an action to confirm the selection
Select presentation mode (radar, chart and other navigation information)	Radar/ECDIS	Simple operator action
Remove AIS Area Notice	Radar/ECDIS	Single operator action
Remove additional information, (including information for route planning, route monitoring, information overlays and supplementary navigation tasks)	Radar/ECDIS	Simple operator action

Table H.2 – Access to functions (based on MSC.1/Circ.1609)

Function	Equipment	Access
Set panel illumination	Radar/ECDIS	Simple operator action
Set display brilliance / Toggle Day /Night mode	Radar/ECDIS	Simple operator action
Select ECDIS mode	INS/Radar/ECDIS	Simple operator action
Select Radar mode	INS/Radar/ECDIS	Simple operator action
Select Conning display mode	INS	Simple operator action
Select CAM-HMI as defined in Bridge Alert Management (BAM) (for example as required by INS)	INS	Simple operator action
Select North Up display	Radar/ECDIS	Simple operator action
Select ship's Head Up display	Radar/ECDIS	Simple operator action
Select ship's Course Up display	Radar/ECDIS	Simple operator action
Select True Motion mode	Radar/ECDIS	Simple operator action
Select Relative Motion mode	Radar	Single operator action
Select Ship centred mode	Radar	Single operator action
Select Ship off centred mode	Radar/ECDIS	Simple operator action
Perform True Motion reset	Radar/ECDIS	Single operator action
Select range	Radar/ECDIS	Simple operator action
Perform Range up	Radar/ECDIS	Single operator action
Perform Range down	Radar/ECDIS	Single operator action
Temporarily suppress the "heading line"	Radar	Single operator action
Toggle Range Rings on and off	Radar/ECDIS	Simple operator action
Start Variable Range Marker adjustment	Radar/ECDIS	Simple operator action
Start Electronic Bearing Line adjustment	Radar/ECDIS	Simple operator action
Start Electronic Range and Bearing Line adjustment	Radar/ECDIS	Simple operator action
Perform Target Acquire	Radar	Simple operator action
Select tracked target	Radar/ECDIS	Simple operator action
Call up the information associated with an object by cursor pick on its symbol	ECDIS	Simple operator action
All AIS targets to Sleep Mode	Radar/ECDIS	Simple operator action
Acknowledge an Alert	Radar/ECDIS	Single operator action
Silence alerts	Radar/ECDIS (if CAM-HMI functionality is incorporated)	Single operator action

Table H.3 – Access to group of functions (based on MSC.1/Circ.1609)

Group of function	Equipment	Access
Record an event	ECDIS	Simple operator action
Set Trial Manoeuvre on	Radar	Simple operator action
Select True Vector	Radar	Single operator action
Select Relative Vector	Radar	Single operator action
Select True Trail	Radar	Simple operator action
Select Relative Trail	Radar	Simple operator action
Select CATZOC	INS/ECDIS	Single operator action
View ECDIS software version	ECDIS	Simple operator action
View ENC information	ECDIS	Simple operator action

Annex I (normative)

Default settings

I.1 General

The requirements of this Annex I are from a recommendatory source (MSC.1/Circ.1609/Appendix 5) for ECDIS, radar and INS. The implementation of these recommendations is optional. Manufacturers shall declare if these requirements have been implemented.

I.2 ECDIS default settings

Table I.1 lists the default settings for ECDIS.

**Table I.1 – ECDIS settings configured in response to "Default" selection
(based on MSC.1/Circ.1609)**

<i>Function</i>	<i>Setting</i>
<i>Display category</i>	<i>ECDIS Standard display</i>
<i>Selected sea area</i>	<i>Around own ship with appropriate off-set</i>
<i>Range / Scale</i>	<i>3 NM</i>
<i>Orientation</i>	<i>True motion, north-up</i>
<i>Geodetic datum, if selectable</i>	<i>WGS84</i>
<i>Manual updates</i>	<i>If applied, i.e. displayed if available</i>
<i>Mariner's notes</i>	<i>If applied, i.e. displayed if available</i>
<i>Selected route</i>	<i>Last selected route, including route parameters</i>
<i>Past track</i>	<i>On</i>
<i>Past track length, if selectable</i>	<i>Remain unchanged</i>
<i>Past track time-labels</i>	<i>Off, 30 min</i>
<i>Look-ahead time</i>	<i>6 min</i>
<i>Menu or Edit windows that overlap chart or route monitor data</i>	<i>Minimized or stacked to provide focus on chart and own ship location</i>
<i>Position data source</i>	<i>GNSS, sensor to remain unchanged if previously in use</i>
<i>Safety contour</i>	<i>Remain unchanged</i>
<i>Planned Safety depth</i>	<i>Remain unchanged</i>
<i>Planned Cross track limit</i>	<i>Remain unchanged</i>
<i>Graphical indication of crossing safety contour during route planning, if selection provided</i>	<i>On</i>
<i>Graphical indication of prohibited areas, areas with special conditions and navigational hazards during route planning, if selection provided</i>	<i>On</i>
<i>User-specified distance to prohibited areas, areas with special conditions and navigational hazards, when planning</i>	<i>Remain unchanged</i>
<i>Graphical indication of crossing safety contour during route monitoring, if selection provided</i>	<i>On</i>
<i>Graphical indication of prohibited areas and areas with special conditions during route monitoring, if selection provided</i>	<i>On</i>
<i>Graphical indication of navigational hazards during route monitoring, if selection provided</i>	<i>On</i>
<i>Object highlight, selected object, track display from log</i>	<i>Cleared from display</i>

Function	Setting
Cursor pick	Closed
Any additional window (dual view, 3d, tides, etc.)	Closed
Any additional information layer, proprietary layer (weather, tides, Additional Military Layer (AML), etc.)	Cleared from display
Chart update, Chart information exchange	Aborted
Colour differentiation test diagrams	Closed
Update review	Off
Chart 1	Closed
Units	m, NM, kn
Crossing a navigational hazard in route monitoring mode	Alert priority set as caution
Vector time (length)	6 min
Vector mode	True
Vector stabilization	Ground
Collision warnings, if provided	On (limits, CPA = 2 NM; TCPA = 12 min)
Radar and AIS target association, if provided	On
Radar and AIS target association priority	AIS
AIS target filtering, if provided	Target range = 6 NM
Target CPA = 4 NM	
Target TCPA = 24 min	
Target display = On	
Sleeping target display = Off	
Class A display = On	
Class B display = On	
AtoN display = On	
SART display = On	
Repeated target display = Off	
AIS data reports display, if provided	On
AIS locating devices display, if provided	On
AIS ASM display, if provided	Off
AIS true target outline	Off
AIS AtoN dimension outline	Off
Display of Radar image overlay, if provided	Off
Display of Radar tracked targets, if provided	On
Display of AIS reported targets, if provided	On
Target past positions, if provided	Off
Target trails, if provided	Off
Lost target warning, if provided	Off
AIS interrogation, if provided	Off
Own ship true outline	On, unless the resultant outline would be smaller than 6 mm on the screen
LOP source indication	Off
User selected time for warning escalation	60 s
Suppression of indication of user selected MSI messages based on first character of NAVTEX code field, if provided	Remain unchanged
Suppression of indication of user selected messages based on time and distance from own ship, monitored route or planned route	No
Brightness and contrast controls, if software controlled	Calibrated setting

I.3 Radar default settings

Table I.2 lists the default settings for Radar.

**Table I.2 – Radar control settings configured in response to "Default" selection
(based on MSC.1/Circ.1609)**

<i>Function</i>	<i>Setting</i>
<i>Band ^a</i>	X-band, if selectable, otherwise remain as selected
<i>Gain and anti-clutter functions (Sea, Rain)</i>	<i>Radar gain automatically optimized, where provided. Anti-sea and anti-rain clutter manual controls set "as is" or set to "zero" if such functionality exists</i>
<i>Tuning</i>	<i>Automatically optimized where provided, otherwise remain as is</i>
<i>Range</i>	6 NM
<i>Fixed range rings</i>	Off
<i>VRMs</i>	On
<i>EBLs</i>	On
<i>Parallel index lines</i>	Remain unchanged
<i>Orientation Mode</i>	North Up
<i>Presentation Mode</i>	True Motion
<i>Vector mode</i>	Relative
<i>Vector time</i>	6 min
<i>Stabilization Sea/Ground</i>	Sea
<i>Off-Centre</i>	Off-Centre, with appropriate look ahead
<i>Target trails</i>	On
<i>Past positions</i>	Off
<i>Radar target tracking</i>	Continued
<i>Automatic radar target acquisition</i>	Off
<i>Graphical AIS reported target display</i>	On
<i>Graphical AIS data report display</i>	On
<i>Graphical AIS locating device display</i>	On
<i>Graphical AIS ASM display</i>	Off
<i>Radar and AIS Target fusion</i>	Association on, priority AIS
<i>Operational alerts (except collision warnings)</i>	On
<i>Collision warnings</i>	On (limits CPA 2 nm; TCPA 12 min)
<i>Display of maps, navigation lines and routes</i>	Last setting
<i>Display of charts</i>	Off
^a Radar band default setting deviates from MSC.1/Circ.1609 due to alignment with IMO MSC 252(83).	

Annex J (normative)

Implementation details of AIS ASM

J.1 General

This Annex J describes details of implementation of AIS ASM.

J.2 AIS ASM

Table J.1 specifies display layers and display sub-layers of AIS ASM and additionally specifies the symbols to be used from Annex A.

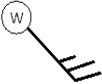
Table J.1 – Details of AIS ASM

Display layer	Display sub-layer	Symbol ^a	AIS ASM parameters to be available from cursor pick of the symbol	Source FI
Hydrological Data	Tidal window	5.6 	Combined from Source FI 32 (Tidal window)	
			Time Stamp	32
			Position #1 Latitude	32
			Position #1 Longitude	32
			From UTC Hour #1	32
			From UTC Minute #1	32
			To UTC Hour #1	32
			To UTC Minute #1	32
			Current Direction predicted #1	32
			Current Speed predicted #1	32
			Position #2 Latitude	32
			Position #2 Longitude	32
			From UTC Hour #2	32
			From UTC Minute #2	32
			Current Direction predicted #2	32
			Current Speed predicted #2	32
			Position #3 Latitude	32
			Position #3 Longitude	32
			From UTC Hour #3	32
			From UTC Minute #3	32
			To UTC Hour #3	32
			To UTC Minute #3	32
			Current Direction predicted #3	32
			Current Speed predicted #3	32

Display layer	Display sub-layer	Symbol ^a	AIS ASM parameters to be available from cursor pick of the symbol	Source FI
Hydrological Data	Water level	5.6 	Combined from Source FI 26 (Site Location) 26 (Station ID report) 26 (Water level report) 31 (Meteorological and Hydrographic data)	
			Site ID (from header)	26
			Time stamp (from header)	26, 31
			Data timeout (from site location)	26
			Latitude (from site location)	26, 31
			Longitude (from site location)	26, 31
			Position Accuracy	31
			Name (Station ID report)	26
			Water Level Type	26
			Sensor Data Description	26
			Water Level / Water level (incl, tide)	26, 31
			Water Level Trend	26, 31
			Vertical Reference Datum	26
			Forecast Water Level Type	26
			Forecast Water Level	26
			Valid Time of Forecast	26
			Duration (forecast)	26

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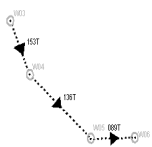
Display layer	Display sub-layer	Symbol ^a	AIS ASM parameters to be available from cursor pick of the symbol	Source FI
Hydrological Data	Current	5.13 	Combined from Source FI 26 (Site Location) 26 (Station ID report) 26 (Current flow report 2-D) 26 (Current flow report 3-D) 26 (Horizontal current flow report) 31 (Meteorological and Hydrographic data)	
			Site ID (from header)	26
			Time stamp (from header)	26, 31
			Data timeout (from site location)	26
			Latitude (from site location)	26, 31
			Longitude (from site location)	26, 31
			Position Accuracy	31
			Name (Station ID report)	26
			Sensor Data Description	26
			Current Measuring level #1	26
			Current Speed #1	26
			Current Direction #1	26
			Current Vector Component Up #1	26
			Surface Current Speed (incl. tide)	31
			Surface Current Direction	31
			Current Measuring level #2	26, 31
			Current Speed #2	26, 31
			Current Direction #2	26, 31
			Current Vector Component Up #2	26
			Current Measuring level #3	26, 31
			Current Speed #3	26, 31
			Current Direction #3	26, 31
The "Horizontal current flow report" may include two separate locations of current values. Both locations shall be presented by symbol 5.13 for which the location shall be based on calculation using parameters "Current Reading 1 Bearing/Current Reading 1 Distance" or "Current Reading 2 Bearing/Current Reading 2 Distance" applied on "Latitude/longitude". The alphanumeric presentation shall also present the calculated location of the symbol 5.13 instead of values used for calculation. The "Current flow report 3-D" may include two separate 3-D current values. The alphanumeric presentation shall be in form of "Current speed/Current direction" calculated from the parameters "Current Vector Component North/Current Vector Component East".				

Display layer	Display sub-layer	Symbol ^a	AIS ASM parameters to be available from cursor pick of the symbol	Source FI
Meteorological Data	Wind	5.5 Dover 	Combined from Source FI 26 (Site Location) 26 (Station ID report) 26 (Wind report) 31 (Meteorological and Hydrographic data)	
			Site ID (from header)	26
			Time stamp (from header)	26, 31
			Data timeout (from site location)	26
			Latitude (from site location)	26, 31
			Longitude (from site location)	26, 31
			Altitude (from site location)	26
			Position Accuracy	31
			Name (Station ID report)	26
			Average Wind Speed	26, 31
			Wind Direction	26, 31
			Wind Gust	26, 31
			Wind Direction	26, 31
			Sensor Data Description	26
			Forecast Wind Speed	26
			Forecast Wind Direction	26
			Forecast Wind Gust	26
			Forecast Wind Direction	26
			Valid Time of Forecast	26
			Duration (forecast)	26

Display layer	Display sub-layer	Symbol ^a	AIS ASM parameters to be available from cursor pick of the symbol	Source FI
Environmental Data	Sea state	5.13 	Combined from Source FI 26 (Site Location) 26 (Station ID report) 26 (Sea state report) 31 (Meteorological and Hydrographic data)	
			Site ID (from header)	26
			Time stamp (from header)	26, 31
			Data timeout (from site location)	26
			Latitude (from site location)	26, 31
			Longitude (from site location)	26, 31
			Position Accuracy	31
			Name (Station ID report)	26
			Sea state	26, 31
			Water Temperature	26, 31
			Water Temperature Depth	26
			Sensor Data Description (water temperature)	26
			Significant Wave Height	26, 31
			Wave Period	26, 31
			Wave Direction	26, 31
			Sensor Data Description (wave)	26
			Swell Height	26, 31
			Swell Period	26, 31
			Swell Direction	26, 31
			Sensor Data Description (swell)	26
			Ice	31
			Salinity	26, 31

Display layer	Display sub-layer	Symbol ^a	AIS ASM parameters to be available from cursor pick of the symbol	Source FI
Meteorological Data	Weather	5.5 Dover 	Combined from Source FI 26 (Site Location) 26 (Station ID report) 26 (Weather report) 31 (Meteorological and Hydrographic data)	
			Site ID (from header)	26
			Time stamp (from header)	26, 31
			Data timeout (from site location)	26
			Latitude (from site location)	26, 31
			Longitude (from site location)	26, 31
			Name (Station ID report)	26
			Position Accuracy	31
			Air Temperature	26
			Sensor Data Description (air temperature)	26
			Relative Humidity	31
			Precipitation	26, 31
			Horizontal Visibility	26, 31
			Dew Point	26, 31
			Sensor Data Description (dew point)	26
			Air Pressure	26, 31
			Air Pressure Trend/Tendency	26, 31
			Sensor Data Description (air pressure)	26
			Salinity	26, 31
Navigational Services	Air Gap	5.12 	Combined from Source FI 26 (Site Location) 26 (Station ID report) 26 (Air gap/Air draft)	
			Site ID (from header)	26
			Time stamp (from header)	26
			Data timeout (from site location)	26
			Latitude (from site location)	26
			Longitude (from site location)	26
			Name (Station ID report)	26
			Air Gap	26
			Air Gap Trend	26
			Forecast Air Gap	26
			Valid Time of the Forecast UTC Day UTC Hour UTC Minute	26

Display layer	Display sub-layer	Symbol ^a	AIS ASM parameters to be available from cursor pick of the symbol	Source FI
Navigational Services	Area Notice may be sub-divided into: Caution Restricted Anchorage Distress Chart feature (see Notice description)	5.11  Default 5.14  when "Notice description = 18"	Combined from Source FI 22 (Area notice – broadcast) 23 (Area notice – addressed) 29 (Text description – broadcast) 30 (Text description – addressed)	
			Notice Description	22, 23
			Start date and time of Area	22, 23
			Duration	22, 23
			Text description – broadcast	29
			Text description – addressed	30
Navigational Services	Berthing Data	5.9 	Combined from Source FI 18 (Clearance time to enter port) 20 (Berthing data) 29 (Text description – broadcast) 30 (Text description – addressed)	
			Destination	18
			Latitude	18
			Longitude	18
			Centre position of Berth, Latitude	20
			Centre position of Berth, Longitude	20
			Clearance date/time to enter port	18
			Berthing date and time	20
			Name of port and berth	18
			Name of Berth	20
			Berth Length	20
			Water Depth at Berth	20
			Mooring Position	20
			Services availability	20
			Type of Services Available	20
			Text description – broadcast	29
			Text description – addressed	30

Display layer	Display sub-layer	Symbol ^a	AIS ASM parameters to be available from cursor pick of the symbol	Source FI
Navigational Services	Routing	5.8 	Combined from Source FI 27 (Route information – broadcast) 28 (Route information – addressed) 29 (Text description – broadcast) 30 (Text description – addressed)	
			Route Type	27, 28
			Sender Classification	27, 28
			Start Date and Time	27, 28
			Duration	27, 28
			Number of Waypoints	27, 28
			Waypoints WP #n, Latitude WP #n, Longitude	27, 28
			Text description – broadcast	29
			Text description – addressed	30
Navigational Services	Signal Station	5.7 	Combined from Source FI 19 (Marine traffic signal) 29 (Text description – broadcast) 30 (Text description – addressed)	
			Name of Signal Station	19
			Position of Station, Latitude	19
			Position of Station, Longitude	19
			Signal in Service	19
			Status of Signal	19
			Time of next signal shift	19
			Expected Next Signal	19
			Text description – broadcast	29
			Text description – addressed	30

Display layer	Display sub-layer	Symbol ^a	AIS ASM parameters to be available from cursor pick of the symbol	Source FI
Meteorological Data	Weather	5.19 	Combined from Source FI 21 (Weather observation report from ship), when Type of weather report = 0	
			Geographic Location (text, 20 characters)	21
			Source ID (MMSI of source)	21
			Date and Time of Observation	21
			Position of observation, Latitude	21
			Position of observation, Longitude	21
			Present Weather	21
			Horizontal Visibility	21
			Relative Humidity	21
			Average Wind Speed	21
			Wind Direction	21
			Air Pressure	21
			Air Pressure tendency	21
			Air Temperature	21
			Water Temperature	21
			Wave period	21
			Significant Wave height	21
			Wave Direction	21
			Swell Height	21
			Swell Direction	21
			Swell Period	21
See 4.3.2 for consistent time presentation.				
^a See requirements in Annex A.				

Annex K (informative)

Overview of AIS Messages

K.1 General

Table K.1 provides an overview of AIS Messages and Table K.2 provides an overview of AIS ASM Messages.

Table K.1 – AIS Messages

ITU-R M.1371 AIS standard Messages ID	AIS Message descriptions	Use in this document
1,2,3	Position Report – 1 = autonomous(A), 2 = assigned(C), 3 = interrogated/pollled(I) – every 2 s, 3½ s, 6 s, or 10 s; 3 min < 3 kn or anchored	AIS target AIS data report AIS locating device
4	Base Station Report – every 10 s.	AIS data report
5	Class A Report – static and voyage related data – every 6 min	AIS target
6,8	Binary message – addressed (6) or broadcast (8)	AIS ASM AIS synthetic target
7	Binary message – acknowledgment to a Message 6	Not applicable in this document
9	SAR aircraft position report – every 10 s.	AIS data report
10,11	Universal Time Coordinated / Date – 10 = enquiry, 11 = response	Not applicable in this document
12	Safety related Texting – addressed (12)	AIS safety related message
14	Safety related Texting – broadcast (14)	AIS safety related message AIS locating device
13	Safety related text message – acknowledgment to Message 12	Not applicable in this document
15	Interrogation – poll for specific messages	Not applicable in this document
16	Assignment Mode Command	Not applicable in this document
17	GNSS Correction Binary message	Not applicable in this document
18	Class B Position Report – 3 min < 2 kn – Class B"CS" every 30 s/Class B"SO" every 5 s, 15 s, 30 s	AIS target
19	Class B Extended Report (when polled by a base station)	AIS target
20	Data Link Management – reserve slots	Not applicable in this document
21	ATON Report – position and status – every 3 min	AIS data report
22	Channel Management	Not applicable in this document
23	Group Assignment Command	Not applicable in this document
24 _{A/B}	Static Data Report – every 6 min (w/in 30 s upon a poll)	AIS target
25	Single-Slot Binary message	AIS ASM AIS synthetic target
26	Multi-Slot Binary message w/Communication State	AIS ASM AIS synthetic target
27	Long-range automatic identification system broadcast message	Not applicable in this document

Table K.2 – AIS ASM Messages

ITU-R M.1371 Message 8 Application Specific Message, FI	Description	Comment	Use in this document
11	Met/Hydrological	SN/Circ.236 Trial message; not to be used after 1 Jan 2013	Not applicable
13	Fairway closed	SN/Circ.236 Trial message; not to be used after 1 Jan 2013	Not applicable
14	Tidal window	SN/Circ.236 Trial message; not to be used after 1 Jan 2013	Not applicable
15	Extended ship static and voyage-related data	SN/Circ.236 Trial message 6; not to be used after 1 Jan 2013	Not applicable
16	Number of persons on board – addressed	SN/Circ.236 Trial message 6; as corrected in SN.1/Circ.289	AIS target
17	VTS-generated/synthetic targets – broadcast	SN/Circ.236 Trial message 7; SN.1/Circ.289 Renamed to "VTS-generated/Synthetic targets"	AIS synthetic targets
18	Clearance time to enter port – addressed	SN.1/Circ.289	AIS ASM
19	Marine traffic signal – broadcast	SN.1/Circ.289	AIS ASM
20	Berthing data – addressed	SN.1/Circ.289	AIS ASM (from shore to ship)
21	Weather observation report from ship – broadcast	SN.1/Circ.289	AIS ASM
22	Area notice – broadcast	SN.1/Circ.289	AIS ASM AIS synthetic targets
23	Area notice – addressed	SN.1/Circ.289	AIS ASM AIS synthetic targets
24	Extended ship static and voyage-related data – broadcast	SN.1/Circ.289	AIS target
25	Dangerous cargo indication – addressed	SN.1/Circ.289	Not applicable
26	Environmental – broadcast	SN.1/Circ.289	AIS ASM
27	Route information – broadcast	SN.1/Circ.289	AIS ASM
28	Route information – addressed	SN.1/Circ.289	AIS ASM
29	Text description – broadcast	SN.1/Circ.289	AIS ASM
30	Text description – addressed	SN.1/Circ.289	AIS ASM
31	Meteorological and Hydrographic data – broadcast	SN.1/Circ.289	AIS ASM
32	Tidal window – addressed	SN.1/Circ.289	AIS ASM
33-63	Reserved for Future Use	SN.1/Circ.289	
Not all ASMs (i.e. AIS binary messages 6, 8, 25 or 26) are defined in IMO SN.1/Circ.289. Regional ASMs provide the same parameter data denoted in Table J.1 and may optionally be presented consistent with this document. A catalogue of regional ASMs can be found at http://www.iala-aism.org/asm/.			

K.2 Use case guidance on AIS ASM

Some details of the use of AIS ASM are given which are useful to know for implementers of presentation and functionality of AIS ASM for equipment which receives AIS ASM information.

- The AIS ASM concept includes a parameter called DAC. For the IMO SN.1/Circ.289 specified AIS ASMs addressed by this document, the DAC is always 1. Within each value of DAC, there could be as many as 64 different AIS ASMs specified by value of FI (6 bits). It should be noted that the value range of "10 bit" DAC is 700 for local/regional use and 10 for international use and within each value of DAC there could be 64 values of FI. Some AIS ASMs outside of DAC = 1 might be of interest to implement. More information is available from the following link <https://www.iala-aism.org/asm/>.
- Some AIS ASM objects include "message linkage ID". The value is set by the information provider and it is unique for each individual AIS ASM object which includes "message linkage ID". The information provider is identified by the first six digits of the source MMSI. The information provider controls the uniqueness of the "message linkage ID". When available, the "message linkage ID" together with value of source MMSI is used as part of unique identifier of an AIS ASM object. For some AIS ASM objects, the first six digits of the nine digits of MMSI is used and in some cases all digits of MMSI are used. The other use of "message linkage ID" is to combine the content of the "Text description" AIS ASMs (FI = 29 and 30) into the AIS ASM object defined by the "main" AIS ASM (FI = 18, 19, 22, 23, 27 and 28).
- AIS ASM object of category "Addressed"
 - These are strictly intended for reception by a single vessel and the "addressed" message type means that these are transmitted until acknowledged by AIS Message 7. This means that there cannot be any concept of automatic removal based on timeout from last reception.
 - Some of these could be valid for short time periods, but some could be valid for long time periods. This depends on the content and user decision. Therefore, the removal from the storage is under user control.
- Environmental information
 - Multiple AIS stations (for example AIS base stations, AIS repeater stations, AIS AtoN stations) may duplicate transmission of the content. An end user is intended to see only one AIS ASM object. This is done intentionally so that the resulting coverage area is larger.
 - May include "end of validity" concept. Again, multiple AIS stations may transmit duplicate AIS ASMs. One should note that the information may be necessary after the vessel has left the reception range of the transmitting AIS stations because coverage area of the information might be much larger. Therefore, these AIS ASMs with "end of validity" concept information are not automatically removed from the storage after the standard 18 min timeout from last reception. Therefore, the manufacturer may as well provide an option for the user to remove these by criteria (i.e. user is able to make decision to remove or to keep depending of the content).
- Area notices
 - Separate area notices are identified by unique combination of "message linkage ID" and MMSI of source. Addressed area notices are possible only by a single source station (for example AIS base station, AIS AtoN station) as the unique identification includes full content of the MMSI of the source. Broadcast area notices use only the first six digits of the source MMSI and therefore transmission of them is possible by multiple source stations when the information provider has coordinated their system to assign the MMSI.
 - Area notices may include "end of validity" concept as described in environmental information.

Annex L (informative)

Overview of the use AIS AtoN status field bits

NOTE Refer to IALA A-126 for possible later versions of Table L.1.

Table L.1 provides an overview of AIS AtoN status field bits.

Table L.1 – AIS AtoN status field

Bit order		RACON/Light	Bit order		Mobile AtoN and method and direction of movement		Regional AtoN
8 th 7 th and 6 th	Bits	Page ID = 111	8 th 7 th and 6 th	Bits	Page ID = 101		Page ID = 001
5 th and 4 th	00	No RACON installed	5 th , 4 th , 3 rd and 2 nd	0000	Direction not reported	No further information default	Reserved for regional use ^a
	01	RACON installed but not monitored		0001		Free-floating ABCD values denote an area (e.g. oil spill)	
	10	RACON operational		0010		Free-floating ABCD values denote an object (e.g. craft, gear, flotsam, etc.)	
	11	RACON Error		0011		Moves as defined (Synthetic) ABCD values denote an object (e.g. craft, gear, flotsam, etc.)	
3 rd and 2 nd	00	No light or no monitoring		0100	Direction of movement (COG)	Moves as defined (Synthetic) ABCD values denote an area (e.g. dredging zone)	
	01	Light ON		0101		Tethered from a watercraft (e.g. cable, pipe, net)	
	10	Light OFF		0110		Reserved for future use	
	11	Light fail or at reduced range		0111		Self-propelled, but direction not reported or unavailable	
1 st	0	Good health		1000	Direction of movement (COG)	000° ± 22,5°	
				1001		045° ± 22,5°	
				1010		090° ± 22,5°	
				1011		000° ± 22,5°	
			1100	135° ± 22,5°			
			1101	180° ± 22,5°			
			1110	225° ± 22,5°			
			1111	270° ± 22,5°			
	1	Alarm	1 st	0	Monitored		
				1	Unmonitored		

NOTE 8th bit is most significant and 1st bit is least significant.

^a E.g. VTT-EG AIS AtoN for inland use standard.

NOTE 8th bit is most significant and 1st bit is least significant.

^a E.g. VTT-EG AIS AtoN for inland use standard.

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COMMISSION ÉLECTROTECHNIQUE INTERNATIONALE

**MATÉRIELS ET SYSTÈMES DE NAVIGATION ET DE
RADIOCOMMUNICATION MARITIMES – PRÉSENTATION DES
INFORMATIONS RELATIVES À LA NAVIGATION SUR DES AFFICHAGES
DE NAVIGATION DE BORD – EXIGENCES GÉNÉRALES, MÉTHODES
D'ESSAI ET RÉSULTATS D'ESSAI EXIGÉS**

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L'IEC 62288 a été établie par le comité d'études 80 de l'IEC: Matériels et systèmes de navigation et de radiocommunication maritimes. Il s'agit d'une Norme internationale.

Cette troisième édition annule et remplace la deuxième édition parue en 2014. Cette édition constitue une révision technique.

Cette édition inclut les modifications techniques majeures suivantes par rapport à l'édition précédente:

- a) l'Article 4 a été révisé pour supprimer les exigences relatives aux indications d'alertes qui sont maintenant spécifiées dans l'IEC 62923-1;

- b) l'Article 5 a fait l'objet d'une révision approfondie afin d'ajouter de nouvelles exigences relatives à la présentation des AIS, ASM et DSC, ainsi que trois nouvelles annexes, l'Annexe J, l'Annexe K et l'Annexe L;
- c) l'Annexe A et l'Annexe B ont été révisées afin d'intégrer les modifications apportées à la circulaire SN.1/Circ.243 de l'OMI;
- d) l'Annexe E a été révisée afin d'intégrer les modifications apportées à la résolution MSC.191(79) de l'OMI et renommée "Commandes opérationnelles et regroupement logique";
- e) deux nouvelles annexes ont été ajoutées : l'Annexe H relative aux actions de l'opérateur et l'Annexe I relative aux paramètres par défaut et venant à l'appui de la circulaire MSC.1/Circ.1609 de l'OMI.

Le texte de cette Norme internationale est issu des documents suivants:

Projet	Rapport de vote
80/1013/FDIS	80/1017/RVD

Le rapport de vote indiqué dans le tableau ci-dessus donne toute information sur le vote ayant abouti à son approbation.

La version française de la norme n'a pas été soumise au vote.

La langue employée pour l'élaboration de cette Norme internationale est l'anglais.

Le présent document a été rédigé selon les Directives ISO/IEC, Partie 2, il a été développé selon les Directives ISO/IEC, Partie 1 et les Directives ISO/IEC, Supplément IEC, disponibles sous http://www.iec.ch/members_experts/refdocs. Les principaux types de documents développés par l'IEC sont décrits plus en détail sous www.iec.ch/standardsdev/publications.

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MATÉRIELS ET SYSTÈMES DE NAVIGATION ET DE RADIOCOMMUNICATION MARITIMES – PRÉSENTATION DES INFORMATIONS RELATIVES À LA NAVIGATION SUR DES AFFICHAGES DE NAVIGATION DE BORD – EXIGENCES GÉNÉRALES, MÉTHODES D'ESSAI ET RÉSULTATS D'ESSAI EXIGÉS

1 Domaine d'application

Le présent document spécifie les exigences générales, les méthodes d'essai et les résultats d'essai exigés pour la présentation des informations relatives à la navigation sur des affichages de navigation de bord, et vient à l'appui de la résolution MSC.191(79) de l'OMI amendée par la MSC.466(101) de juin 2019, et la résolution MSC.302(87) lorsqu'elle est applicable.

Le présent document vient également à l'appui des lignes directrices exposées dans la circulaire associée MSC.1/Circ.1609 de l'OMI relative à la normalisation de la conception de l'interface utilisateur pour les matériels de navigation, ainsi que dans la circulaire SN.1/Circ.243 dans sa version révisée de juin 2019 concernant la présentation des symboles, termes et abréviations liés à la navigation.

Le présent document spécifie également la présentation des comptes rendus de données AIS et les messages spécifiques à l'application de l'AIS définis pour un usage international dans la circulaire SN.1/Circ.289 de l'OMI et destinés à être reçus pour un affichage à bord d'un navire.

NOTE Tout texte du présent document dont la formulation est identique au texte contenu dans un document de l'OMI est imprimé en *italique*. Le document de référence est indiqué au début du paragraphe. La notation contient un préfixe renvoyant au document et un suffixe se rapportant au numéro de paragraphe du document (par exemple, (MSC.191/1); (SN243/1), etc.).

2 Références normatives

Les documents suivants sont cités dans le texte de sorte qu'ils constituent, pour tout ou partie de leur contenu, des exigences du présent document. Pour les références datées, seule l'édition citée s'applique. Pour les références non datées, la dernière édition du document de référence s'applique (y compris les éventuels amendements).

IEC 60945:2002, *Matériels et systèmes de navigation et de radiocommunication maritimes – Spécifications générales – Méthodes d'essai et résultats exigibles*

IEC 61174, *Matériels et systèmes de navigation et de radiocommunication maritimes – Système de visualisation des cartes électroniques et d'information (ECDIS) – Exigences opérationnelles et de fonctionnement, méthodes d'essai et résultats d'essai exigés*

IEC 61966-4, *Systèmes et appareils multimédia – Mesure et gestion de la couleur – Partie 4: Appareils utilisant des afficheurs à cristaux liquides*

IEC 62388, *Matériels et systèmes de navigation et de radiocommunication maritimes – Radar de bord – Exigences de performance, méthodes d'essai et résultats exigés*

IEC 62923-1, *Matériels et systèmes de navigation et de radiocommunication maritimes – Gestion des alertes à la passerelle – Partie 1: Exigences opérationnelles et de fonctionnement, méthodes d'essai et résultats d'essai exigés*

IHO S-52, *Specifications for chart content and display aspects of ECDIS*

IMO, *Seafarers' Training, Certification and Watchkeeping Code (STCW Code)*

IMO A.694(17):1991, *General requirements for shipborne radio equipment forming part of the global maritime distress and safety system (GMDSS) and for electronic navigational aids*

IMO MSC.191(79):2004, *Performance standards for the presentation of navigation related information on shipborne navigational displays*

IMO MSC.192(79):2004, *Performance standards for radar equipment*

IMO MSC.232(82):2006, *Revised performance standards for electronic chart display and information systems (ECDIS)*

IMO SN.1/Circ.243/Rev.2:2019+Corr.1, *Guidelines for the presentation of navigation related symbols, terms and abbreviations*

IMO SN.1/Circ.289:2010, *Guidance on the use of AIS application-specific messages*

IMO MSC.302(87):2010, *Performance standards for bridge alert management (BAM)*

IMO MSC.1/Circ.1609:2019, *Guidelines for the standardization of user interface design for navigation equipment*

IMO A.1021(26):2009, *Code on Alerts and Indications*

VESA-2001-6, *Flat Panel Display Measurements (FPDM)*

3 Termes, définitions et abréviations

Pour les besoins du présent document, les termes, définitions et abréviations suivants s'appliquent.

L'ISO et l'IEC tiennent à jour des bases de données terminologiques destinées à être utilisées en normalisation, consultables aux adresses suivantes:

- IEC Electropedia: disponible à l'adresse <http://www.electropedia.org/>
- ISO Online browsing platform: disponible à l'adresse <http://www.iso.org/obp>

3.1 Termes et définitions

3.1.1

cible AIS activée

(MSC191/A) *cible représentant l'activation automatique ou manuelle d'une cible en veille pour l'affichage d'informations supplémentaires présentées graphiques*

3.1.2

système d'identification automatique

AIS

système qui satisfait aux exigences spécifiées à l'Annexe 3 de la Résolution MSC.74(69) de l'OMI

Note 1 à l'article: L'abréviation "AIS" est dérivée du terme anglais développé correspondant "Automatic Identification System".

3.1.3

message AIS propre à l'application

AIS ASM

messages AIS 6, 8, 25 ou 26, à l'exclusion des cibles AIS synthétiques

Note 1 à l'article: Le présent document ne traite spécifiquement que des AIS ASM définis pour une utilisation internationale dans la SN.1/Circ.289 de l'OMI et qui sont destinés à être reçus pour l'affichage à bord d'un navire. Différentes administrations ont mis en œuvre des messages propres à l'application non définis dans la SN.1/Circ.289 de l'OMI, mais que l'IALA a répertorié à l'adresse <https://www.iala-aism.org/asm/> et qui, si cela s'avère approprié, peuvent être affichés en utilisant les mêmes symboles et règles que ceux du présent document.

Note 2 à l'article: Voir l'Annexe J.

Note 3 à l'article: L'abréviation "AIS ASM" est dérivée du terme anglais développé correspondant "AIS Application Specific Message".

3.1.4

objet AIS ASM

informations construites à partir d'un ou plusieurs AIS ASM

Note 1 à l'article: Voir l'Annexe J.

3.1.5

compte rendu de données AIS

informations issues de comptes rendus AIS d'aides à la navigation (AtoN), d'aéronefs SAR et de stations de base

Note 1 à l'article: Voir l'Annexe J.

3.1.6

Dispositifs de localisation AIS

stations AIS-SART, EPIRB-AIS et AIS MOB qui transmettent les Messages AIS 1 et 14 à l'aide des transmissions par rafales décrites dans l'UIT-R M.1371

Note 1 à l'article: AIS MOB désigne les informations provenant d'un dispositif DSC de classe M capable de générer des comptes rendus à l'aide de transmissions AIS par rafales.

3.1.7

messages AIS liés à la sécurité

messages AIS 12 ou 14

3.1.8

cible AIS synthétique

objet généré à partir d'un Message AIS 6, 8, 25 ou 26 lorsque FI = 17 (Cible synthétique/générée par VTS); ou lorsque FI = 22 ou FI = 23 (Avis de zone) avec "Sous-zones" fixé à "0" (cercle ou point), "Forme de zone" fixé à "0", "Rayon" fixé à "0" et "Description d'avis" fixé à une valeur dans la plage de 64 à 74

Note 1 à l'article: Les cibles AIS synthétiques sont générées par les systèmes d'informations côtiers (par exemple VTS) et transmises via les stations de base AIS.

Note 2 à l'article: Une valeur située dans la plage de 64 à 73 pour "Description d'avis" représente une situation de détresse d'un navire alors que la valeur 74 représente une situation de détresse humaine. Ces messages peuvent être associés ou non à une alerte de détresse du SMDSM.

3.1.9

cible AIS

cible AIS signalée

(MSC191/A) *cible générée à partir d'un message* de compte rendu de position AIS provenant d'un navire, d'un bâtiment ou d'une embarcation, sur la base du Message AIS 1, 2, 3 ou 18

Note 1 à l'article: Le numéro MMSI dans les Messages AIS 1, 2, 3 ou 18 identifie la source comme étant un navire, un bâtiment ou une embarcation conformément à l'UIT-R M.585-8:2019, Annexe 1, Sections 1 et 5.

Note 2 à l'article: La classe A d'AIS utilise les Messages 1, 2 et 3. La classe B d'AIS utilise le Message 18.

3.1.10

alarme

(MSC.302/A) *condition nécessitant une attention et une action immédiates de l'équipe de passerelle, pour maintenir la sécurité de navigation du navire*

Note 1 à l'article: Une alarme est une *alerte de haute priorité*.

3.1.11

alerte

(MSC.302/A) *annonce de situations et de conditions anormales nécessitant une attention.*

Note 1 à l'article: Les alertes sont divisées en quatre priorités: *alarmes d'urgence, alarmes, mises en garde et précautions*. Une alerte donne des informations sur un changement d'état défini en lien avec des informations sur la façon d'annoncer cet événement d'une manière définie au système et à l'opérateur.

3.1.12

cible associée

(MSC191/A) *cible représentant simultanément une cible poursuivie par radar et une cible AIS signalée ayant des paramètres similaires (par exemple, position, route, vitesse, etc.) et qui sont conformes à un algorithme d'association*

3.1.13

brillance

réglage de luminance d'un affichage pour un éclairage ambiant

EXEMPLE Commande de rétroéclairage pour LCD (affichage à cristaux liquides).

3.1.14

précaution

(MSC.302/A) *conscience d'une condition ne nécessitant pas l'émission d'une alarme ou d'une mise en garde, mais exigeant une attention et une considération particulières de la situation ou des informations données*

Note 1 à l'article: Une précaution est la *priorité la plus basse d'une alerte*.

3.1.15

point de référence commun constant

CCRP

(MSC191/A) *emplacement à bord du navire porteur, à partir duquel sont effectuées toutes les mesures horizontales telles que celles de la position du navire porteur, du cap et de la distance, du relèvement, de la route et de la vitesse relatives, du point de rapprochement maximal (CPA) ou du temps prévu pour arriver au point de rapprochement maximal (TCPA) des cibles ou à partir duquel elles sont relevées; il s'agit le plus souvent du poste d'où le navire est commandé à la passerelle*

Note 1 à l'article: Selon les besoins, il est possible d'utiliser un (ou plusieurs) emplacement(s) alternatif(s), lorsqu'il(s) est (sont) clairement indiqué(s) ou se distingue(nt) de façon évidente (l'origine de l'axe de référence du navire, par exemple)

Note 2 à l'article: L'abréviation "CCRP" est dérivée du terme anglais développé correspondant "Consistent Common Reference Point".

3.1.16

présentation composite

présentation intégrée qui résulte de l'affichage simultané d'informations provenant d'au moins deux systèmes de navigation ou d'autres matériels

3.1.17

cible dangereuse

(MSC191/A) *cible poursuivie par radar ou cible AIS signalée suivie dont le CPA et le TCPA prévus enfreignent les valeurs prédéfinies par l'utilisateur.*

Note 1 à l'article: La cible concernée est marquée d'un symbole "*cible dangereuse*".

3.1.18**position de navigation à l'estime****DR**

position extrapolée à partir de la dernière mise à jour de position acceptée, en fonction du cap et de la vitesse actuels, et mise à jour dans un intervalle de temps

Note 1 à l'article: L'abréviation "DR" est dérivée du terme anglais développé correspondant "Dead Reckoned".

3.1.19**base d'affichage**

(MSC191/A) *niveau d'information qui ne peut pas être supprimé de l'affichage ECDIS, constitué d'informations qui sont exigées en permanence dans toutes les zones géographiques et dans toutes les circonstances*

Note 1 à l'article: Ce niveau n'est pas considéré comme suffisant pour garantir une navigation sûre.

3.1.20**matériel d'affichage**

dispositif capable de représenter visuellement des informations

3.1.21**intégrité douteuse**

état dans lequel l'intégrité ne peut pas être vérifiée

3.1.22**appel DSC reçu**

informations générées à partir d'un message DSC reçu

Note 1 à l'article: Un appel DSC reçu peut être disponible à partir de toutes les classes de matériel compatibles avec les DSC, qui peuvent fournir des informations via une interface normalisée.

3.1.23**système de visualisation des cartes électroniques et d'information****ECDIS**

système satisfaisant aux exigences spécifiées dans la Résolution MSC.232(82) de l'OMI

Note 1 à l'article: L'abréviation "ECDIS" est dérivée du terme anglais développé correspondant "Electronic Chart Display and Information System".

3.1.24**informations relatives aux cartes électroniques**

base(s) de données de cartes électroniques

EXEMPLE ENC.

3.1.25**carte électronique de navigation****ENC**

(MSC191/A) *base de données normalisée quant au contenu, à la structure et au format conformément à l'IHO S-57 et son Annexe B.1, et diffusée par un service public ou avec son approbation*

Note 1 à l'article: L'abréviation "ENC" est dérivée du terme anglais développé correspondant "Electronic Navigational Chart".

3.1.26**alarme d'urgence**

(MSC.302/A) *alarmes qui indiquent qu'un danger immédiat pour la vie humaine ou pour le navire et ses machines existe, exigeant une action immédiate*

Note 1 à l'article: Une alarme d'urgence est la priorité la plus élevée d'une alerte.

3.1.27

position estimée

EP

position extrapolée à partir de la dernière mise à jour de position acceptée, en fonction du cap et de la vitesse actuels (STW), compte tenu notamment des effets du vent, de la marée et du courant, et mise à jour dans un intervalle de temps

Note 1 à l'article: L'abréviation "EP" est dérivée du terme anglais développé correspondant "Estimated Position".

3.1.28

relevé

position du navire porteur établie, sans référence à une position antérieure

3.1.29

cap

(MSC191/A) direction horizontale, *exprimée sous forme d'un écart angulaire par rapport au nord*, vers laquelle est effectivement *orientée l'étrave du navire*, à tout instant

3.1.30

icône

symbole graphique ayant une signification particulière et utilisé pour transmettre des informations indépendamment de la langue

Note 1 à l'article: Les icônes peuvent être utilisées pour l'identification visuelle ou la mise en valeur d'une description textuelle, pour appeler une fonction ou ouvrir un objet sélectionné avec le curseur.

3.1.31

indication importante

(MSC191/A) *marquage d'un statut opérationnel des informations affichées qui nécessite une attention particulière*, par exemple *des informations à faible intégrité ou des informations non valides*

Note 1 à l'article: L'indication importante n'est pas incluse dans la classification des alertes.

3.1.32

indication

affichage d'informations et de conditions régulières, ne faisant pas partie de la gestion des alertes

3.1.33

système de navigation intégré

INS

système qui satisfait aux exigences de la Résolution MSC.252(83) de l'OMI amendée par la Résolution MSC.452(99) de l'OMI

Note 1 à l'article: L'abréviation "INS" est dérivée du terme anglais développé correspondant "Integrated Navigation System".

3.1.34

intégrité

propriété d'une information à être dans les limites de précision spécifiées, en temps voulu, de manière exhaustive et sans ambiguïté

3.1.35

ligne de position

LOP

ligne tracée sur laquelle se trouve le navire porteur, établie par l'observation ou la mesure de la distance, ou par le relèvement d'une aide à la navigation ou d'autre élément cartographique

Note 1 à l'article: L'abréviation "LOP" est dérivée du terme anglais développé correspondant "Line Of Position".

3.1.36**cible perdue**

(MSC191/A) *cible* poursuivie par radar ou *cible* signalée pour laquelle le système ne reçoit plus de données *de position valide*

Note 1 à l'article: La cible est *représentée* par un symbole "cible perdue".

3.1.37**informations sur la sécurité maritime****MSI**

(SOLAS IV/2) *prises en garde relatives à la navigation et aux conditions météorologiques, prévisions météorologiques et autres messages liés à la sécurité diffusés aux navires*

Note 1 à l'article: Les MSI sont promulguées en utilisant les services NAVTEX et EGC (voir OMI MSC.468(101)).

Note 2 à l'article: L'abréviation "MSI" est dérivée du terme anglais développé correspondant "Maritime Safety Information".

3.1.38**menu**

zone de l'affichage qui est allouée à une liste structurée d'options pour le choix et la saisie de paramètres opérationnels, de données et de commandes

3.1.39**affichage multifonction**

bloc d'affichage visuel unique qui peut présenter, simultanément ou par une série de pages sélectionnables, des informations issues de plusieurs systèmes ou matériels

Note 1 à l'article: Un affichage multifonction peut habituellement faire partie intégrante d'un INS (fournissant, par exemple, des modes de présentation spécialisés satisfaisant aux exigences de présentation radar et ECDIS) et peut remplacer leurs blocs d'affichage individuels.

3.1.40**zone d'affichage opérationnel**

(MSC191/A) *zone de l'affichage utilisée pour représenter graphiquement des informations cartographiques électroniques et/ou radar, zone de dialogue utilisateur non comprise.*

Note 1 à l'article: Dans le cas de l'affichage des cartes, cette zone est utilisée pour la présentation des cartes. Dans le cas de l'affichage radar, cette zone comprend l'image vidéo radar.

3.1.41**positions antérieures**

(MSC191/A) *marques représentant, pour des intervalles de temps égaux, la route antérieure du navire porteur, ou d'une cible poursuivie par radar ou d'une cible AIS signalée*

3.1.42**information permanente**

propriété d'une information dont l'existence s'étend sur une longue période (ou à l'infini) et qui ne subit aucune modification

3.1.43**information persistante**

propriété d'une information dont l'existence est continue

3.1.44**radar**

système qui satisfait aux exigences de la Résolution MSC.192(79) de l'OMI

3.1.45**écho radar**

signal radar renvoyé (c'est-à-dire le "spot") apparaissant sur l'image vidéo radar

3.1.46

image vidéo radar

ensemble d'informations affichées construites à partir d'échos radar traités, par exemple par des moyens d'élimination d'échos fixes et d'autres outils

3.1.47

information facilement disponible

<information> directement accessible

Note 1 à l'article: Par exemple, dans un menu de niveau supérieur, à partir d'une fonction d'écran ou d'une icône, etc.

3.1.48

cible sélectionnée

(MSC191/A) *cible sélectionnée manuellement* ou automatiquement *pour l'affichage de données alphanumériques détaillées, d'informations et de texte dans une zone de dialogue utilisateur séparée*

Note 1 à l'article: *La cible est représentée par un symbole "cible sélectionnée".*

3.1.49

action simple de l'opérateur

(MSC252/A1) *procédure exécutée par un maximum de deux actionnements de touches programmables ou non programmables, à l'exclusion des mouvements d'alidade nécessaires, ou commande vocale utilisant des codes programmés ou d'autres moyens équivalents*

3.1.50

action unique de l'opérateur

(MSC252/A1) *procédure exécutée par un maximum d'un actionnement de touche programmable ou non programmable, à l'exclusion des mouvements d'alidade nécessaires, ou commande vocale utilisant des codes programmés*

3.1.51

cible AIS en veille

(MSC191/A) *cible AIS indiquant la présence d'un navire équipé d'un AIS à un certain emplacement*

Note 1 à l'article: *La cible est représentée par un symbole "cible en veille" indiquant l'orientation du navire. Aucune information supplémentaire n'est présentée tant que la cible AIS n'est pas activée.*

3.1.52

affichage normalisé

(MSC191/A) *niveau d'information qu'il convient de fournir lorsqu'une carte est d'abord affichée sur l'ECDIS*

Note 1 à l'article: *Le niveau d'information fourni pour la planification ou la surveillance de la route peut être modifié par l'utilisateur, en fonction de ses besoins.*

3.1.53

système de poursuite de cibles

système qui satisfait aux exigences de la Résolution MSC.192(79) de l'OMI

3.1.54

tâche à accomplir

activité de navigation spécifique réalisée par un utilisateur

EXEMPLE Planification de la route, surveillance de la route, poursuite d'une cible et prévention des collisions.

3.1.55

cible poursuivie par radar

objet, fixe ou mobile, qui est poursuivi par un radar ou une fonction de poursuite de cibles

3.1.56**manœuvre d'essai**

(MSC191/A) *moyen utilisé pour aider l'utilisateur à effectuer une manœuvre simulée aux fins de la navigation et de la prévention d'un abordage, consistant à afficher les conséquences des manœuvres simulées sur l'état futur prévu de toutes les cibles poursuivies par radar et cibles AIS signalées*

3.1.57**informations relatives aux cartes électroniques ajoutées par l'utilisateur**

informations relatives aux cartes électroniques, saisies manuellement par l'utilisateur en vue de leur présentation

EXEMPLE Les notes de navigation, les zones de sécurité présentant un intérêt, les notifications locales aux marins.

3.1.58**présentation configurée par l'utilisateur**

(MSC191/A) *présentation auxiliaire configurée par l'utilisateur pour une tâche à accomplir*

Note 1 à l'article: *Cette présentation peut comprendre des informations relatives aux radars et/ou aux cartes électroniques, combinées avec d'autres données relatives à la navigation ou au navire*

3.1.59**zone de dialogue utilisateur**

(MSC191/A) *zone de l'affichage constituée de champs de données et/ou de menus, qui est réservée à la présentation interactive et à la saisie ou sélection de paramètres de fonctionnement, de données, d'informations, de textes et de commandes principalement sous forme alphanumérique*

3.1.60**validité**

propriété d'une information qui est conforme à des critères spécifiés et dont le marquage est considéré comme "valide" ou "non valide" (c'est-à-dire une information "bonne" ou "mauvaise") pour son utilisation prévue

3.1.61**mise en garde**

(MSC.302/A) *alerte concernant un état qui exige une attention immédiate, mais aucune action immédiate de la part de l'équipe de passerelle*

Note 1 à l'article: *Les mises en garde sont présentées à titre de précaution afin que l'équipe de passerelle ait connaissance des états modifiés qui ne sont pas immédiatement dangereux, mais qui pourraient le devenir si aucune action n'était menée.*

3.2 Abréviations

DAC Designated Area Code (code de zone désigné)

FI Function Identifier (identificateur de fonction)

MID Maritime Identity Digits (chiffres d'identification maritime)

VTS Vessel Traffic Services (services du trafic maritime)

4 Exigences générales applicables à tous les affichages sur la passerelle d'un navire**4.1 Relations avec les normes de l'OMI**

(MSC191/1) La résolution MSC.191(79) de l'OMI *harmonise les exigences concernant la présentation des informations relatives à la navigation sur la passerelle d'un navire, pour s'assurer que tous les affichages de navigation adoptent une philosophie et une mise en œuvre cohérentes en matière d'interface homme-machine.*

(MSC191/1) La résolution MSC.191(79) de l'OMI *complète, et en cas de divergence, prévaut sur les exigences de présentation des normes de fonctionnement individuelles adoptées par l'OMI pour les systèmes et matériels de navigation correspondants et couvre la présentation des informations relatives à la navigation par le matériel pour lequel les normes de fonctionnement n'ont pas été adoptées par l'OMI.*

Le présent document *complète, et en cas de divergence, prévaut sur les exigences de présentation des normes d'essai individuelles pour les systèmes et matériels de navigation correspondants et couvre la présentation des informations relatives à la navigation par le matériel pour lequel des normes d'essai ne sont pas disponibles.*

NOTE 1 Les normes d'essai individuelles sont, par exemple, des normes de matériel spécifique publiées par l'IEC ou l'ISO. La commande des feux de navigation est un exemple de matériel pour lequel il n'existe aucune norme d'essai au moment de la publication du présent document.

(MSC302/3.6) *En cas de divergence avec les exigences relatives aux alertes dans les normes de fonctionnement existantes, les présentes normes de fonctionnement (MSC.302(87)) l'emportent.*

NOTE 2 En cas de divergence sur des questions relatives à la présentation des alertes, la priorité des normes de fonctionnement de l'OMI découle des résolutions de plus haut niveau MSC.302(87), MSC.252(83), MSC.191(79), toutes les autres normes de fonctionnement étant égales.

(MSC191/2) La résolution MSC.191(79) de l'OMI, telle qu'amendée par la résolution MSC.466(101) de l'OMI, *spécifie la présentation des informations de navigation sur la passerelle d'un navire, y compris l'utilisation cohérente des termes, abréviations, couleurs et symboles de navigation, ainsi que d'autres caractéristiques de présentation.*

(MSC191/2) *La résolution MSC.191(79) de l'OMI traite également de la présentation des informations relatives à des tâches de navigation spécifiques, en reconnaissant les présentations choisies par l'utilisateur en plus des présentations exigées par les normes de fonctionnement individuelles correspondantes adoptées par l'OMI.*

Le présent document donne également des lignes directrices pour la présentation des symboles, termes et abréviations relatifs à la navigation dans la circulaire Sécurité de Navigation SN/Circ.243.

(MSC191/3) Le présent document *est applicable à tout matériel d'affichage associé à des systèmes et matériels de navigation pour lesquels des normes de fonctionnement individuelles ont été adoptées par l'OMI.* Elle traite des affichages autonomes pour les radars, les ECDIS, les affichages multifonctions et les présentations composites qui intègrent des informations obtenues à partir d'au moins deux systèmes. Le présent document *traite également des matériels d'affichage associés à des systèmes et matériels de navigation dont les normes de fonctionnement individuelles n'ont pas été adoptées par l'OMI.*

(MSC191/3) *Les principes généraux et les caractéristiques physiques spécifiés respectivement aux Articles 4 et 7 du présent document, sont applicables à tous les affichages sur la passerelle d'un navire.*

Certaines exigences spécifiées dans la Résolution MSC.191(79) reproduisent celles stipulées dans d'autres documents de l'OMI ou dans les normes IEC spécifiant plus précisément les méthodes d'essai et les résultats exigés pour ces exigences (par exemple, l'IEC 60945, l'IEC 61174, l'IEC 61993-2, l'IEC 62388, etc.). Lorsque le présent document reproduit une exigence contenue dans une autre norme, la (les) méthode(s) d'essai pour l'exigence en question peu(ven)t se référer à l'autre norme. Des fabricants peuvent proposer des données d'essais pertinentes issues d'essais de conformité à d'autres normes, comme preuve de la conformité à des essais appropriés du présent document.

Les messages AIS sont définis dans l'UIT-R M.1371. Les normes de fonctionnement de l'OMI relatives à la présentation et aux radars utilisent le terme "cibles AIS" et "cibles signalées" pour

les cibles reçues par les messages AIS et le terme "informations AIS" pour désigner les informations liées à ces cibles AIS.

NOTE 3 Le mot "cible" tel qu'utilisé dans "cible radar", "cible AIS" et "cible signalée" provient des développements d'origine des radars pour le contrôle de l'artillerie.

Les normes de fonctionnement de l'OMI relatives aux systèmes de navigation intégrés (INS) se rapportent aux types suivants de messages AIS:

- cibles AIS;
- comptes rendus AIS pour les AtoN;
- messages AIS binaires et liés à la sécurité;
- messages propres aux applications (ASM).

Le présent document se rapporte aux types suivants de messages AIS (voir Annexe K):

- cibles AIS;
- comptes rendus de données AIS;
- dispositifs de localisation AIS;
- cibles AIS synthétiques;
- messages AIS liés à la sécurité;
- AIS ASM.

Le présent document utilise les termes suivants pour le concept que l'OMI qualifie de "cibles AIS" et "cibles signalées":

- cibles AIS;
- comptes rendus de données AIS;
- dispositifs de localisation AIS;
- cibles AIS synthétiques.

L'OMI utilise le terme "compte rendu AIS pour les AtoN" pour le concept appelé

- "AIS AtoN" dans le présent document.

NOTE Des recommandations techniques complémentaires sur l'AIS ASM sont fournies dans la SN.1/Circ.289 de l'OMI.

Les recommandations complémentaires de la MSC/Circ.982 de l'OMI relatives à la conception des affichages et des dialogues sont référencées dans l'Annexe C.

4.2 Application de l'IEC 60945

4.2.1 Remarque

Si un matériel d'affichage peut être monochrome, alors les exigences relatives à la couleur spécifiées en 4.5.1, 4.7.1, 4.7.2, 4.7.3 et 4.8.2 ne s'appliquent pas.

4.2.2 Exigences générales

4.2.2.1 Exigence

(MSC191/3) Outre les exigences générales spécifiées dans la Résolution A.694(17) de l'OMI et précisées dans l'IEC 60945, le matériel d'affichage doit satisfaire aux exigences stipulées dans la Résolution MSC.191(79) de l'OMI et précisées dans le présent document, *selon le cas*.

4.2.2.2 Méthodes d'essai et résultats exigés

Voir l'Annexe D pour obtenir des recommandations concernant l'application de l'IEC 60945 pour les essais.

4.3 Disposition des informations

4.3.1 Cohérence de la présentation et regroupement logique

4.3.1.1 Exigence

(MSC191/5.1.1 amendée par MSC466) *La présentation des informations doit être cohérente au sein de l'interface utilisateur quant à la présentation à l'écran et la disposition des informations, par exemple, quant aux concepts, à la terminologie, à l'étiquetage et aux paradigmes d'interaction utilisés dans toute l'application et d'un écran à l'autre et/ou d'une page à l'autre. Les données et les fonctions de commande doivent être regroupées d'une manière logique selon leur fonctionnement ou la tâche à accomplir, voir l'Annexe E. L'Article E.2 définit les groupes d'informations liées à la navigation. Les informations prioritaires essentielles à la tâche à accomplir doivent être identifiées pour chaque application (radar, ECDIS, par exemple), affichées de manière permanente ou persistante, selon ce qui est approprié pour l'application, et présentées à l'utilisateur de manière bien visible en utilisant, par exemple, la position (l'emplacement sur l'écran, par exemple), la taille et la couleur.*

(MSC/Circ.1609/Appendice 3/1) L'Article E.2 définit des groupes d'informations liées à la navigation qui doivent être affichées conjointement sur l'interface utilisateur, pour permettre à l'utilisateur de localiser rapidement et de réagir à des informations essentielles pour la navigation, si elles sont disponibles sur l'écran. Le regroupement logique de l'Article E.2 s'applique aux matériels radar, aux ECDIS et aux fonctions minimales des INS. Le regroupement logique de l'Article E.2 peut être appliqué à d'autres matériels de navigation électroniques et capteurs de navigation, selon le cas, afin d'améliorer la normalisation et l'aptitude à l'utilisation.

(MSC/Circ.1609/Appendice 3/2) L'Article E.2 ne spécifie pas l'endroit où il convient que les groupes d'informations apparaissent sur l'écran, ni l'ordre dans lequel il convient de regrouper les éléments d'information individuels. Les groupes d'informations liées à la navigation présentés sur l'interface utilisateur ne sont pas limités aux informations énumérées à l'Article E.2. Les groupes de l'Article E.2 peuvent être élargis par des informations associées. Ces regroupements s'appliquent aux informations obligatoires et non obligatoires. Au sein d'un groupe individuel, il n'est pas exigé d'afficher toutes les informations, mais seulement de les regrouper, si elles sont affichées.

4.3.1.2 Méthodes d'essai et résultats exigés

Les méthodes d'essai et les résultats exigés sont les suivants:

- a) confirmer par évaluation analytique que la disposition, le regroupement logique, le fonctionnement et l'identification des commandes, des affichages sur écrans et des indications sont conformes à l'Annexe E et à l'IEC 60945:2002, 4.2.1.2 à 4.2.1.5;
- b) confirmer par évaluation analytique que les concepts, la terminologie, l'étiquetage et les paradigmes d'interaction, la présentation à l'écran et la disposition des informations sont cohérents d'un écran à l'autre et/ou d'une page à l'autre;
- c) confirmer par évaluation analytique que les informations prioritaires essentielles à la tâche à accomplir sont identifiées et affichées de façon permanente ou persistante et d'une manière bien visible, selon ce qui est approprié, pour chaque application.

4.3.2 Présentation cohérente des informations

4.3.2.1 Exigence

(MSC191/5.1.2) *La présentation des informations doit être cohérente en ce qui concerne:*

- les *valeurs* numériques (position, vitesse, distance, temps, par exemple);
- les *unités*;
- la *signification* des informations (utilisation des termes et abréviations de l'Annexe B, par exemple);
- les *sources* d'informations (utilisation des termes et abréviations de l'Annexe B, par exemple);
- la *validité* des informations (voir aussi 4.8.1 et 4.8.2); et
- l'*intégrité* des informations, le cas échéant (voir aussi 4.8.1 et 4.8.2).

(Voir aussi l'IEC 60945:2002, 4.2.1.5)

4.3.2.2 Méthodes d'essai et résultats exigés

Confirmer, par observation, que les valeurs numériques et leurs unités, la signification et la (les) source(s) d'informations, ainsi que la validité et l'intégrité des informations, sont présentées de manière cohérente.

4.3.3 Séparation de la zone d'affichage opérationnel

4.3.3.1 Exigence

(MSC191/5.1.3) *La présentation des informations doit être clairement séparée en une ou plusieurs zones d'affichage opérationnel (par exemple: radar, carte) et une ou plusieurs zones de dialogue utilisateur (par exemple: menus, données, fonctions de commande).*

4.3.3.2 Méthodes d'essai et résultats exigés

Confirmer, par observation, que la présentation est clairement séparée en une ou plusieurs zones d'affichage opérationnel et une ou plusieurs zones de dialogue utilisateur.

4.4 Lisibilité

4.4.1 Lisibilité dans toutes les conditions d'éclairage ambiant

4.4.1.1 Exigence

(MSC191/5.2.1) *La présentation de données alphanumériques, de texte, de symboles et autres informations graphiques (par exemple: informations cartographiques, échos radar ou image vidéo radar, etc.) doit aider à la lisibilité à partir de positions types d'utilisateur (c'est-à-dire pour la distance de lecture) dans toutes les conditions d'éclairage ambiant susceptibles d'être rencontrées sur la passerelle d'un navire (jour, crépuscule et nuit, par exemple) et en tenant dûment compte de la vision nocturne de l'officier de quart. (Voir aussi 4.5.1 et 7.2.1)*

Le Tableau 1 caractérise les niveaux d'éclairage pour les conditions d'éclairage ambiant diurne, crépusculaire et nocturne.

Tableau 1 – Conditions d'éclairage ambiant

Condition ambiante	Niveau d'éclairage
Jour	200 cd/m ² ± 50 %
Crépuscule	10 cd/m ² ± 50 %
Nuit	Obscurité (c'est-à-dire lorsque l'affichage est la source d'éclairage prédominante)
NOTE 1 La lumière diurne naturelle est préférentielle pour les conditions diurne et crépusculaire.	
NOTE 2 L'ajustement des conditions d'éclairage ambiant appropriées pour les moniteurs étalonnés, par exemple pour afficher des informations cartographiques, est décrit en G.1.3 d).	

NOTE 1 Il est possible que l'arrière-plan blanc utilisé dans la table de couleurs "Jour" fournie dans la Bibliothèque de présentation de l'OHI pour les ECDIS ne prenne pas en charge la lisibilité dans toutes les conditions d'éclairage, et constitue un risque pour la sécurité de navigation de certains systèmes et matériels de navigation, y compris les radars. La lisibilité peut être assurée en utilisant l'arrière-plan noir dans les tables de couleurs "Crépuscule" ou "Nuit" fournies dans la Bibliothèque de présentation de l'OHI pour les ECDIS et en réajustant la luminosité et le contraste, s'ils sont donnés, pour une utilisation dans toutes les conditions d'éclairage.

Le matériel d'affichage doit fournir une luminance d'au moins 85 cd/m², mesurée au centre de l'affichage lorsqu'il est réglé à la valeur maximale de réglage de la luminosité. Le niveau de luminance du blanc de l'affichage doit être ajustable afin de descendre jusqu'à 1 cd/m² ± 20 % et peut être éteint en dessous de ce point.

Si cela est prévu, le maintien à une valeur de niveau du blanc inférieure à 0,8 cd/m² doit permettre d'assurer la lisibilité des alertes (alarmes, mises en garde et précautions) alors que la lisibilité de tous les autres éléments n'est pas exigée.

NOTE 2 Les exigences générales relatives à l'éclairage sont présentées dans l'IEC 60945.

Les affichages transflectifs et réflectifs doivent assurer un autoéclairage réglable, adapté à toutes les conditions d'éclairage ambiant susceptibles d'être rencontrées sur la passerelle d'un navire (jour, crépuscule et nuit) et en tenant dûment compte de la vision nocturne de l'officier de quart. L'éclairage doit être réglable pour produire une luminance d'affichage d'au moins 1 cd/m² à 5 cd/m² en conditions nocturnes.

La variance de luminance à travers la zone d'affichage opérationnel ne doit pas être supérieure à 30 % du point le plus lumineux au point le plus obscur.

NOTE 3 La variance est calculée par l'équation:

$$1 - \left(\frac{L_{\min}}{L_{\max}} \right)$$

où

$L_{\min}$ est la luminance minimale;

$L_{\max}$ est la luminance maximale mesurée à travers la zone d'affichage opérationnel ou l'écran entier, selon l'application.

Il doit être possible d'afficher des données alphanumériques, du texte, des symboles (voir 4.6) et d'autres informations graphiques en utilisant un avant-plan plus clair (caractère, symbole, par exemple) sur un arrière-plan sombre de contraste élevé, émettant aussi peu de lumière que possible la nuit. Les éléments les plus lumineux de la présentation doivent se limiter à des points et à des traits fins.

Si le matériel d'affichage est destiné à présenter des symboles pour des informations cartographiques (voir 4.6.2), il doit fournir un moyen ou une méthode permettant à l'utilisateur

de vérifier que la couleur noire se distingue visuellement par rapport à un arrière-plan réglé au gris foncé, et inversement.

NOTE 4 La Bibliothèque de présentation de l'OHI pour les ECDIS fournit les symboles "ajustement de noir" BKAJ1 et BKAJ2, pour le noir et le gris respectivement.

Si le matériel d'affichage n'est pas destiné à présenter des symboles pour des informations cartographiques (voir 4.6.2), il doit continuer à garantir que toutes les couleurs utilisées se distinguent visuellement par rapport à l'arrière-plan.

NOTE 5 Pour pouvoir distinguer visuellement un objet, un rapport de luminance d'au moins 1:2 doit être obtenu lors d'une vérification par un instrument.

La nuit, il est important d'éviter d'altérer la vision nocturne de l'officier de quart par un éclat excessif des affichages sur la passerelle. L'affichage doit être capable de proposer un contraste de 100:1 entre le niveau de blanc à 1 cd/m² et l'arrière-plan noir.

NOTE 6 Le niveau de blanc peut être créé en appliquant une méthode normalisée (c'est-à-dire les valeurs RVB ou les coordonnées chromatiques de la CIE 1931 (x, y et L) pour le blanc) spécifiée par le fabricant ou, si aucune spécification de fabricant n'est disponible, en utilisant les valeurs RVB 255, 255, 255.

4.4.1.2 Méthodes d'essai et résultats exigés

Monter le matériel d'affichage pour les mesures de luminance, de contraste et de couleurs conformément aux lignes directrices de l'IEC 61966- 4 ou de la norme VESA FPDM (Flat Panel Display Measurement) (voir VESA-2001-6). Avant de procéder aux mesures, mettre le matériel d'affichage sous tension et le laisser se stabiliser pendant la durée spécifiée par le fabricant, comme suit.

- a) Confirmer, par observation à la distance recommandée par le fabricant, que les données alphanumériques, les textes, les symboles et les autres informations graphiques, y compris les alertes, sont lisibles dans les conditions d'éclairage ambiant décrites dans le Tableau 1.
- b) Pour les affichages à vision directe (tube cathodique, affichage à cristaux liquides, par exemple), confirmer par des mesures réalisées à l'aide d'une image d'essai avec un carré blanc au centre de la zone d'affichage opérationnel (à fournir par le fabricant) que la luminosité peut varier d'un niveau minimal de tout au plus 1 cd/m² ± 20 % à un niveau maximal d'au moins 85 cd/m² (mesures réalisées dans l'obscurité). Confirmer, par des mesures, que les valeurs de luminosité utilisées pour le montage sont stables à l'issue de la période de stabilisation définie par le fabricant. Confirmer, par des mesures réalisées en condition ambiante nocturne, que le rapport de contraste entre le niveau de blanc à 1 cd/m² et l'arrière-plan noir est d'au moins 100:1.
- c) Pour les affichages transfectifs et réflectifs, confirmer, par des mesures réalisées à l'aide d'une image d'essai avec un carré blanc au centre de la zone d'affichage opérationnel (à fournir par le fabricant) que la luminosité peut être réglable entre au moins 1 cd/m² et 5 cd/m² dans des conditions d'éclairage ambiant nocturne et un niveau maximal d'au moins 85 cd/m² dans des conditions d'éclairage ambiant diurne. Confirmer, par des mesures, que les valeurs de luminosité utilisées pour le montage sont stables à l'issue de la période de stabilisation définie par le fabricant. Confirmer, par des mesures réalisées en condition ambiante nocturne, que le rapport de contraste entre le niveau de blanc à 1 cd/m² et l'arrière-plan noir est d'au moins 100:1. Les niveaux d'éclairage ambiant doivent être tels que spécifiés dans le Tableau 1.

NOTE L'image d'essai n'est pas générée en interne par le matériel d'affichage.

- d) Confirmer, par observation, que les données alphanumériques, les textes, les symboles et autres informations graphiques, y compris les alertes, peuvent être présentés en utilisant un avant-plan plus clair par rapport à un arrière-plan sombre.
- e) Confirmer, par des mesures, que lorsque le matériel d'affichage est configuré à la luminosité maximale, la luminance ne varie pas à travers la zone d'affichage opérationnel de plus de 30 % du point le plus lumineux au point le plus sombre.

- f) Confirmer, par observation, que les éléments les plus lumineux de la présentation en condition d'éclairage ambiant nocturne décrite dans le Tableau 1 sont des points et des traits fins.
- g) Si le matériel d'affichage est destiné à présenter des symboles pour des informations cartographiques, confirmer par observation à chaque condition d'éclairage ambiant que l'utilisateur peut vérifier que la couleur noire se distingue visuellement par rapport à un arrière-plan réglé au gris foncé, et inversement.
- h) Si le matériel d'affichage n'est pas destiné à présenter des symboles pour des informations cartographiques, confirmer par observation à chaque condition d'éclairage ambiant que toutes les couleurs utilisées se distinguent visuellement par rapport à l'arrière-plan.
- i) Si la réduction en dessous de 0,8 cd/m² comme niveau de blanc est prévue, alors confirmer par observation au bout de 10 min d'adaptation à la condition d'éclairage ambiant nocturne par l'observateur que les alertes (alarmes, mises en garde, précautions) au moins sont lisibles, et que les différents niveaux d'alerte se distinguent les uns des autres.

4.4.2 Lisibilité des données alphanumériques et du texte

4.4.2.1 Exigence

(MSC191/5.2.2) *Les données alphanumériques et le texte doivent être présentés en utilisant une police sans-sérif non italique clairement lisible. La taille de la police doit être appropriée pour la distance d'observation à partir des positions utilisateur (c'est-à-dire pour la distance de lecture et les angles d'observation) susceptibles d'être rencontrées sur la passerelle d'un navire.*

La hauteur des caractères en millimètres ne doit pas être inférieure à 3,5 fois la distance d'observation nominale en mètres. La documentation du fabricant doit identifier la distance d'observation nominale du matériel d'affichage.

4.4.2.2 Méthodes d'essai et résultats exigés

Les méthodes d'essai et les résultats exigés sont les suivants:

- a) confirmer par observation que les données alphanumériques et le texte sont présentés en utilisant une police sans-sérif non italique;
- b) confirmer par des mesures que la hauteur des caractères (c'est-à-dire la distance entre les bords haut et bas de la plus petite lettre majuscule utilisée dans la présentation) en millimètres n'est pas inférieure à 3,5 fois la distance d'observation nominale en mètres;
- c) confirmer, par examen de la documentation du fabricant, que la distance d'observation nominale du matériel d'affichage est identifiée dans cette documentation.

4.4.3 Présentation du texte et des icônes

4.4.3.1 Exigence

(MSC191/5.2.3 amendée par MSC.466) *Le texte doit être présenté en utilisant un langage simple, sans équivoque et aisé à comprendre (terminologie maritime normalisée ou texte qui dont le contexte donne une signification claire, par exemple). Les termes et abréviations de navigation doivent être présentés à l'aide de la nomenclature définie à l'Annexe B et à l'Article E.3.*

(MSC191/5.2.4 amendée par MSC.466) *Lorsque des icônes sont utilisées, leur but doit être reconnu de manière intuitive par l'aspect, l'emplacement, et le regroupement tel que défini en Article E.3.*

La Circ.1609/Appendice 2 et l'Article E.3 identifient les fonctions couramment utilisées sur le matériel de navigation et spécifient, pour chaque fonction, la terminologie, l'abréviation et (lorsque cela est approprié) les icônes associées pour obtenir une présentation cohérente sur les matériels de navigation.

Pour les fonctions énumérées dans l'Article E.3, les exigences suivantes s'appliquent.

- a) (Circ.1609/Appendice 2/2) *Lorsque des icônes, termes et/ou abréviations sont utilisés, ils doivent satisfaire aux exigences de l'Article E.3. Si un terme, une abréviation ou une icône normalisé(e) n'est pas disponible, un(e) autre icône, terme ou abréviation peut être utilisé(e), mais il (elle) ne doit pas être en contradiction avec ceux énumérés à l'Article E.3.*
- b) (Circ.1609/Appendice 2/3) *Les icônes spécifiées peuvent indiquer une situation, peuvent exécuter une fonction spécifique (touche rapide) ou peuvent donner accès à un groupe de fonctions associées (raccourci).*
- c) (Circ.1609/Appendice 2/4) *Seule la forme de l'icône est spécifiée; l'Article E.3 ne spécifie pas une combinaison de couleurs pour les icônes, sauf pour celles représentées en couleur dans le Tableau E.6 qui doivent respecter la combinaison de couleurs de l'OHI ou analogue.*
- d) (Circ.1609/Appendice 2/5) *Lorsque cela s'avère approprié et pratique, l'utilisateur doit pouvoir obtenir facilement une brève explication du but d'une icône. Cette fonctionnalité doit pouvoir être désactivée facilement par l'utilisateur.*

Les icônes utilisées pour la présentation des alertes doivent être présentées conformément à l'Annexe F.

4.4.3.2 Méthodes d'essai et résultats exigés

Les méthodes d'essai et les résultats exigés pour les textes sont les suivants:

- a) confirmer, par évaluation analytique, que les textes sont présentés en utilisant un langage simple sans équivoque;
- b) confirmer, par observation, que les termes et abréviations de navigation sont présentés en utilisant la nomenclature de l'Annexe B et de l'Article E.3;
- c) confirmer, par examen de preuve documentée, que l'autre terminologie ou abréviation éventuellement utilisée est expliquée dans le manuel de l'opérateur et n'est pas en contradiction avec celle énumérée à l'Article E.3.

Les méthodes d'essai et les résultats exigés pour les icônes sont les suivants:

- d) pour les icônes non spécifiées à l'Article E.3 ou à l'Annexe F, confirmer, par évaluation analytique, que les icônes et leur but peuvent être reconnus de manière intuitive par leur aspect, leur emplacement et leur regroupement et que ces icônes ne sont pas en contradiction avec celles de l'Article E.3;
- e) confirmer, par observation, que la forme des icônes utilisées pour les données et les fonctions de commande est présentée conformément à l'Article E.3;
- f) confirmer, par observation, que les couleurs des icônes spécifiées dans le Tableau E.6 respectent les combinaisons de couleurs de l'OHI ou analogue;
- g) confirmer, par observation, que les icônes utilisées pour la présentation des alertes sont présentées conformément à l'Annexe F (voir aussi 5.6.1.2).

4.5 Couleurs et intensité

4.5.1 Distinction des couleurs – Exigences

(MSC191/5.3.1) *Les couleurs utilisées pour la présentation des données alphanumériques, du texte, des symboles et d'autres informations graphiques doivent créer un contraste suffisant pour assurer la distinction et l'identification par rapport à l'arrière-plan dans toutes les conditions d'éclairage ambiant susceptibles d'être rencontrées sur la passerelle d'un navire (jour, crépuscule et nuit, par exemple) et en tenant dûment compte de la vision nocturne de l'officier de quart.*

(MSC191/5.3.2) *Les couleurs et la luminosité doivent tenir compte des conditions d'éclairage ambiant du jour, du crépuscule et de la nuit. La présentation doit aider à l'observation nocturne en montrant des informations d'avant-plan plus clair sur un arrière-plan sombre non réfléchissant.*

(MSC191/5.3.3) *La couleur et le contraste de l'arrière-plan doivent être choisis de manière à faciliter la distinction des informations affichées sans dégrader les aspects du codage couleur de la présentation.*

Le matériel d'affichage peut utiliser une palette de tonalités de couleurs de base, à condition qu'elles soient identifiables et se distinguent visuellement les unes des autres. Les couleurs utilisées pour la présentation des informations dans les zones de dialogue utilisateur ne doivent pas porter atteinte à la présentation des informations dans la zone d'affichage opérationnel.

Si le matériel d'affichage est destiné à présenter des symboles pour les informations cartographiques, il doit utiliser des couleurs qui sont conformes ou reposent sur les couleurs spécifiées dans les normes pertinentes de l'OHI, par exemple la Bibliothèque de présentation de l'OHI pour les ECDIS dans l'OHI S-52 et ses Appendices, ou un ensemble équivalent de tables de couleurs, dans la mesure du possible.

NOTE Il est possible que l'arrière-plan blanc utilisé dans la table de couleurs "Jour" fournie dans la Bibliothèque de présentation de l'OHI pour les ECDIS ne prenne pas en charge la lisibilité dans toutes les conditions d'éclairage, et constitue un risque pour la sécurité de navigation de certains systèmes et matériels de navigation, y compris les radars. La lisibilité peut être assurée en utilisant l'arrière-plan noir dans les tables de couleurs "Crépuscule" ou "Nuit" fournies dans la Bibliothèque de présentation de l'OHI pour les ECDIS et en réajustant la luminosité et le contraste, s'ils sont donnés, pour une utilisation dans toutes les conditions d'éclairage.

4.5.2 Méthodes d'essai et résultats exigés

La personne qui procède à cet essai doit avoir réussi aux essais de vision des couleurs et d'acuité visuelle minimales exigés pour les utilisateurs du Code STCW Partie B de l'OMI et s'être adaptée à l'observation nocturne pendant 10 min avant de vérifier l'affichage nocturne.

- a) Confirmer, par observation, que les couleurs utilisées pour la présentation des données alphanumériques, du texte, des symboles et d'autres informations graphiques créent un contraste suffisant pour l'identification et la distinction par rapport à l'arrière-plan dans les conditions d'éclairage ambiant décrites dans le Tableau 1.
- b) Confirmer, par observation, que les couleurs utilisées pour la présentation des données alphanumériques, du texte, des symboles et d'autres informations graphiques aident à l'observation nocturne en montrant des informations d'avant-plan plus clair sur un arrière-plan sombre non réfléchissant.
- c) Confirmer, par observation, que les couleurs utilisées pour la présentation des données alphanumériques, du texte, des symboles et d'autres informations graphiques sont identifiables et se distinguent visuellement les unes des autres.
- d) Confirmer, par observation, que les couleurs utilisées dans les zones de dialogue utilisateur ne portent pas atteinte à la présentation des informations dans la zone d'affichage opérationnel.
- e) Si le matériel d'affichage est destiné à présenter des symboles pour des informations cartographiques, confirmer par évaluation analytique que les couleurs utilisées sont conformes aux couleurs spécifiées dans la Bibliothèque de présentation de l'OHI S-52 pour les ECDIS ou équivalent, dans la mesure du possible (voir le paragraphe G.1 pour obtenir des recommandations supplémentaires).

4.6 Symboles

4.6.1 Informations opérationnelles

4.6.1.1 Exigence

(MSC191/5.4.1) *Les symboles utilisés pour la présentation d'informations opérationnelles autres que des informations cartographiques doivent être conformes ou reposer sur les symboles indiqués à l'Annexe A.*

(SN-Circ.243/1/3) *En l'absence de symbole normalisé, un autre symbole peut être utilisé, mais il ne doit pas être en contradiction avec ceux qui figurent à l'Annexe A ou dans la Bibliothèque*

de présentation de l'OHI S-52 pour les ECDIS. (Pour obtenir des recommandations supplémentaires, voir aussi l'ISO 80416- 4).

Les couleurs utilisées pour la présentation des informations opérationnelles doivent se distinguer des couleurs utilisées pour la présentation de l'image radar, des sillages de cibles, des informations traitées supplémentaires relatives aux radars et des informations relatives aux cartes électroniques.

Pour les symboles pour lesquels le présent document ne spécifie aucune taille, les exigences suivantes s'appliquent: Un symbole doit sous-tendre au moins 5 mm/m (17 min d'arc) à la distance d'observation nominale. Si une identification précise des couleurs d'un symbole est exigée par une norme de matériel individuelle alors, en l'absence d'exigences de taille dans cette norme, le symbole doit sous-tendre au moins 8,7 mm/m (30 min d'arc) à la distance d'observation nominale. L'utilisation du bleu extrême du spectre ($v' < 0,2$) doit être évitée pour les images qui sous-tendent moins de 35 mm/m (2° d'arc) de distance d'observation.

L'Annexe A spécifie des symboles normalisés, y compris leur taille à une distance d'observation de 1 m. Si le fabricant déclare une distance d'observation différente, la taille du symbole doit être mesurée proportionnellement à cette distance (par exemple, un symbole de 5 mm à une distance d'observation de 1 m doit mesurer 7,5 mm si la distance déclarée est de 1,5 m).

4.6.1.2 Méthodes d'essai et résultats exigés

Les méthodes d'essai et les résultats exigés sont les suivants:

- a) confirmer, par examen de la preuve documentée, que les symboles utilisés pour présenter des informations opérationnelles sont présentés conformément à l'Annexe A;
- b) confirmer, par une mesure, que la plus grande dimension du symbole est d'au moins 5 mm/m (17 min d'arc) à la distance d'observation nominale et inclut au moins 16 pixels;
- c) si une identification précise des couleurs est exigée pour un symbole, confirmer par une mesure que la plus grande dimension du symbole est d'au moins 8,7 mm/m (30 min d'arc) à la distance d'observation nominale et inclut au moins 29 pixels.

4.6.2 Informations relatives aux cartes électroniques

4.6.2.1 Exigence

(MSC191/5.4.2) *Les symboles utilisés pour la présentation des informations cartographiques doivent être conformes à la norme pertinente de l'OHI, par exemple la Bibliothèque de présentation de l'OHI pour les ECDIS dans l'OHI S-52 et ses Appendices, ou un jeu de symboles équivalent, dans la mesure du possible.*

NOTE Il est possible que certains symboles donnés dans la Bibliothèque de présentation de l'OHI pour les ECDIS ne soient pas adaptés à l'affichage d'informations radar relatives aux cartes électroniques ou dans une présentation composite basée sur les radars. La norme OHI S-52 et ses Appendices autorisent des écarts mineurs par rapport à la symbolologie. Elle fournit un cadre et des lignes directrices pour la symbolisation cartographique à partir de laquelle les fabricants peuvent définir un jeu de symboles personnalisé.

Si des symboles qui s'écartent de la Bibliothèque de présentation de l'OHI S-52 pour les ECDIS sont utilisés pour présenter des informations cartographiques, ils doivent:

- être lisibles;
- avoir une signification certaine et sans équivoque;
- être de taille suffisante pour assurer la distance d'observation nominale (voir aussi 4.4.2);
- avoir la même forme générale que les symboles de la Bibliothèque de présentation de l'OHI S-52 pour les ECDIS, utilisés pour des buts identiques ou semblables.

Les symboles ajoutés à la Bibliothèque de présentation pour les ECDIS ne doivent pas être confondus avec des symboles de la Bibliothèque de présentation de l'OHI S-52 pour les ECDIS.

4.6.2.2 Méthodes d'essai et résultats exigés

Les méthodes d'essai et les résultats exigés sont les suivants:

- a) confirmer, par examen de la preuve documentée, que les symboles utilisés pour présenter des informations cartographiques sont présentés conformément aux normes pertinentes de l'OHI, par exemple l'OHI S-52 et ses Appendices;
- b) si des symboles s'écartent de la Bibliothèque de présentation de l'OHI S-52 pour les ECDIS, confirmer par observation qu'ils:
 - 1) sont lisibles;
 - 2) ont une signification certaine et sans équivoque;
 - 3) ont une taille suffisante pour assurer la distance d'observation nominale;
 - 4) avoir la même forme générale que les symboles de la Bibliothèque de présentation de l'OHI S-52 pour les ECDIS, utilisés pour des buts identiques ou semblables.
- c) confirmer, par observation, que des symboles ajoutés à la Bibliothèque de présentation pour les ECDIS ne peuvent pas être confondus avec des symboles de la Bibliothèque de présentation de l'OHI S-52 pour les ECDIS.

4.7 Codage couleur

4.7.1 Codage couleur pour la discrimination

4.7.1.1 Exigence

(MSC191/5.5.1) *Si un codage couleur est utilisé pour la discrimination ou la mise en évidence de textes alphanumériques, de symboles et d'autres informations graphiques, toutes les couleurs contenues dans chaque table de couleurs doivent nettement différer les unes des autres (voir aussi 4.5.1).*

4.7.1.2 Méthodes d'essai et résultats exigés

Confirmer, par observation, que les couleurs contenues dans chaque table de couleurs diffèrent nettement les unes des autres.

4.7.2 Codage couleur des informations

4.7.2.1 Exigence

(MSC191/5.5.2) *Si le codage couleur est utilisé, la couleur rouge doit alors être utilisée pour le codage des informations relatives aux alertes pour les conditions d'alarme et d'alarme d'urgence, sauf spécification contraire par l'OMI (par exemple dans les Tableaux 7.1.1 et 7.1.2 de l'OMI A.1021(26), Recueil de règles relatives aux alertes et indicateurs).*

Si le codage couleur est utilisé et si la couleur rouge est utilisée dans d'autres buts que le codage d'informations relatives aux alertes pour les conditions d'alarme et d'alarme d'urgence, son but (par exemple pour l'indication d'un port par rapport à tribord, la couleur d'une bouée ou d'un feu, etc.) doit être suffisamment clair.

4.7.2.2 Méthodes d'essai et résultats exigés

Si le codage couleur est utilisé, confirmer, par examen de preuve documentée ou par observation, que la couleur rouge est utilisée pour indiquer une condition d'alarme ou d'alarme d'urgence, sauf spécification contraire par l'OMI ou si le but est suffisamment clair.

4.7.3 Codage couleur en combinaison avec d'autres attributs

4.7.3.1 Exigence

(MSC191/5.5.3). *Si le codage couleur est utilisé, il doit être utilisé en combinaison avec d'autres attributs de symboles, tels que la taille, la forme et l'orientation.*

Une mise en œuvre spécifique ne doit pas reposer uniquement sur une seule couleur saturée. Si la technologie du matériel d'affichage s'appuie sur l'émission séparée de couleurs primaires, la présentation des alertes doit être visible et identifiable même après la défaillance d'une entrée de couleur primaire dans l'affichage.

4.7.3.2 Méthodes d'essai et résultats exigés

Les méthodes d'essai et les résultats exigés sont les suivants:

- a) confirmer, par examen de la preuve documentée ou par observation, que le codage couleur est toujours combiné à un autre attribut de symbole;
- b) si la technologie du matériel d'affichage s'appuie sur la transmission séparée de couleurs primaires, confirmer par observation que les alertes restent identifiées même après la désactivation de la transmission de chacune des couleurs primaires successivement.

4.7.4 Clignotement des informations

4.7.4.1 Exigence

(MSC191/5.5.4) *Le clignotement des informations doit être réservé à l'indication de l'état des alertes non acquittées.*

4.7.4.2 Méthodes d'essai et résultats exigés

Confirmer, par observation, que le clignotement des informations n'est utilisé que pour des alertes non acquittées.

4.8 Indication d'intégrité

4.8.1 Indication du statut de la source, de la validité et de l'intégrité

4.8.1.1 Exigence

(MSC191/5.6.1) *La source, la validité et, dans la mesure du possible, l'intégrité des informations doivent être indiquées. Les informations non valides ou de faible intégrité doivent être clairement indiquées de manière qualitative et/ou quantitative (voir "indication importante"). Les informations non valides ou de faible intégrité peuvent être indiquées de manière quantitative en affichant des valeurs absolues ou des pourcentages.*

4.8.1.2 Méthodes d'essai et résultats exigés

Les méthodes d'essai et les résultats exigés sont les suivants:

- a) confirmer, par observation, que la source des informations peut être indiquée;
- b) confirmer, par observation, que la validité des informations est indiquée;
- c) confirmer, par observation, que l'intégrité des informations est indiquée, le cas échéant. Si l'intégrité est indiquée de manière quantitative, confirmer par observation que des valeurs absolues ou des pourcentages sont affichés.

4.8.2 Codage couleur de la validité et de l'intégrité

4.8.2.1 Exigence

(MSC191/5.6.2) *Si le codage couleur est utilisé, les informations ayant une intégrité faible ou douteuse doivent alors être indiquées de manière qualitative en utilisant la couleur définie dans le Tableau 2, et les informations non valides doivent être indiquées de manière qualitative en utilisant la couleur définie dans le Tableau 2.*

4.8.2.2 Méthodes d'essai et résultats exigés

Si le codage couleur est utilisé, les méthodes d'essai et les résultats exigés sont les suivants:

- confirmer, par observation, que la couleur définie dans le Tableau 2 est utilisée pour indiquer les informations d'intégrité faible ou douteuse;
- confirmer, par observation, que la couleur définie dans le Tableau 2 est utilisée pour indiquer les informations non valides.

4.8.3 Indication de défaillance de la présentation

4.8.3.1 Exigence

(MSC191/5.6.3) Dans la plupart des cas, les informations sur l'affichage ne changent pas suffisamment souvent pour rendre la défaillance de la présentation immédiatement évidente pour l'utilisateur. *Pour montrer que l'écran est en cours d'actualisation, un moyen ou une méthode doit être fourni(e) pour signaler immédiatement à l'utilisateur une défaillance de la présentation sur un affichage opérationnel ("gel d'image", par exemple).*

Un élément remarquable variant périodiquement au fil du temps doit être signalé par une indication bien visible de l'actualisation normale de l'écran (deux points alternés, par exemple).

4.8.3.2 Méthodes d'essai et résultats exigés

Confirmer, par observation, qu'une indication remarquable variant périodiquement au fil du temps est fournie dans tous les modes de présentation.

4.9 Alertes et indications

4.9.1 Statut opérationnel

4.9.1.1 Exigence

(MSC191/5.7.1) *Le statut opérationnel des informations (indications) doit être indiqué selon le Tableau 2 sauf spécification contraire par l'OMI (par exemple, Tableaux 7.1.1 et 7.1.2 du Recueil de règles relatives aux alertes et indicateurs, 2009).*

Pour les alertes, le matériel doit être conforme à l'IEC 62923-1.

Tableau 2 – Statut opérationnel des indications

Statut	Indication visuelle	Signal sonore
Informations non valides	Rouge	Silence
Informations de faible intégrité	Jaune	Silence
Indications importantes	Jaune	Silence
Indication	Aucune exigence spéciale	Silence
Etat normal	Eventuellement le vert	Silence

4.9.1.2 Méthode d'essai et résultats exigés

Confirmer, par examen de preuve documentée, que les indications sont présentées conformément au Tableau 2, sauf spécification contraire de l'OMI, et que le matériel est conforme à l'IEC 62923-1.

4.9.2 Liste des alertes

Voir l'IEC 62923-1 pour les exigences et les essais concernant la liste des alertes actives.

NOTE La résolution MSC.302 et l'IEC 62923-1 qui en découle ont remplacé l'exigence: (MSC191/5.7.2).

4.9.3 Informations relatives aux alertes provenant de plusieurs sources

Voir l'IEC 62923-1 pour les exigences et les essais.

NOTE La résolution MSC.302 et l'IEC 62923-1 qui en découle ont remplacé l'exigence: (MSC191/5.7.3).

4.9.4 Données vocales en sortie pour les alarmes et les mises en garde

Voir l'IEC 62923-1 pour les exigences et les essais.

4.10 Mode de présentation

4.10.1 Exigence

(MSC191/5.8) *Si les affichages sont capables de présenter des informations dans différents modes, une indication claire des modes utilisés doit être fournie, par exemple:*

- l'*orientation* (nord en haut, route en haut, cap en haut);
- la *stabilisation* (sur le fond ou sur la mer),
- le *mouvement* (vrai, relatif); et
- la *projection cartographique* (Mercator, gnomonique, etc.).

L'indication de projection cartographique est uniquement exigée lorsque des informations relatives aux cartes électroniques sont présentées. Elle peut être fournie à l'utilisateur sur demande.

4.10.2 Méthodes d'essai et résultats exigés

Confirmer, par observation, que les modes de présentation utilisés sont clairement indiqués.

4.11 Manuels de l'utilisateur, instructions et guides de référence

4.11.1 Exigence

(MSC191/5.9) *Le manuel de l'utilisateur et les instructions et guides de référence doivent être au moins disponibles en anglais. Le manuel de l'utilisateur ou le guide de référence doit inclure une liste de tous les termes, abréviations, symboles, icônes et leurs explications présentés par le matériel.* (Voir aussi l'Annexe A, l'Annexe B et l'Annexe E.)

4.11.2 Méthodes d'essai et résultats exigés

Les méthodes d'essai et les résultats exigés sont les suivants:

- a) confirmer, par observation, que le manuel de l'utilisateur, les instructions et le guide de référence sont disponibles en anglais;
- b) confirmer, par examen de la preuve documentée, que le manuel de l'utilisateur et/ou le guide de référence inclu(en)t une liste de tous les termes, abréviations, symboles, icônes et leurs explications utilisés par le système.

5 Présentation des informations opérationnelles

5.1 Application

Les dispositions de l'Article 5 sont applicables aux affichages sur la passerelle d'un navire qui fournissent la fonctionnalité décrite dans les paragraphes 5.2 à 5.20.

5.2 Présentation des informations sur le navire porteur

5.2.1 Représentation graphique du navire porteur – Exigences

(MSC191/6.1.1) *Si une représentation graphique du navire porteur est fournie, l'utilisateur doit pouvoir sélectionner une silhouette à échelle réelle du navire ou un symbole simplifié tel que défini à l'Annexe A. La taille (longueur) de la silhouette à échelle réelle du navire ou du symbole simplifié dans la présentation graphique doit être soit la taille à échelle réelle du navire, soit 6 mm, à la distance d'observation nominale de 1 m, la valeur la plus élevée étant retenue.*

Il convient que le fabricant ajuste les tailles de symbole pour rendre correctement compte de la distance d'observation nominale du matériel d'affichage.

Le matériel d'affichage peut (sauf si cela est stipulé comme étant obligatoire dans une norme de matériel) donner la possibilité de passer automatiquement de la silhouette à échelle réelle du navire au symbole simplifié, lorsque la largeur de la silhouette à échelle réelle du navire porteur est inférieure à 3 mm à la distance d'observation nominale, et inversement. La silhouette à échelle réelle ne doit pas être utilisée lorsque le cap est inconnu en mode stabilisé sur gyro/THD. L'utilisateur doit toujours avoir la possibilité de sélectionner le symbole simplifié en lieu et place de la silhouette à échelle réelle du navire.

(MSC191/6.1.2) *Une ligne de foi et, le cas échéant, un vecteur vitesse, doivent être associés au symbole de navire porteur et doit avoir pour origine la position du point de référence commun constant (CCRP) définie à l'Annexe A.*

La combinaison de la ligne de foi et de la ligne de travers (le symbole minimisé) peut être utilisée comme alternative au symbole simplifié et peut être sélectionnable à ce titre. Le matériel d'affichage peut permettre de passer automatiquement de la silhouette à échelle réelle du navire à la ligne de foi et à la ligne de travers lorsque la largeur de la silhouette à échelle réelle du navire porteur est inférieure à 3 mm à la distance d'observation nominale, et inversement.

5.2.2 Méthodes d'essai et résultats exigés

Si le matériel d'affichage fournit une représentation graphique du navire porteur:

- confirmer, par observation, que le système fournit une silhouette à échelle réelle du navire et un symbole simplifié conformément à l'Annexe A;
- confirmer, par observation, que le matériel d'affichage donne à l'utilisateur la possibilité de sélectionner la représentation du navire porteur sous forme de silhouette à échelle réelle du navire ou de symbole simplifié;
- confirmer, par mesure, que la taille de la silhouette du navire est correcte pour l'échelle de l'affichage;
- confirmer, par observation, que le symbole simplifié est automatiquement sélectionné lorsque la largeur de la silhouette à échelle réelle du navire est inférieure à 3 mm, et inversement;
- confirmer, par observation, que le matériel d'affichage fournit une ligne de foi conforme à l'Annexe A;
- confirmer, par observation, que le matériel d'affichage fournit un vecteur vitesse conforme à l'Annexe A.

Noter que le symbole minimisé peut être utilisé comme alternative au symbole simplifié.

5.3 Présentation des informations cartographiques

5.3.1 Altération des informations cartographiques

5.3.1.1 Exigence

Les informations relatives aux cartes électroniques ne doivent pas pouvoir être modifiées, sauf dans le cadre d'une mise à jour.

5.3.1.2 Méthodes d'essai et résultats exigés

Confirmer, par observation, que les informations relatives aux cartes électroniques ne peuvent pas être modifiées.

5.3.2 Couleurs et symboles pour informations cartographiques

5.3.2.1 Exigence

(MSC191/6.2.1) *La présentation d'informations cartographiques électroniques officielles qui sont diffusées par, ou sous l'autorité d'un bureau hydrographique gouvernemental compétent, ou une autre agence (l'ENC, par exemple), doit être conforme aux normes pertinentes de l'OHI, par exemple, les couleurs et symboles spécifiés pour la Bibliothèque de présentation de l'OHI pour les ECDIS dans l'IHO S-52 et ses Appendices, ou un jeu équivalent de couleurs et de symboles, dans la mesure du possible.*

(MSC191/6.2.2) *La présentation d'informations confidentielles relatives aux cartes électroniques doit être conforme aux normes pertinentes de l'OHI, dans toute la mesure du possible. Elle peut par exemple reposer sur les couleurs et symboles spécifiés pour la Bibliothèque de présentation de l'OHI pour les ECDIS dans l'OHI S-52 et ses Appendices, ou sur un jeu équivalent de couleurs et de symboles. Une présentation non conforme aux normes OHI doit être clairement indiquée.*

(MSC191/6.2.3) *La présentation d'informations relatives aux cartes électroniques ajoutées par l'utilisateur doit être conforme aux normes pertinentes de l'OHI, dans la mesure du possible. Elle peut, par exemple, reposer sur les couleurs et symboles spécifiés pour la Bibliothèque de présentation de l'OHI pour les ECDIS dans l'OHI S-52 et ses Appendices, ou sur un jeu équivalent de couleurs et de symboles.*

NOTE Il est possible que certaines couleurs et certains symboles fournis par la Bibliothèque de présentation de l'OHI pour les ECDIS ou autrement spécifiés par l'OHI dans la S-52 et ses Appendices ne soient pas adaptés à l'affichage d'informations relatives aux cartes électroniques sur un radar ou dans une présentation composite basée sur un radar. La norme OHI S-52 et ses Appendices autorisent des écarts mineurs par rapport à la symbologie. Elle fournit un cadre et des lignes directrices pour la symbolisation cartographique à partir de laquelle les fabricants peuvent définir un jeu de symboles personnalisé.

(MSC191/6.2.4) *Si les informations relatives aux cartes électroniques déduites d'échelles différentes apparaissent dans la présentation, la frontière entre échelles doit être clairement indiquée conformément aux normes pertinentes de l'OHI, par exemple la Bibliothèque de présentation de l'OHI pour les ECDIS dans l'OHI S-52 et ses Appendices.*

5.3.2.2 Méthodes d'essai et résultats exigés

Les méthodes d'essai et les résultats exigés sont les suivants:

- a) confirmer, par observation, que la présentation des informations relatives aux cartes électroniques officielles et ajoutées par l'utilisateur, selon le cas, est conforme aux 5.3.2.1 et 4.5.1;
- b) confirmer, par observation, que la présentation des informations cartographiques électroniques propriétaires, le cas échéant, est conforme aux 5.3.2.1 et 4.5.1 ou qu'une indication est donnée;

- c) si des informations relatives aux cartes électroniques déduites d'échelles différentes (cellules ENC adjacentes, par exemple) sont affichées, confirmer par observation qu'une frontière entre échelles est présentée entre les échelles.

5.4 Présentation des informations radar

5.4.1 Images vidéo radar

5.4.1.1 Exigence

(MSC191/6.3.1) *Les images vidéo radar doivent être affichées en utilisant une couleur de base qui assure un contraste optimal. Les échos radar doivent être clairement visibles lorsqu'ils sont présentés au-dessus d'un arrière-plan de carte. L'intensité relative des échos radar peut être différenciée par des tonalités de la même couleur de base. Les couleurs peuvent être différentes pour le fonctionnement dans différentes conditions d'éclairage ambiant (jour, crépuscule et nuit) susceptibles d'être rencontrées sur la passerelle d'un navire, et compte tenu de la vision nocturne de l'officier de quart.*

D'autres informations radar traitées qui ne font pas partie de l'image vidéo radar peuvent être différenciées de la vidéo radar par des tonalités de la couleur de base utilisée pour présenter l'image. Elles peuvent également être différenciées par des tonalités d'autres couleurs de base.

Pour les affichages radar, un arrière-plan sombre non réfléchissant doit être utilisé. La couleur utilisée pour l'image radar doit contraster par rapport à l'arrière-plan et doit être clairement visible lorsqu'elle est présentée sur un arrière-plan de carte.

NOTE 1 Il est possible que la table "Jour" basée sur un arrière-plan blanc incluse dans les tables de couleurs spécifiées par l'OHI et fournies dans la Bibliothèque de présentation de l'OHI pour les ECDIS ne prenne pas en charge la lisibilité dans les conditions diurnes, et constitue un risque pour la sécurité de navigation de certains systèmes et matériels de navigation, y compris les radars. La lisibilité dans les conditions diurnes peut être assurée en utilisant l'arrière-plan noir des tables de couleurs "Crépuscule" ou "Nuit" fournies dans la Bibliothèque de présentation de l'OHI pour les ECDIS, et en ajustant la luminosité et le contraste, s'ils sont donnés.

Si la couleur rouge est utilisée pour l'image vidéo radar, elle doit se distinguer des autres utilisations de la couleur rouge (les alarmes incluant des cibles dangereuses, par exemple).

Si des informations relatives aux cartes électroniques recouvrent des informations radar (c'est-à-dire une image vidéo radar) ou si une image radar recouvre des informations cartographiques, le recouvrement peut s'afficher transparent ou opaque. Si un recouvrement transparent est utilisé, il peut être variable de sorte que les informations sous-jacentes sont visibles à travers le recouvrement. Si un recouvrement opaque de cartes est utilisé, le remplissage couleur d'objets étendus doit être exclu. Eventuellement, le remplissage couleur d'objets ponctuels peut également être exclu. Dans un cas comme dans l'autre, la couleur de base de l'arrière-plan de l'image radar doit être la même que celle des plans d'eau de la carte.

NOTE 2 Si le matériel d'affichage fournit des fonctions de recouvrement d'informations radar indépendantes d'un radar embarqué à bord du navire (par un convertisseur de balayage radar distinct, par exemple), ces fonctions sont alors décrites dans les articles correspondants de l'IEC 62388.

5.4.1.2 Méthodes d'essai et résultats exigés

Les méthodes d'essai et les résultats exigés sont les suivants:

- a) confirmer, par observation, dans chacune des conditions d'éclairage ambiant décrites dans le Tableau 1 que les informations radar sont présentées avec une couleur contrastant par rapport à l'arrière-plan, et que l'arrière-plan doit être sombre pour les affichages radar;
- b) confirmer, par observation, que les informations radar sont clairement visibles si elles sont présentées au-dessus d'un arrière-plan de carte pour les conditions d'éclairage ambiant décrites dans le Tableau 1;
- c) si la couleur rouge est utilisée pour l'image vidéo radar, confirmer, par observation, qu'elle se distingue des autres utilisations de la couleur rouge (les alarmes incluant des cibles dangereuses, par exemple).

5.4.2 Sillages de cibles

5.4.2.1 Exigence

(MSC191/6.3.2) Si le matériel d'affichage fournit des *sillages de cibles*, ceux-ci doivent se *distinguer des échos radar et être clairement visibles dans toutes les conditions d'éclairage ambiant* (jour, crépuscule et nuit) susceptibles d'être rencontrées sur la passerelle d'un navire, et compte tenu de la vision nocturne de l'officier de quart. Les sillages de cibles peuvent être différenciés par les tonalités de la couleur de base utilisée pour l'image vidéo radar. Elles peuvent également se distinguer par les tonalités d'une autre couleur de base.

Si le matériel d'affichage fournit des sillages de cibles, une indication de temps de sillage et de *mode* de stabilisation du mouvement doit être fournie.

5.4.2.2 Méthodes d'essai et résultats exigés

Si des sillages de cibles sont fournis:

- a) confirmer, par observation, qu'elles se distinguent des échos radar et qu'elles sont clairement visibles dans les conditions d'éclairage ambiant décrites dans le Tableau 1;
- b) confirmer, par observation, que le temps de sillage et le mode de stabilisation du mouvement sont indiqués.

5.5 Présentation des informations relatives à la cible

5.5.1 Fourniture d'informations relatives à la cible

5.5.1.1 Exigence

(MSC191/6.4.1.1) *Les informations relatives à la cible peuvent être fournies par un système de poursuite de cibles radar et/ou par l'AIS.*

Un système de poursuite de cibles radar détecte et poursuit des cibles radar. D'autres systèmes de navigation peuvent fournir une présentation à distance des cibles poursuivies par radar. Ces systèmes doivent présenter les cibles radar signalées conformément à l'Annexe A.

NOTE Si le matériel d'affichage fournit des fonctions de détection et de poursuite de cibles radar qui sont indépendantes d'un système radar embarqué à bord d'un navire, ces fonctions sont alors décrites dans les paragraphes correspondants de l'IEC 62388.

Tout système ou matériel de navigation peut fournir une présentation à distance des cibles AIS signalées. Ces systèmes doivent présenter les cibles AIS signalées conformément à l'Annexe A.

Un système ou matériel de navigation peut recevoir des informations de cibles AIS via une interface d'un radar, et recevoir des informations de cibles AIS provenant d'un AIS. Les informations relatives aux cibles AIS provenant de ces sources doivent être combinées en utilisant le MMSI de chaque cible AIS pour éviter toute duplication de cibles AIS.

NOTE Un radar peut signaler des cibles AIS en utilisant les sentences TTD et TLB. La valeur MMSI incluse dans la sentence TLB sert de base au processus combinatoire du radar et de l'AIS en tant que sources de cibles AIS.

Une cible AIS peut être répétée (voir 5.5.4.1). Dans ce cas, la présentation doit être comme dans le cas d'une cible AIS signalée conformément à l'Annexe A.

5.5.1.2 Méthodes d'essai et résultats exigés

Les méthodes d'essai et les résultats exigés sont les suivants:

- a) si le matériel d'affichage donne la possibilité de se connecter à un système de poursuite de cibles radar, confirmer par observation que la présentation est conforme à l'Annexe A;

- b) si le matériel d'affichage donne la possibilité de se connecter à un AIS, confirmer par observation que la présentation est conforme à l'Annexe A;
- a) si le matériel d'affichage donne la possibilité de recevoir des cibles AIS via une interface d'un radar et d'une cible AIS, utiliser un agencement de simulation radar et un simulateur AIS pour fournir des informations relatives à la cible AIS provenant des deux sources et confirmer, par observation, que les informations relatives à la cible AIS ont été combinées à partir des deux sources pour éviter toute duplication des cibles AIS.

5.5.2 Interface utilisateur cohérente pour les informations relatives à la cible

5.5.2.1 Exigence

(MSC191/6.4.1.3) *Dans la mesure du possible, l'interface utilisateur et le format des données pour exploiter et présenter les informations relatives aux cibles poursuivies par radar et les informations relatives aux cibles AIS signalées doivent être cohérentes.*

5.5.2.2 Méthodes d'essai et résultats exigés

Confirmer, par observation, que la présentation des informations relatives aux cibles poursuivies par radar et des informations relatives aux cibles AIS signalées est cohérente.

5.5.3 Indication de dépassement de capacité de cibles

5.5.3.1 Exigence

(MSC191/6.4.2.1) *Une indication doit être donnée lorsque la capacité de suivi des cibles et/ou de traitement/d'affichage des cibles signalées est sur le point d'être dépassée, sauf spécification contraire dans les normes de matériels individuels (par exemple à titre de précaution).*

(MSC191/6.4.2.2) *Une indication doit être donnée lorsque la capacité de suivi des cibles et/ou de traitement/d'affichage des cibles signalées a été dépassée, sauf spécification contraire dans les normes de matériels individuels (par exemple sous forme de mise en garde).*

La poursuite de cibles désigne la capacité d'un système de poursuite de cibles à suivre des cibles. Les cibles signalées désignent des cibles signalées par l'AIS. Le fabricant doit déclarer la capacité de traitement et d'affichage du matériel de façon distincte pour les cibles poursuivies et signalées (soit 4 valeurs de capacité).

NOTE Une définition des capacités en cibles minimales est donnée dans l'IEC 62388.

La capacité de traitement correspond au nombre de cibles que le matériel peut traiter simultanément. La capacité d'affichage correspond au nombre de cibles qu'il peut afficher en même temps. La capacité de traitement peut être supérieure à la capacité d'affichage. Si la capacité de traitement déclarée par le fabricant est supérieure à la capacité d'affichage déclarée par ce même fabricant, des indications séparées doivent être fournies, ou des alertes si les normes de matériels individuels les spécifient, en cas de dépassement des capacités d'affichage et de traitement.

NOTE Le matériel peut fournir la fonctionnalité de sélection ou de filtrage des cibles affichées. Ceci peut conduire une situation où la capacité de traitement est sur le point d'être dépassée ou a été dépassée alors que la capacité d'affichage ne l'est pas.

Le manuel de l'utilisateur doit décrire les conséquences opérationnelles du traitement et de l'affichage des cibles actuelles et nouvelles dans l'éventualité où la capacité de traitement ou d'affichage serait atteinte et que des cibles supplémentaires apparaîtraient.

5.5.3.2 Méthodes d'essai et résultats exigés

Confirmer par examen de la documentation du fabricant que les capacités de traitement et d'affichage du matériel sont déclarées de façon distincte pour les cibles poursuivies et signalées (soit 4 valeurs de capacité).

Il existe deux méthodes d'essai en fonction de la capacité du matériel.

- a) Si le matériel d'affichage donne la possibilité de se connecter à un système de poursuite de cibles radar:
 - 1) confirmer, par observation, qu'il donne une indication, ou une alerte (par exemple une précaution) si une norme de matériel individuelle le spécifie, d'un dépassement imminent de la capacité d'affichage des cibles poursuivies par radar (lorsque le nombre de cibles poursuivies par radar présentées dépasse 95 % de la capacité d'affichage, par exemple);
 - 2) confirmer, par observation, qu'il donne une indication, ou une alerte (par exemple une mise en garde) si une norme de matériel individuelle le spécifie, du dépassement de la capacité d'affichage des cibles poursuivies par radar lorsque le nombre de cibles poursuivies par radar présentées dépasse 100 % de la capacité d'affichage;
 - 3) si la capacité de traitement est supérieure à la capacité d'affichage, confirmer, par observation, qu'il donne une indication, ou une alerte (par exemple une précaution) si une norme de matériel individuelle le spécifie, d'un dépassement imminent de la capacité de traitement des cibles poursuivies par radar (lorsque le nombre de cibles poursuivies par radar traitées dépasse 95 % de la capacité de traitement, par exemple);
 - 4) si la capacité de traitement est supérieure à la capacité d'affichage, confirmer, par observation, qu'il donne une indication, ou une alerte (par exemple une mise en garde) si une norme de matériel individuelle le spécifie, d'un dépassement de la capacité de traitement des cibles poursuivies par radar lorsque le nombre de cibles poursuivies par radar traitées dépasse 100 % de la capacité de traitement.
- b) Si le matériel d'affichage donne la possibilité de se connecter à un AIS:
 - 1) confirmer, par observation, qu'il donne une indication, ou une alerte (par exemple une précaution) si une norme de matériel individuelle le spécifie, d'un dépassement imminent de la capacité d'affichage des cibles AIS signalées (lorsque le nombre de cibles AIS signalées présentées dépasse 95 % de la capacité d'affichage, par exemple);
 - 2) confirmer, par observation, qu'il donne une indication, ou une alerte (par exemple une mise en garde) si une norme de matériel individuelle le spécifie, du dépassement de la capacité d'affichage des cibles AIS signalées lorsque le nombre de cibles AIS signalées présentées dépasse 100 % de la capacité d'affichage ;
 - 3) si la capacité de traitement est supérieure à la capacité d'affichage, confirmer, par observation, qu'il donne une indication, ou une alerte (par exemple une précaution) si une norme de matériel individuelle le spécifie, d'un dépassement imminent de la capacité de traitement des cibles AIS signalées (lorsque le nombre de cibles AIS signalées traitées dépasse 95 % de la capacité de traitement, par exemple);
 - 4) si la capacité de traitement est supérieure à la capacité d'affichage, confirmer, par observation, qu'il donne une indication, ou une alerte (par exemple une mise en garde) si une norme de matériel individuelle le spécifie, d'un dépassement de la capacité de traitement des cibles AIS signalées lorsque le nombre de cibles AIS signalées traitées dépasse 100 % de la capacité de traitement.

Confirmer, par examen du manuel de l'utilisateur, qu'il contient une description des conséquences opérationnelles du traitement et de l'affichage des cibles actuelles et nouvelles dans l'éventualité où la capacité de traitement ou d'affichage serait atteinte et que des cibles supplémentaires apparaîtraient.

5.5.4 Présentation de comptes rendus répétés

5.5.4.1 Exigence

Les stations de base AIS et les stations de répéteur AIS peuvent répéter des comptes rendus sur les informations et les cibles AIS avec une fréquence de mise à jour plus faible que lorsqu'ils sont transmis à partir du navire émetteur et avec une latence significative et variable.

Si les comptes rendus AIS répétés et directs sont reçus pour la même cible, les rapports répétés ne doivent pas être traités en vue d'un affichage de la cible AIS ou des informations associées.

Si plusieurs comptes rendus AIS répétés sont reçus pour la même cible, le compte rendu au nombre de répétitions le plus faible doit être traité pour afficher la cible AIS ou les informations associées.

5.5.4.2 Méthodes d'essai et résultats exigés

Les méthodes d'essai et les résultats exigés sont les suivants:

- confirmer que les données répétées ne sont pas affichées, en procédant à une évaluation analytique et en utilisant le simulateur AIS pour générer des comptes rendus AIS concernant une cible AIS proche se déplaçant à 24 kn et des rapports AIS répétés pour cette cible avec une fréquence de mise à jour retardée et réduite (retardée de 30 s avec une fréquence de mise à jour de 10 s, par exemple);
- confirmer que seules les données provenant du nombre de répétitions le plus faible sont affichées, en procédant à une évaluation analytique et en utilisant le simulateur AIS pour produire au moins deux comptes rendus AIS répétés pour une cible avec une fréquence de mise à jour retardée et réduite (retardée de 30 s avec une fréquence de mise à jour de 10 s, par exemple).

5.5.5 Filtrage de cibles AIS en veille

5.5.5.1 Exigence

(MSC191/6.4.3.1) *Il doit être possible de filtrer la présentation des cibles AIS en veille (par exemple: par distance de cible, CPA/TCPA ou classe A/B de cibles AIS, proximité d'une route surveillée ou autre lien avec une route surveillée, etc.).*

Les critères de filtrage doivent uniquement inclure la classe de veille A ou B en cas de combinaison avec un ou plusieurs autres facteurs (CPA/TCPA, vitesse, distance ou route, par exemple).

(MSC191/6.4.3.2) *Si un filtre est appliqué, une indication claire et ou persistante doit alors être donnée, selon ce qui est approprié pour l'application. Les critères de filtrage utilisés doivent être facilement disponibles pour l'utilisateur.*

(MSC191/6.4.3.3) *Il ne doit pas être possible de retirer des cibles AIS individuelles de la présentation.*

5.5.5.2 Méthodes d'essai et résultats exigés

Les méthodes d'essai et les résultats exigés sont les suivants:

- a) confirmer, par observation, que l'utilisateur peut filtrer la présentation des cibles AIS en veille et que les critères de filtrage l'incluent que la classe de veille A ou B combinée avec un ou plusieurs autres facteurs;
- b) confirmer, par observation, qu'une indication est fournie lorsque des cibles en veille sont filtrées de la présentation;
- c) confirmer, par observation, que l'indication persiste lorsque le filtre est actif;

- d) confirmer, par évaluation analytique, que les critères de filtrage utilisés sont facilement disponibles;
- e) confirmer, par observation, que l'utilisateur ne peut pas retirer de cibles AIS individuelles de la présentation.

5.5.6 Activation de cibles AIS

5.5.6.1 Exigence

(MSC191/6.4.4.1) *Si des zones d'activation automatique de cibles AIS sont fournies, elles doivent être les mêmes que dans le cas de l'acquisition automatique de cibles radar, le cas échéant. Toute zone définie par l'utilisateur (zones d'acquisition/activation, par exemple) en utilisation doit être présentée sous forme graphique avec les symboles correspondants indiqués à l'Annexe A.*

(MSC191/6.4.4.2) *En outre, les cibles AIS en veille doivent être activées automatiquement lorsqu'elles satisfont aux paramètres définis par l'utilisateur (par exemple: distance de cible, zones d'activation, CPA/TCPA ou classe A/B de cibles AIS).*

L'activation automatique est indépendante du filtrage des cibles AIS. Si des moyens sont fournis pour l'activation automatique des cibles AIS, des moyens de désactivation de cette fonction doivent alors être prévus et le statut désactivé doit être indiqué.

NOTE Si le matériel d'affichage fournit des fonctions pour le calcul de CPA/TCPA qui sont indépendants d'un système de poursuite de cibles radar de bord, ces fonctions sont alors décrites dans les paragraphes correspondants de l'IEC 62388.

5.5.6.2 Méthodes d'essai et résultats exigés

Si le matériel d'affichage fournit des zones d'activation automatique de cibles AIS:

- a) confirmer, par observation, que les zones sont les mêmes que dans le cas de l'acquisition automatique de cibles radar, le cas échéant;
- b) confirmer, par observation, que les zones sont présentées conformément à l'Annexe A;
- c) confirmer, par observation, qu'il est possible de désactiver l'activation automatique et que le statut désactivé est indiqué;
- d) confirmer, par observation, que les cibles AIS en veille filtrées et affichées entrant dans une zone sont activées automatiquement lorsqu'elles satisfont à des critères définis par l'utilisateur.

5.5.7 Présentation graphique des cibles

5.5.7.1 Exigence

(MSC191/6.4.5.1) *Les cibles doivent être présentées avec leurs symboles respectifs définis à l'Annexe A.*

(MSC191/6.4.5.2) *Les cibles AIS signalées doivent être présentées graphiquement aux positions prévues, comme étant soit en veille, soit activées. Si aucun symbole séparé n'est défini pour les états actif et en veille, la cible AIS signalée doit être présentée graphiquement avec le type de symbole unique disponible dans l'Annexe A.*

EXEMPLE Le navire AIS-SAR (symbole 2.16) conserve toutes les exigences pour la cible AIS en veille et la cible AIS activée à l'exception de la représentation graphique du symbole.

(MSC191/6.4.5.3) *La route et la vitesse d'une cible poursuivie par radar ou d'une cible AIS signalée activée doivent être indiquées par un vecteur qui montre clairement le mouvement prévu. Le temps des vecteurs (c'est-à-dire la longueur) doit être cohérent pour la présentation d'une cible, quelle que soit sa source.*

(MSC191/6.4.5.4) *La présentation des symboles vectoriels doit être cohérente, quelle que soit la source d'informations. Le mode de présentation doit être indiqué de manière claire et permanente ou persistante, selon ce qui est approprié pour l'application, y compris par exemple,*

- le mouvement *vrai/relatif*,
- le temps des vecteurs, et
- la stabilisation.

(MSC191/6.4.5.5) *L'orientation du symbole de cible AIS doit indiquer son cap (HDG). Si les informations relatives au cap ne sont pas reçues, l'orientation du symbole AIS doit être alignée sur la route fond (COG) signalée. Si le cap ou la route fond (COG) n'est pas disponible, l'orientation du symbole AIS doit être alignée vers le haut de la zone d'affichage opérationnel. S'il est disponible, l'indicateur de virage ou de taux de giration (ROT) et/ou la prédiction de route doivent indiquer la manœuvre d'une cible AIS activée.*

(MSC191/6.4.5.6) *Le CCRP d'un navire porteur doit être utilisé pour l'alignement des symboles des cibles poursuivies par radar et des symboles des cibles AIS signalées avec d'autres informations sur le même affichage.*

(MSC191/6.4.5.7) *Sur des affichages à grande échelle et courte distance, un moyen ou une méthode de présentation d'une silhouette à échelle réelle d'une cible AIS activée doit être fourni conformément à l'Annexe A.*

(MSC191/6.4.5.8) *Les positions antérieures des cibles AIS activées doivent pouvoir être affichées.*

Le manuel de l'utilisateur doit décrire la durée ou le nombre de positions antérieures disponibles pour chaque cible.

5.5.7.2 Méthodes d'essai et résultats exigés

Les méthodes d'essai et les résultats exigés sont les suivants:

- a) confirmer, par observation, que les cibles sont présentées avec leurs symboles correspondants conformément à l'Annexe A;
- b) confirmer, par observation, que les cibles AIS signalées sont présentées graphiquement comme des cibles en veille ou activées conformément à l'Annexe A;
- c) confirmer, par observation, que le mouvement prévu des cibles poursuivies par radar et des cibles AIS signalées activées est clairement indiqué par un vecteur;
- d) confirmer, par observation, que le temps des vecteurs (c'est-à-dire la longueur) est cohérent pour toutes les cibles;
- e) confirmer, par observation, que la présentation des symboles vectoriels est cohérente, quelle que soit la source d'informations;
- f) vérifier que le mode de présentation est clairement indiqué conformément au 4.10.1;
- g) confirmer, par observation, que le temps des vecteurs est clairement indiqué;
- h) confirmer, par observation, que l'orientation du symbole de cible AIS indique clairement son cap. Changer les informations de cap en "non disponibles" pour une cible AIS signalée et confirmer, par observation, que l'orientation du symbole AIS est alignée sur la COG signalée. Changer également les informations de COG en "non disponibles" pour la même cible AIS signalée et confirmer, par observation, que l'orientation de la cible AIS signalée est alignée vers le haut de la zone d'affichage opérationnel;
- i) confirmer, par observation, que le fanion de virage ou de taux de giration (ROT) et/ou la prédiction de route, si elle est disponible, indique la manœuvre d'une cible AIS activée changeant de route;

- j) confirmer, par évaluation analytique, que le CCRP de navire porteur est utilisé pour aligner les symboles des cibles poursuivies par radar et les symboles des cibles AIS signalées avec d'autres informations sur le même affichage;
- k) confirmer, par observation, que sur des affichages à grande échelle et courte distance, un moyen ou une méthode de présentation de la silhouette à échelle réelle d'une cible AIS activée est fourni;
- l) confirmer, par observation, qu'il est possible d'afficher les positions antérieures des cibles AIS activées en termes de longueur en temps et en nombre, tel que décrit dans le manuel de l'utilisateur.

5.5.8 Sélection de cible

5.5.8.1 Exigence

(MSC191/6.4.6.1) Une cible sélectionnée en vue de l'affichage de ses informations alphanumériques doit être identifiée par le symbole correspondant spécifié dans l'Annexe A. *Si plusieurs cibles sont sélectionnées pour l'affichage de données, les symboles et les données de cible correspondantes doivent être clairement identifiés.*

5.5.8.2 Méthodes d'essai et résultats exigés

Les méthodes d'essai et les résultats exigés sont les suivants:

- a) confirmer, par observation, qu'une cible sélectionnée est identifiée conformément à l'Annexe A;
- b) confirmer, par observation, que si plusieurs cibles sont sélectionnées, les symboles et les informations de cible correspondantes sont clairement identifiés conformément à l'Annexe A.

5.5.9 Indication de dérivation de cible

5.5.9.1 Exigence

(MSC191/6.4.6.2) *Une indication doit clairement montrer que les informations relatives à la cible sont dérivées du radar, de l'AIS ou d'une combinaison de ceux-ci.*

5.5.9.2 Méthodes d'essai et résultats exigés

Confirmer, par évaluation analytique, la présence d'une indication claire de la source d'informations relatives à la cible.

5.5.10 Présentation des informations relatives aux cibles poursuivies par radar

5.5.10.1 Exigence

(MSC191/6.4.6.3) *Pour chaque cible poursuivie par radar sélectionnée, les informations suivantes doivent être présentées sous forme alphanumérique:*

- *source(s) des informations relatives à la cible;*
- *distance mesurée de la cible;*
- *relèvement mesuré de la cible;*
- *distance de cible prévue au point de rapprochement maximal (CPA);*
- *temps prévu jusqu'au CPA (TCPA);*
- *CTW calculée de la cible (ou COG calculée, en cas de stabilisation sur le fond);*
- *STW calculée de la cible (ou SOG calculée, en cas de stabilisation sur le fond).*

Des informations supplémentaires relatives à la cible, si elles sont disponibles, doivent être données à l'utilisateur sur demande. Si des informations supplémentaires relatives à la cible

sont disponibles, une indication doit être donnée lors de l'affichage des informations alphanumériques de la cible sélectionnée.

Si plusieurs cibles sont sélectionnées, un sous-ensemble de données, d'informations et de texte alphanumériques peut être présenté.

Les informations relatives à la cible doivent être "appariées" logiquement pour la présentation (c'est-à-dire distance et relèvement, CPA et TCPA, route et vitesse).

NOTE Si le matériel d'affichage fournit des fonctions pour le calcul de CPA/TCPA qui sont indépendants d'un système de poursuite de cibles radar de bord, ces fonctions sont alors décrites dans les paragraphes correspondants de l'IEC 62388.

5.5.10.2 Méthodes d'essai et résultats exigés

Les méthodes d'essai et les résultats exigés sont les suivants:

- a) confirmer, par observation, que les informations ci-dessus sont présentées sous forme alphanumérique pour chaque cible sélectionnée;
- b) confirmer, par observation, que les informations supplémentaires, si elles sont disponibles, sont indiquées et données à l'utilisateur sur demande;
- c) confirmer, par évaluation analytique, que les informations relatives à la cible sont "appariées" logiquement pour la présentation.

5.5.11 Présentation des informations relatives aux cibles AIS signalées

5.5.11.1 Exigence

(MSC191/6.4.6.4) *Pour chaque cible AIS signalée sélectionnée, les informations suivantes doivent être présentées sous forme alphanumérique:*

- *source(s)* des informations relatives à la cible (répétées, par exemple);
- *identification* de la cible (au moins un élément parmi MMSI, indicatif d'appel, nom ou numéro OMI);
- *position* signalée et, lorsqu'elle est disponible, *sa qualité* (Précision de position sous la forme " ≤ 10 m" ou " > 10 m" et RAIM sous la forme "non utilisé" ou "utilisé");
- *distance* calculée de la cible;
- *relèvement* calculé de la cible;
- CPA calculé;
- TCPA calculé;
- COG signalée (ou CTW calculée si l'affichage est la stabilisation sur le fond). Dans l'affichage de la stabilisation sur la mer, la COG signalée doit au moins être disponible sur demande;
- SOG signalée (ou STW calculée si l'affichage est la stabilisation sur le fond). Dans l'affichage de la stabilisation sur la mer, la SOG signalée doit au moins être disponible sur demande;
- *statut de navigation* signalé ;
- Le *cap* signalé et le *taux de giration* (ROT) signalé doivent également être disponibles.

Des informations supplémentaires relatives à la cible doivent être données à l'utilisateur sur demande. Si des informations supplémentaires relatives à la cible sont disponibles, une indication doit être donnée lors de l'affichage des informations alphanumériques de la cible sélectionnée. Les informations supplémentaires relatives à la cible se composent des éléments suivants:

- MMSI, s'il n'a pas encore été présenté;

- signal d'appel, s'il n'a pas encore été présenté;
- nom, s'il n'a pas encore été présenté;
- numéro OMI, s'il n'a pas encore été présenté;
- dimensions;
- type de navire et de cargaison;
- destination;
- ETA;
- tirant statique;
- indicateur DTE;
- classe AIS;
- informations étendues relatives à la cible AIS signalée, si elles sont prises en charge (voir le Tableau 8 et en 5.18);
- si la réception des messages AIS liés à la sécurité est supportée, sur demande de l'utilisateur, lorsqu'ils sont disponibles, un lien vers ou le contenu complet des messages AIS reçus liés à la sécurité les plus récents et se rapportant au même MMSI (voir 5.19);
- éventuellement, si l'envoi de messages AIS liés à la sécurité est supporté, un lien vers ou le contenu complet de tous les messages AIS liés à la sécurité envoyés par le navire porteur à la cible (base = MMSI) (voir 5.20).

Des informations supplémentaires relatives à la cible peuvent également être présentées.

Si plusieurs cibles sont sélectionnées, un sous-ensemble de données, d'informations et de texte alphanumériques peut être présenté.

Les informations relatives à la cible doivent être "appariées" logiquement pour la présentation (c'est-à-dire distance et relèvement, CPA et TCPA, COG et SOG, cap et ROT).

(MSC191/6.4.6.5) *Si les informations reçues relatives à la cible AIS sont incomplètes, les informations absentes doivent alors être clairement indiquées en tant que tel dans le champ de données de la cible.*

5.5.11.2 Méthodes d'essai et résultats exigés

Les méthodes d'essai et les résultats exigés sont les suivants.

Sélectionner une cible AIS signalée et:

- a) confirmer, par observation, que les informations ci-dessus sont présentées sous forme alphanumérique;
- b) confirmer, par observation, que toutes les informations supplémentaires relatives à la cible, lorsqu'elles sont disponibles, sont données à l'utilisateur sur demande;
- c) confirmer, par évaluation analytique, que les informations relatives à la cible sont "appariées" logiquement pour la présentation;
- d) confirmer, par observation, que les informations absentes sont clairement indiquées en tant que telles dans le champ de données de la cible;
- e) confirmer, par observation, que la disponibilité d'informations supplémentaires, le cas échéant, est clairement indiquée.

5.5.12 Mise à jour continue des informations relatives à la cible

5.5.12.1 Exigence

(MSC191/6.4.6.6) *Les informations pour une cible sélectionnée doivent être affichées et mises à jour en continu, jusqu'à ce qu'une autre cible, un compte rendu de données AIS, un dispositif de localisation AIS ou une cible AIS synthétique soit sélectionné pour l'affichage d'informations ou, le cas échéant, jusqu'à ce que la zone de dialogue utilisateur soit fermée.*

NOTE Les informations peuvent être affichées dans une fenêtre séparée de dialogue avec l'utilisateur.

5.5.12.2 Méthodes d'essai et résultats exigés

Les méthodes d'essai et les résultats exigés sont les suivants:

- a) confirmer, par observation, que les informations affichées pour une cible sélectionnée sont mises à jour en continu;
- b) confirmer, par observation, que les informations affichées pour une cible sélectionnée restent affichées tant qu'une autre cible, un compte rendu de données AIS, un dispositif de localisation AIS ou une cible AIS synthétique n'est pas sélectionné ou que la zone de dialogue utilisateur n'est pas fermée.

5.5.13 Informations AIS du navire porteur

5.5.13.1 Exigence

(MSC191/6.4.6.7) *Un moyen ou une méthode doit être prévu pour présenter les données AIS du navire porteur sur demande.*

Les données AIS du navire porteur comportent:

- l'identification (MMSI, signal d'appel, nom, numéro OMI);
- le statut de navigation;
- les informations supplémentaires (dimensions, type de navire et de cargaison, destination, ETA, tirant statique);
- les informations étendues, si elles sont prises en charge (voir le Tableau 8).

5.5.13.2 Méthodes d'essai et résultats exigés

Confirmer, par observation, que les données AIS du navire porteur peuvent être présentées sur demande.

5.5.14 Obscurcissement de la zone d'affichage opérationnel

5.5.14.1 Exigence

(MSC191/6.4.6.8) *L'affichage des données alphanumériques, des informations et du texte ne doit pas obscurcir les informations opérationnelles présentées graphiquement.*

5.5.14.2 Méthodes d'essai et résultats exigés

Confirmer, par évaluation analytique, que l'affichage de données, d'informations et de textes alphanumériques n'obscurcit pas les informations opérationnelles présentées graphiquement.

5.6 Alertes opérationnelles

5.6.1 Statut des alertes

5.6.1.1 Exigence

(MSC191/6.4.7.1) *Une indication claire du statut des alertes et des critères d'alerte (c'est-à-dire l'identification) doit être donnée à l'utilisateur. (Voir aussi 4.9.1 et 4.9.3.)*

Le matériel doit être conforme à l'IEC 62923-1 pour s'assurer que le statut des alertes est clairement donné à l'utilisateur (voir 4.9.1.2).

Excepté pour les exigences de l'OMI relatives aux symboles de cible radar et AIS affichés dans la zone opérationnelle et à la mise en évidence ECDIS du danger, des mises en garde et des précautions dans la zone de carte, seule une indication visuelle d'alerte sous forme textuelle (une zone de dialogue utilisateur, par exemple) est obligatoire. Des icônes peuvent éventuellement accompagner le texte (voir l'IEC 62923-1 et l'Annexe F).

5.6.1.2 Méthodes d'essai et résultats exigés

Confirmer, par évaluation analytique, qu'une indication claire des critères d'alertes est fournie sous forme de texte à l'utilisateur.

Confirmer, par observation, que si des icônes sont fournies en plus, elles sont conformes à l'IEC 62923-1 et l'Annexe F (voir aussi 4.4.3.2).

5.6.2 Alarmes relatives à CPA/TCPA

5.6.2.1 Exigence

(MSC191/6.4.7.2) *Une alarme relative à CPA/TCPA d'une cible poursuivie par radar ou d'une cible AIS activée doit être clairement indiquée et la cible doit être clairement marquée d'un symbole de cible dangereuse comme indiqué à l'Annexe A (états acquittés et non acquittés). Sont inclus les cas où les informations des alarmes relatives à CPA/TCPA sont reçues par une sentence TTD (voir l'IEC 61162-1).*

NOTE 1 Si le matériel d'affichage fournit des fonctions pour le calcul de CPA/TCPA qui sont indépendants d'un système de poursuite de cibles radar de bord, ces fonctions sont alors décrites dans les paragraphes correspondants de l'IEC 62388.

Les alarmes relatives à CPA/TCPA ne doivent pas être répétées comme une alerte par le matériel qui reçoit les informations relatives aux cibles par la sentence TTD.

NOTE 2 La présentation du symbole est associée à l'état de la cible et n'est pas liée à la fonctionnalité d'alerte du matériel.

5.6.2.2 Méthodes d'essai et résultats exigés

Confirmer, par observation, que les cibles dangereuses sont présentées conformément à l'Annexe A.

Pour le matériel qui reçoit les informations relatives aux cibles par sentence TTD, confirmer par observation qu'aucune alerte n'est générée à partir des cibles avec les alarmes actives relatives à CPA/TCPA indiquées par la sentence TTD.

5.6.3 Mises en garde relatives aux zones d'acquisition/activation

5.6.3.1 Exigence

(MSC191/6.4.7.3) *Si une fonction de zone d'acquisition/activation définie par l'utilisateur est fournie, une cible pénétrant ou déjà présente dans la zone doit être clairement identifiée avec le symbole correspondant indiqué à l'Annexe A et, pour les cibles poursuivies par radar, une mise en garde doit être effectuée. La zone doit être identifiée avec la symbologie pertinente signalée à l'Annexe A, et doit être applicable aux cibles poursuivies par radar et aux cibles AIS signalées.*

Un système de poursuite de cibles radar doit commander les zones d'acquisition de cibles radar. Le système de poursuite de cibles doit fournir toutes les mises en garde et indications liées à la détection et la poursuite de la cible, y compris la pénétration ou la détection dans une zone d'acquisition. D'autres systèmes et matériels de navigation peuvent fournir les mises en garde et indications de zone d'acquisition uniquement s'ils fournissent une fonction de poursuite de cibles radar satisfaisant à l'IEC 62388.

NOTE 1 La sentence TTD ne fournit pas aux autres systèmes et matériels de navigation qui fournissent une présentation à distance des cibles poursuivies par radar, d'informations indiquant si la cible a été acquise manuellement ou automatiquement ou le statut de toute alerte d'acquisition automatique.

Tout système ou matériel de navigation peut fournir une présentation à distance des cibles AIS signalées. Ces systèmes doivent fournir leurs propres fonctions de zone d'activation AIS.

NOTE 2 Si le matériel d'affichage fournit des fonctions pour zones d'activation pour la détection de cibles radar qui sont indépendantes vis-à-vis d'un système de poursuite de cibles radar embarqué à bord d'un navire, ces fonctions sont alors décrites dans les paragraphes correspondants de l'IEC 62388.

5.6.3.2 Méthodes d'essai et résultats exigés

Si le matériel d'affichage fournit des zones d'acquisition/activation automatique:

- a) confirmer, par observation, que les zones sont présentées avec leur symbologie correspondante conformément à l'Annexe A;
- b) confirmer, par observation, que les cibles radar détectées pénétrant ou déjà présentes dans une zone sont acquises;

NOTE Le statut d'acquisition des cibles poursuivies par radar est signalé par le système de poursuite de cibles radar (conformément à l'IEC 61162 (toutes les parties), par exemple).

- c) confirmer, par observation, que les cibles radar ayant le statut d'acquisition sont présentées conformément à l'Annexe A;
- d) confirmer, par évaluation analytique, que les zones s'appliquent tant aux cibles radar qu'aux cibles AIS signalées conformément au 5.5.7.

5.6.4 Mises en garde relatives aux cibles perdues

5.6.4.1 Exigence

(MSC191/6.4.7.4) *La dernière position prévue d'une cible perdue doit être clairement repérée par un symbole de cible perdue sur l'affichage comme indiqué à l'Annexe A, et la mise en garde de cible perdue doit être effectuée si la fonction de mise en garde en cas de cible perdue est activée. Le symbole de cible perdue doit disparaître si le signal (ou message) correspondant à la cible est de nouveau reçu ou après l'acquiescement de la mise en garde. Un moyen ou une méthode permettant à l'utilisateur d'activer/de désactiver la fonction de mise en garde en cas de cible perdue doit être indiqué. Une indication claire doit permettre de savoir si la fonction de mise en garde en cas de cible perdue pour les cibles poursuivies par radar et les cibles AIS activées est activée ou désactivée. Si une cible est située au-delà d'une distance définie par l'utilisateur, aucune mise en garde ne doit alors être générée.*

Les systèmes et matériels de navigation qui fournissent une présentation à distance des cibles poursuivies par radar reçues et des cibles AIS activées (par exemple par la sentence TTD)

doivent présenter le symbole de cible perdue et ne doivent pas générer de mises en garde à l'état de cible perdue.

5.6.4.2 Méthodes d'essai et résultats exigés

Les méthodes d'essai et les résultats exigés sont les suivants:

- a) confirmer, par observation, qu'en cas de perte d'une cible poursuivie par radar ou d'une cible AIS signalée, qui n'est pas reçue d'un matériel à distance (par exemple par une sentence TTD), une mise en garde est effectuée et que la dernière position prévue est clairement repérée par le symbole de cible perdue conformément à l'Annexe A;
- b) pour les systèmes et matériels de navigation qui fournissent une présentation à distance des cibles poursuivies par radar et des cibles AIS activées reçues (par exemple par sentence TTD) à l'état de cible perdue, confirmer, par observation, que le symbole de cible perdue est présent et qu'aucune mise en garde associée n'apparaît;
- c) confirmer, par observation, que le symbole de cible perdue disparaît si le signal correspondant à la cible est de nouveau reçu ou après l'acquittement de la mise en garde de cible perdue;
- d) confirmer, par observation, qu'un moyen ou une méthode permettant d'activer/de désactiver la fonction de mise en garde en cas de cible perdue a été indiqué;
- e) confirmer, par observation, qu'une indication précisant clairement si la fonction de mise en garde en cas de cible perdue pour les cibles poursuivies par radar et les cibles AIS activées est activée ou désactivée;
- f) confirmer, par observation, qu'aucune mise en garde n'est générée pour une cible perdue située au-delà de la distance définie par l'utilisateur.

5.7 Association de cibles AIS et de cibles radar

5.7.1 Exigence

(MSC191/6.4.8.1) *Si des informations relatives à la cible issues de l'AIS et de la poursuite radar sont toutes deux disponibles, et si les informations AIS et radar sont considérées comme étant une seule et même cible, alors par défaut, le symbole de cible AIS activée et les informations alphanumériques relatives à la cible AIS doivent être automatiquement sélectionnés et affichés comme indiqué à l'Annexe A. L'utilisateur doit avoir la possibilité de remplacer l'état par défaut par l'affichage des cibles poursuivies par radar et doit être en mesure de sélectionner les informations de poursuite radar ou les informations alphanumériques AIS.*

(MSC191/6.4.8.2) *Si les informations AIS et radar sont considérées comme étant deux cibles distinctes, un symbole de cible AIS activée et un symbole de cible poursuivie par radar doivent être affichés comme indiqué dans l'Annexe A. Aucune alerte ne doit être déclenchée.*

NOTE Si le matériel d'affichage fournit des fonctions d'association automatique de cibles AIS signalées à des cibles poursuivies par radar et qui sont indépendantes vis-à-vis d'un système de poursuite de cibles radar embarqué à bord d'un navire, ces fonctions sont alors décrites dans les paragraphes correspondants de l'IEC 62388.

5.7.2 Méthodes d'essai et résultats exigés

Si le matériel d'affichage donne la possibilité d'associer automatiquement des cibles AIS signalées à des cibles poursuivies par radar:

- a) confirmer, par observation, qu'une cible AIS signalée associée à une cible poursuivie par radar est présentée conformément à l'Annexe A:
 - 1) comme une cible AIS activée, l'état par défaut;
 - 2) comme une cible poursuivie par radar, selon le choix de l'utilisateur comme étant l'état par défaut.
- b) confirmer, par observation, que l'utilisateur peut sélectionner soit des informations AIS, soit des informations de poursuite de radar.

5.8 Sélecteurs d'utilisateur pour la présentation AIS et leurs indications de statut

5.8.1 Exigence

Lorsqu'ils sont applicables (c'est-à-dire si le matériel fournit la fonctionnalité associée pour la présentation), les sélecteurs d'utilisateur pour la présentation AIS doivent être fournis conformément au Tableau 3.

Tableau 3 – Sélecteurs d'utilisateur pour la présentation AIS

Sélecteur	Fonction
AIS ON/OFF Il s'agit du principal sélecteur pour toutes les présentations AIS.	Active ou désactive toutes les présentations graphiques liées à l'AIS
Filtrage des cibles AIS en veille Sélecteur séparé pour chaque critère de filtrage de cible AIS en veille fourni (voir 5.5.5);	Active ou désactive le filtrage des cibles AIS en veille pour le critère N ^a
Dispositifs de localisation AIS (voir 5.14.3.1);	Active ou désactive toutes les présentations de dispositifs de localisation AIS
Stations de base AIS (voir 5.13.3.1 a))	Active ou désactive la présentation des stations de base AIS
Aéronefs AIS SAR (voir 5.13.3.1 b))	Active ou désactive la présentation des aéronefs AIS SAR
AIS AtoN, physiques (voir 5.13.3.1 c) et le symbole 2.10 a)	Active ou désactive la présentation des AIS AtoN physiques ou en mauvais état (les AtoN en mauvais état incluent le symbole '2.10a' versions "Off Posn", "Unlit", "Racon err", "Error" et "Missing")
AIS AtoN, virtuelles (voir 5.13.3.1 c) et le symbole 2.10 b)	Active ou désactive la présentation des AIS AtoN virtuelles
AIS AtoN, mobiles physiques (voir 5.13.3.1 c) et le symbole 2.10 c)	Active ou désactive la présentation des AIS AtoN mobiles physiques
AIS AtoN, mobiles virtuelles (voir 5.13.3.1 c) et le symbole 2.10 c)	Active ou désactive la présentation des AIS AtoN mobiles virtuelles
AIS AtoN, synthétiques (voir 5.13.3.1 c) et le symbole 2.10 a)	Active ou désactive la présentation des AIS AtoN synthétiques
AIS AtoN, silhouette de dimensions (voir 5.13.4 et le symbole 2.10 d)	Active ou désactive la présentation de la silhouette AIS AtoN
AIS ASM Sélecteur séparé pour chaque couche ou sous-couche (voir 5.15 et l'Annexe J)	Activer ou désactiver la présentation des AIS ASM pour la couche/sous-couche N ^b
AIS ASM Sélecteur éventuellement séparé pour chaque critère d'affichage (voir 5.15.4.1);	Active ou désactive la présentation des AIS ASM pour le critère N ^a
Cibles AIS synthétiques (voir 5.16);	Active ou désactive la présentation des cibles AIS synthétiques
messages AIS liés à la sécurité (voir 5.19 et le symbole 5.16)	Active ou désactive les messages AIS liés à la sécurité
^a Remplacer "N" par chaque critère disponible.	
^b Remplacer "N" par chaque couche ou sous-couche disponible.	

Lorsqu'un sélecteur d'utilisateur du Tableau 3 a empêché l'affichage d'un objet AIS associé, une indication permanente ou persistante doit être donnée (voir aussi 5.5.5.1). Les détails des sélecteurs individuels doivent être facilement disponibles pour l'utilisateur.

(MSC191/6.4.9) S'il est disponible (c'est-à-dire si le matériel fournit la fonctionnalité associée), le statut de présentation AIS doit être indiqué conformément au Tableau 4.

Tableau 4 – Indications de statut AIS

Fonction	Cas à présenter		Présentation
	Traitement AIS activé/présentation graphique désactivée	Traitement AIS activé/présentation graphique activée	
AIS ON/OFF	Indique que la présentation graphique AIS est désactivée	Indique que la présentation graphique AIS est activée	Alphanumérique ou graphique (voir Tableau E.4)
Filtrage de cibles AIS en veille (voir 5.5.5)	Indique si le statut de filtre des cibles AIS en veille est activé ou désactivé	Indique si le statut de filtre des cibles AIS en veille est activé ou désactivé	Les indications peuvent être alphanumériques ou graphiques (par icône, par exemple)
Activation des cibles (voir 5.5.6)		Indique le statut des critères d'activation automatique pour les cibles AIS, y compris la présentation graphique des zones d'activation automatique utilisées	Les indications doivent être graphiques (voir symbole 2.14)
Alarme CPA/TCPA (voir 5.6.2)	Indique si la fonction Alarme CPA/TCPA est activée ou désactivée Indique les critères CPA/TCPA Indique si les cibles AIS en veille sont incluses dans le traitement CPA/TCPA ou en sont exclues	Indique si la fonction Alarme CPA/TCPA est activée ou désactivée Indique les critères CPA/TCPA Indique si les cibles AIS en veille sont incluses dans le traitement CPA/TCPA ou en sont exclues	Les indications doivent être alphanumériques et, le cas échéant, graphiques (par icône, par exemple)
Mise en garde de cible perdue (voir 5.6.4)	Indique si la fonction de mise en garde en cas de cible perdue est activée ou désactivée Le cas échéant, indique les critères de filtrage de cibles perdues	Indique si la fonction de mise en garde en cas de cible perdue est activée ou désactivée Le cas échéant, indique les critères de filtrage de cibles perdues	Les indications doivent être alphanumériques et, le cas échéant, graphiques
Association de cibles (voir 5.7)	Indique si la fonction d'association de cibles est activée ou désactivée Indique les critères d'association Indique la priorité de la cible comme une priorité de cible AIS (par défaut) ou une priorité de cible poursuivie	Indique si la fonction d'association de cibles est activée ou désactivée Indique les critères d'association Indique la priorité de la cible comme une priorité de cible AIS (par défaut) ou une priorité de cible poursuivie	Les indications doivent être alphanumériques

5.8.2 Méthodes d'essai et résultats exigés

Lorsqu'ils sont applicables, les méthodes d'essai et les résultats exigés sont les suivants:

- a) confirmer, par observation, que les sélecteurs d'utilisateur pour la présentation AIS sont fournis conformément au Tableau 3

- b) confirmer, par observation, que lorsqu'un sélecteur d'utilisateur du Tableau 3 a empêché l'affichage d'un objet AIS associé, une indication permanente ou persistante est donnée et que les détails des sélecteurs individuels sont facilement disponibles pour l'utilisateur;
- c) confirmer, par observation, que le statut de présentation AIS est indiqué conformément au Tableau 4.

5.9 Simulation de manœuvre

5.9.1 Exigence

(MSC191/6.4.10) *Une simulation de manœuvre d'essai doit être clairement identifiée par le symbole correspondant* indiqué à l'Annexe A, *placé* en un emplacement bien en évidence à l'intérieur de la zone d'affichage opérationnel, par exemple nominalement centré en bas de la zone de présentation ou à l'arrière du symbole de navire porteur.

NOTE Si le matériel d'affichage fournit des fonctions pour la manœuvre d'essai indépendantes d'un système de poursuite de cibles radar embarqué à bord d'un navire, ces fonctions sont alors décrites dans les paragraphes correspondants de l'IEC 62388.

5.9.2 Méthodes d'essai et résultats exigés

Si le matériel d'affichage fournit une simulation de manœuvre d'essai:

- a) confirmer, par observation, que la manœuvre est identifiée conformément à l'Annexe A;
- b) confirmer, par évaluation analytique, que le symbole est positionné dans un emplacement bien en évidence.

5.10 Mesure

5.10.1 Mesure à partir du navire porteur

5.10.1.1 Exigence

Les mesures à partir du navire porteur (cercles de distance, distance et relèvement, curseur, données de poursuite, par exemple) doivent être réalisées par rapport au CCRP (poste de contrôle, par exemple).

Pour assurer la cohérence des valeurs mesurées de distance et de relèvement, il convient que l'emplacement de référence recommandé soit le poste de contrôle. D'autres emplacements de référence peuvent être utilisés lorsqu'ils sont clairement indiqués ou se distinguent de façon évidente.

5.10.1.2 Méthodes d'essai et résultats exigés

Les méthodes d'essai et les résultats exigés sont les suivants:

- a) confirmer, par observation, que les moyens de mesure sont centrés sur le CCRP et pas sur une autre position, sauf si cette dernière est spécifiquement sélectionnée et clairement indiquée;
- b) confirmer, par la mesure, en comparant au moins deux autres données d'entrée de capteurs présentant différents décalages de position par rapport au CCRP, que les mesures de distance et de relèvement sont correctes par rapport à la position du CCRP et, si elle est fournie, par rapport à une autre position de référence;
- c) confirmer, par la mesure, que les données affichées lors du passage du CCRP à une autre position de référence changent en conséquence, mais que les données émises par l'interface restent référencées au CCRP.

5.10.2 Mesures de relèvement et de distance

5.10.2.1 Exigence

La précision des relèvements et des distances tracés sur l'affichage ou des mesures de relèvement et de distance entre des éléments caractéristiques déjà tracés sur l'affichage doit être au moins égale à celle obtenue par l'échelle et la résolution de l'affichage.

Les mesures de distance doivent être exprimées en milles marins. En outre, des fonctions peuvent être fournies pour les mesures métriques. Toutes les valeurs indiquées pour la mesure de distance doivent être cohérentes et sans équivoque. Si des mesures de distances métriques sont exigées, la précision ne doit pas être inférieure à celle des autres mesures de distance.

5.10.2.2 Méthodes d'essai et résultats exigés

Les méthodes d'essai et les résultats exigés sont les suivants:

- a) confirmer, par évaluation analytique, que la précision de mesure des relèvements et des distances est cohérente par rapport à l'échelle et à la résolution de l'affichage;
- b) confirmer, par observation, que les distances peuvent être mesurées en milles marins;
- c) confirmer, par observation, que les unités utilisées pour les mesures de distance et les échelles de distances sont cohérentes au sein du système;
- d) confirmer, par observation, qu'une indication est donnée sur les unités utilisées pour la mesure.

5.11 Outils de navigation

5.11.1 Exigences générales

Le paragraphe 5.11 traite des outils utilisateur qui sont communs aux systèmes et matériels de navigation. Les exigences relatives à la mise à disposition de ces outils sont traitées dans les normes de fonctionnement individuelles correspondantes. S'ils sont fournis, ces outils doivent être présentés avec leur(s) symbole(s) correspondant(s) tel(s) qu'indiqué(s) à l'Annexe A.

5.11.2 Cercles de distance

5.11.2.1 Exigence

(MSC191/7.1.4) *Si des cercles de distance sont affichés, leur échelle doit alors être indiquée.*

Les cercles de distance doivent être espacés de façon à diviser logiquement l'échelle de distance en parts égales. En règle générale, deux à six cercles de distance sont fournis pour les échelles de distance en milles marins, et jusqu'à cinq cercles pour les échelles de distance en unités métriques.

La précision du système de cercles de distance doit être dans les limites de 1 % de la distance maximale de l'échelle de distance utilisée ou de 30 m, la plus grande distance étant retenue.

Les cercles de distance doivent toujours être centrés sur le CCRP.

Un moyen ou une méthode d'activation et de désactivation de l'ensemble de cercles de distance doit être fourni(e) (voir également 6.1.4).

5.11.2.2 Méthodes d'essai et résultats exigés

Si des cercles de distance sont fournis:

- a) confirmer, par observation, que les cercles de distance sont présentés conformément à l'Annexe A;

- b) confirmer, par observation, que la séparation (échelle) des cercles de distance est indiquée;
- c) confirmer, par évaluation analytique, que l'espacement des cercles de distance divise logiquement chaque échelle de distance en parts égales;
- d) confirmer, par mesure, que la précision des cercles de distance est dans les limites de $\pm 1 \%$ de l'échelle de distance utilisée ou qu'elle est de 30 m, la plus grande valeur étant retenue;
- e) confirmer, par observation, que les cercles de distance sont toujours centrés sur le CCRP;
- f) confirmer, par observation, qu'un moyen ou une méthode d'activation et de désactivation de l'ensemble de cercles de distance est fourni(e).

5.11.3 Marqueur de distance variable (VRM)

5.11.3.1 Exigence

Un ou plusieurs marqueurs de distance variable (VRM) peuvent être fournis pour mesurer la distance d'un objet ponctuel à l'intérieur de la zone d'affichage opérationnel.

Chaque VRM actif doit avoir une lecture numérique dont la résolution doit être compatible avec l'échelle de distance utilisée.

Chaque VRM actif doit être capable de régler la résolution à 0,01 Nm ou à l'équivalent métrique approprié. Une résolution plus grossière peut être prévue pour les échelles de distance plus élevées. La lecture doit être disponible dans la zone de dialogue utilisateur ou être, de plus, adjacente au curseur lorsque ce dernier est sur le VRM.

Le VRM doit permettre à l'utilisateur de mesurer la distance d'un objet à l'intérieur de la zone d'affichage opérationnel avec une erreur système maximale égale à 1 % de l'échelle de distance utilisée ou à 30 m, la plus grande distance étant retenue.

Chaque VRM doit pouvoir être utilisé pour mesurer la distance à n'importe quel point à l'intérieur de la zone opérationnelle et à la précision spécifiée dans les 5 s.

Un moyen ou une méthode d'activation et de désactivation de chaque VRM doit être fourni(e).

La plage de VRM définie par l'utilisateur doit être conservée en cas de changement d'échelle de distance.

Si des moyens sont prévus pour déplacer l'origine du VRM du CCRP vers d'autres points à l'intérieur de la zone d'affichage opérationnel, géographiquement fixes ou se déplaçant à la vitesse du navire porteur, un moyen doit être fourni pour remettre l'origine du VRM à la position du CCRP par une action simple de l'opérateur.

5.11.3.2 Méthodes d'essai et résultats exigés

Si un VRM est fourni:

- a) confirmer, par observation, que chaque VRM est présenté conformément à l'Annexe A;
- b) confirmer, par observation, qu'une lecture dédiée est disponible pour chaque VRM actif;
- c) confirmer que les VRM sont capables de régler la résolution à 0,01 Nm (ou à l'équivalent métrique approprié). Un réglage plus grossier peut être prévu pour les distances supérieures à 24 Nm ou à l'équivalent métrique approprié;
- d) confirmer, par mesure, que la précision des VRM satisfait à l'exigence en utilisant une cible ou un marqueur étalonné(e);
- e) confirmer, par mesure, que lorsque des mesures métriques sont fournies, la lecture et la précision sont équivalentes à celles exprimées en milles marins;

- f) confirmer, par mesure, que la distance par rapport à n'importe quel objet à l'intérieur de la zone d'affichage opérationnel peut être mesurée dans les 5 s avec la précision exigée;
- g) confirmer, par observation, qu'un moyen ou une méthode d'activation et de désactivation de chaque VRM est fourni(e);
- h) confirmer, par observation, que la distance du VRM est maintenue d'une échelle de distance à l'autre;
- i) confirmer, par observation, que si des moyens sont fournis pour déplacer l'origine du VRM du CCRP vers d'autres points, des moyens sont fournis pour remettre l'origine du VRM à la position du CCRP par une action simple de l'opérateur.

5.11.4 Echelle de relèvement

5.11.4.1 Exigence

Une échelle de relèvement peut être fournie. Cette échelle doit indiquer le relèvement à partir du CCRP.

Pour le matériel d'affichage radar comprenant un radar avec des informations cartographiques, l'échelle de relèvement doit être à l'extérieur de la zone d'affichage opérationnel (c'est-à-dire à sa périphérie et à l'extérieur de laquelle aucune vidéo radar ne doit être affichée). Pour les autres matériels d'affichage, l'échelle de relèvement peut être à l'intérieur de la zone d'affichage opérationnel. Elle doit être numérotée au moins toutes les divisions de 30° et doit avoir des marques de division d'au moins 5°. Les marques de division de 5° et 10° doivent se distinguer clairement les unes des autres. Les marques de division de 1° peuvent être présentées si elles se distinguent clairement les unes des autres et des marques de division de 5° et 10°.

Si l'affichage est excentré ou si la position du navire porteur est située à l'extérieur de la zone d'affichage opérationnel, l'échelle de relèvement doit alors être supprimée ou ses marques doivent être ajustées pour représenter le relèvement à partir du CCRP.

Pour le matériel d'affichage sans représentation radar, un moyen ou une méthode d'activation et de désactivation de l'échelle de relèvement doit être fourni(e).

5.11.4.2 Méthodes d'essai et résultats exigés

Si une échelle de relèvement est fournie:

- a) confirmer, par évaluation analytique, que l'échelle de relèvement indique des relèvements tels que mesurés à partir du CCRP;
- b) pour un matériel d'affichage radar, confirmer, par observation, que l'échelle de relèvement est à la périphérie de la zone d'affichage opérationnel;
- c) confirmer, par observation, que l'échelle de relèvement reste centrée sur le CCRP (en mode d'affichage de mouvement vrai, par exemple);
- d) confirmer, par observation, que l'échelle de relèvement est numérotée au moins tous les 30° et comporte des marques de division au moins tous les 5°;
- e) confirmer, par observation, que les marques de division de 5° se distinguent clairement des marques de division de 10°;
- f) si des marques de division de 1° sont fournies, confirmer, par observation, qu'elles se distinguent clairement les unes des autres et des marques de division de 5° et 10°;
- g) pour le matériel d'affichage sans représentation radar, confirmer, par observation, qu'un moyen ou une méthode d'activation et de désactivation de l'échelle de relèvement est fourni(e).

5.11.5 Alidade électronique (EBL)

5.11.5.1 Exigence

Au moins une alidade électronique (EBL) peut être fournie pour mesurer le relèvement d'un objet ponctuel à l'intérieur de la zone d'affichage opérationnel, avec une erreur système maximale de 1° à la périphérie de l'affichage.

Les EBL doivent être capables de réaliser une mesure à partir du CCRP par rapport au cap des navires et par rapport au nord vrai. La référence de relèvement (c'est-à-dire vraie ou relative) doit être clairement indiquée.

L'origine des EBL doit pouvoir être déplacée du CCRP vers un point quelconque à l'intérieur de la zone d'affichage opérationnel, et l'EBL être remis au CCRP par une action simple de l'opérateur.

L'origine des EBL doit pouvoir être positionnée de manière fixe ou déplacée à la vitesse du navire porteur.

Un moyen ou une méthode doit être fourni(e) pour s'assurer que l'utilisateur peut positionner l'EBL en douceur dans l'une ou l'autre direction, avec un réajustement par incréments permettant de satisfaire aux exigences relatives à la précision de mesure du système.

L'EBL doit pouvoir être utilisé pour mesurer dans les 5 s le relèvement à un objet ponctuel dans la zone d'affichage opérationnel.

Chaque EBL active doit avoir une lecture numérique présentant une résolution de 0,1° permettant de satisfaire aux exigences relatives à la précision de mesure du système sur la base d'une incertitude de mesure de $\pm 0,5^\circ$.

Un moyen ou une méthode d'activation et de désactivation de chaque EBL doit être fourni(e).

Le relèvement de l'EBL (c'est-à-dire défini par l'utilisateur) doit être conservé lorsque l'EBL est activée (après un changement d'échelle de distance ou de l'orientation d'affichage, par exemple).

5.11.5.2 Méthodes d'essai et résultats exigés

Si une EBL est fournie:

- a) confirmer, par observation, que chaque EBL est présenté conformément à l'Annexe A;
- b) confirmer, par mesure, que le relèvement à un objet ponctuel à l'intérieur de la zone d'affichage opérationnel peut être mesuré à 1° près;
- c) confirmer, par évaluation analytique, que les relèvements peuvent être mesurés par rapport au cap des navires et par rapport au nord vrai, et qu'une indication claire de la référence des relèvements est fournie;
- d) confirmer, par observation, qu'un moyen ou une méthode de déplacement de l'origine d'une EBL du CCRP vers un point quelconque à l'intérieur de la zone d'affichage opérationnel est fourni(e);
- e) confirmer, par observation, que l'origine de l'EBL peut être rétablie au CCRP par une action simple de l'utilisateur ;
- f) confirmer, par observation, qu'un moyen ou une méthode de positionnement fixe de l'origine de l'EBL sur un emplacement géographique est fourni(e);
- g) confirmer, par observation, qu'un moyen ou une méthode de déplacement de l'origine de l'EBL à la vitesse du navire porteur est fourni(e);

- h) confirmer, par observation, que l'EBL peut être pivotée en douceur dans l'une ou l'autre direction;
- i) confirmer, par observation, que l'ajustement par incréments est de $0,1^\circ$ au moins;
- j) confirmer, par mesure, que l'EBL peut être utilisée pour mesurer dans les 5 s le relèvement à un objet ponctuel quelconque à l'intérieur de la zone d'affichage opérationnel à $\pm 0,5^\circ$ près;
- k) confirmer, par observation, qu'une lecture numérique présentant une résolution de $0,1^\circ$ est disponible pour chaque EBL active;
- l) confirmer, par observation, qu'un moyen ou une méthode d'activation et de désactivation de chaque EBL est fourni(e);
- m) confirmer, par observation, qu'une EBL activée reste sur le même objet ponctuel pendant un changement d'échelle de distance et un changement de mode d'orientation.

5.11.6 Alidades mécaniques (PI)

5.11.6.1 Exigence

Des alidades mécaniques (PI) peuvent être fournies. Si des alidades mécaniques sont fournies:

- des alidades mécaniques indépendantes avec un moyen ou une méthode pour tronquer et désactiver des alignements individuels, doivent être fournies;
- un moyen ou une méthode simple et rapide de configurer la plage de relèvements et de lignes de travers d'une alidade mécanique doit être fourni(e).

La plage de relèvements et de lignes de travers d'une alidade mécanique sélectionnée doit être disponible sur demande.

La plage de relèvements et de lignes de travers d'une alidade mécanique doit pouvoir être configurée dans les 5 s.

Les paramètres de distance de l'alidade mécanique doivent rester constants lorsque l'opérateur change l'échelle de distance de l'affichage. De même, les paramètres de relèvement de l'alidade mécanique doivent rester constants lorsque le cap du navire porteur change.

En plus de l'activation ou de la désactivation des alidades mécaniques individuelles, des moyens d'activation ou de désactivation des alidades mécaniques regroupées doivent être fournis.

5.11.6.2 Méthodes d'essai et résultats exigés

Si des alidades mécaniques sont fournies:

- a) confirmer, par observation, que les alidades mécaniques sont présentées conformément à l'Annexe A;
- b) confirmer, par observation, qu'un moyen ou une méthode permettant de tronquer la longueur de chaque alidade mécanique est fourni(e);
- c) confirmer, par observation, qu'il est possible de sélectionner les alidades mécaniques pour les afficher individuellement et sous forme de groupe incluant toutes les alidades mécaniques;
- d) confirmer, par mesure, qu'un moyen ou une méthode de configuration dans les 5 s du relèvement ou de la distance d'une alidade mécanique est fourni(e);
- e) confirmer, par observation, que des moyens sont fournis pour afficher sur demande le relèvement et la distance d'une alidade mécanique;
- f) confirmer, par observation, que la distance d'une alidade mécanique par rapport au navire porteur et que le relèvement vrai de l'alidade mécanique ne changent pas lorsqu'une échelle

de distance différente est choisie, lorsque le cap du navire porteur change ou en mode d'affichage de mouvement vrai.

5.11.7 Mesure de décalage de la distance et du relèvement

5.11.7.1 Exigence

Un moyen ou une méthode peut être fourni(e) pour mesurer la distance et le relèvement d'une position sur l'affichage par rapport à une autre position à l'intérieur de la zone d'affichage opérationnel. Cette mesure peut être effectuée, par exemple, en utilisant un alignement électronique azimut/distance (ERBL), une combinaison d'un VRM et d'une EBL, ou le curseur.

Si un outil séparé est fourni pour mesurer la combinaison azimut-distance (un ERBL, par exemple):

- il doit avoir une lecture numérique de distance et de relèvement. La résolution de la lecture de distance doit être compatible avec l'échelle de distance utilisée. La résolution de la lecture de relèvement doit être de $0,1^\circ$, ce qui permet de satisfaire aux exigences relatives à la précision de mesure du système;
- il doit permettre à l'utilisateur de mesurer, d'une part, la distance d'un objet à l'intérieur de la zone d'affichage opérationnel avec une erreur système maximale de 1 % de l'échelle de distance utilisée ou de 30 m, la plus grande des deux valeurs de distance étant retenue, et, d'autre part, le relèvement d'un objet ponctuel quelconque avec une erreur système maximale de 1° basée sur une incertitude de mesure de $\pm 0,5^\circ$ à la périphérie de l'affichage;
- les paramètres utilisateur doivent être conservés lors de l'activation de l'outil (après un changement d'échelle de distance ou d'orientation de l'affichage, par exemple);
- il doit permettre à l'utilisateur de positionner sa composante de relèvement en douceur dans l'une ou l'autre direction, avec un réglage par incréments permettant de satisfaire aux exigences relatives à la précision de mesure du système.

La distance et le relèvement à un objet dans la zone d'affichage opérationnel doivent pouvoir être mesurés dans les 5 s.

5.11.7.2 Méthodes d'essai et résultats exigés

Si un moyen ou une méthode de mesure de la distance et du relèvement entre deux positions dans la zone d'affichage opérationnel est fourni(e):

- a) confirmer, par observation, que des lectures numériques sont disponibles pour afficher la distance et le relèvement;
- b) confirmer, par évaluation analytique, que la résolution de la lecture de distance est compatible avec chaque échelle de distance;
- c) confirmer, par observation, que la résolution de la lecture de relèvement est de $0,1^\circ$;
- d) confirmer, par mesure, que la distance entre une position à l'intérieur de la zone d'affichage opérationnel et une autre position peut être mesurée avec une précision de $\pm 1\%$ de l'échelle de distance utilisée ou de 30 m, la plus grande valeur étant retenue;
- e) confirmer, par mesure, que le relèvement entre une position à l'intérieur de la zone d'affichage opérationnel et une autre position peut être mesuré à $0,5^\circ$ près à la périphérie de l'affichage;
- f) confirmer, par observation, que la composante de relèvement peut être pivotée en douceur dans l'une ou l'autre direction;
- g) confirmer, par mesure, que la distance et le relèvement à un objet à l'intérieur de la zone d'affichage opérationnel peuvent être mesurés dans les 5 s;
- h) si un outil séparé est fourni pour mesurer la combinaison distance-relèvement, confirmer, par observation, qu'un moyen ou une méthode d'activation et de désactivation de l'outil en question est fourni(e);

- i) confirmer, par observation, que les paramètres utilisateur sont conservés après le changement d'échelle de distance et du mode d'orientation pendant que l'outil est activé.

5.11.8 Curseur utilisateur

5.11.8.1 Exigence

Un curseur utilisateur peut être un moyen ou une méthode rapide et concis(e) de désigner une position quelconque sur la zone d'affichage opérationnel. Si un curseur utilisateur est fourni:

- la position du curseur doit avoir une lecture numérique continue indiquant la distance et le relèvement, mesurés à partir du CCRP, ainsi que la latitude et la longitude du curseur présentées en alternance ou simultanément;
- un moyen ou une méthode permettant de localiser aisément la position du curseur dans la zone d'affichage opérationnel doit être fourni(e);
- la précision des mesures de distance et de relèvement fournies par le curseur doit satisfaire aux exigences correspondantes pour le VRM et l'EBL.

La distance et le relèvement à un objet dans la zone d'affichage opérationnel doivent pouvoir être mesurés dans les 5 s.

5.11.8.2 Méthodes d'essai et résultats exigés

Si un curseur utilisateur est fourni:

- a) confirmer, par observation, que le curseur est présenté conformément à l'Annexe A;
- b) confirmer, par observation, qu'une lecture numérique est disponible et qu'elle affiche en continu, de manière alternée ou simultanée, la distance et le relèvement de la position du curseur mesurés à partir du CCRP du navire porteur, ainsi que la latitude et la longitude du curseur;
- c) confirmer, par observation, qu'un moyen ou une méthode permettant de localiser le curseur dans la zone d'affichage opérationnel est fourni(e);
- d) confirmer, par évaluation analytique, que la résolution de la lecture de distance est compatible avec chaque échelle de distance;
- e) confirmer, par observation, que la résolution de la lecture de relèvement est de 0,1°;
- f) confirmer, par évaluation analytique, que la résolution de la lecture de latitude et de longitude est compatible avec chaque échelle d'affichage;
- g) confirmer, par mesure, que la distance à un objet à l'intérieur de la zone d'affichage opérationnel peut être mesurée à $\pm 1\%$ près de l'échelle de distance utilisée ou 30 m, la plus grande valeur étant retenue;
- h) confirmer, par mesure, que le relèvement à un objet ponctuel quelconque à l'intérieur de la zone d'affichage opérationnel peut être mesuré à 0,5° près à la périphérie de l'affichage;
- i) confirmer, par observation, que le curseur peut être déplacé en douceur pour engendrer une rotation dans l'un ou l'autre sens;
- j) confirmer, par mesure, que la distance et le relèvement à un objet quelconque à l'intérieur de la zone d'affichage opérationnel peuvent être mesurés dans les 5 s.

5.12 Capacité de traitement des messages AIS de liaison de données

5.12.1 Généralités

Une présentation des informations associées à l'AIS peut être prévue. Si elle est fournie, les exigences et essais suivants s'appliquent.

5.12.2 Exigences

La capacité de traitement des messages de liaison de données du matériel doit permettre de traiter le nombre de VDM (messages de liaison de données VHF) correspondant à 90 % de la VDL à pleine charge (liaison de données VHF). Dans cet état, la mise à jour des données AIS affichée doit être assurée de manière continue et régulière.

NOTE L'IEC 61162-1 spécifie que l'interface AIS a un débit maximal de transfert de données de 4 500 messages par minute.

5.12.3 Méthodes d'essai et résultats exigés

Utiliser le simulateur AIS pour générer un scénario de sentences VDM pour 130 cibles AIS mobiles, mises à jour toutes les 2 s, et pour 10 autres objets AIS pris en charge par le matériel et mis à jour toutes les 3 min, correspondant à près de 90 % d'une VDL à pleine charge. Confirmer, par observation, que la mise à jour affichée des objets AIS pris en charge par le matériel s'effectue de manière régulière et continue.

Si les cibles AIS sont prises en charge, utiliser le simulateur AIS pour générer un scénario de sentences VDM pour 6 000 cibles AIS au mouillage, mises à jour toutes les 3 min avec une ou plusieurs cibles AIS mobiles mises à jour toutes les 2 s. Confirmer, par observation, que la mise à jour affichée d'un échantillon de 10 cibles AIS affichées des deux types choisies au hasard s'effectue de manière régulière et continue.

5.13 compte rendu de données AIS

5.13.1 Généralités

Les comptes rendus de données AIS incluent les AIS AtoN, les aéronefs AIS SAR et les stations de base AIS.

Une présentation des comptes rendus de données AIS peut être prévue. Si elle est fournie, les exigences et essais suivants s'appliquent.

5.13.2 Capacité des comptes rendus de données AIS

5.13.2.1 Exigences

Le matériel doit offrir la possibilité d'afficher un nombre minimal de comptes rendus de données AIS conforme au Tableau 5 si aucun nombre plus élevé n'est spécifié dans les normes de matériels individuels.

Le manuel de l'utilisateur doit mentionner les capacités de traitement et d'affichage des comptes rendus de données AIS. De plus, le manuel de l'utilisateur doit décrire les conséquences opérationnelles du traitement et de l'affichage des comptes rendus de données AIS actuels et nouveaux si la capacité atteint la valeur maximale prévue pour chaque cas lorsque des comptes rendus de données AIS supplémentaires sont reçus.

Une indication, ou une alerte (par exemple une précaution) si des normes de matériels individuels la spécifie, doit être donné(e) lorsque la capacité de traitement ou d'affichage des comptes rendus de données AIS a été dépassée.

Tableau 5 – Capacité des comptes rendus de données AIS

Exigence	Capacité
Capacité d'affichage minimale des comptes rendus de données AIS	20
Capacité de traitement minimale des comptes rendus de données AIS	20

5.13.2.2 Méthodes d'essai et résultats exigés

Les méthodes d'essai et les résultats exigés sont les suivants:

- a) confirmer, par exemple du manuel de l'utilisateur, que ce dernier spécifie les capacités de traitement et d'affichage des comptes rendus de données AIS et qu'au moins les capacités minimales sont fournies;
- b) utiliser le simulateur AIS et confirmer, par observation, qu'une indication, ou une alerte (par exemple une précaution) si des normes de matériels individuels la spécifie, est donné(e) lorsque la capacité de traitement ou d'affichage des comptes rendus de données AIS a été dépassée, et que l'EUT fonctionne conformément à la description du manuel de l'utilisateur;
- c) confirmer, par examen du manuel de l'utilisateur, que ce dernier décrit les conséquences opérationnelles du traitement et de l'affichage des comptes rendus de données AIS actuels et nouveaux si la capacité de traitement ou d'affichage atteint la valeur maximale prévue pour chaque cas lorsque des comptes rendus de données AIS supplémentaires sont reçus.

5.13.3 Affichage des comptes rendus de données AIS

5.13.3.1 Exigence

Il doit être possible d'ajouter ou de retirer des comptes rendus de données AIS de l'affichage, par couche, mais pas comme des objets individuels. Les couches suivantes doivent être fournies:

- AIS AtoN, physiques (y compris "en mauvais état");
- AIS AtoN, virtuelles;
- AIS AtoN, mobiles physiques;
- AIS AtoN, mobiles virtuelles;
- AIS AtoN, synthétiques;

NOTE 1 Une AtoN synthétique est une structure d'AtoN physique, sans émetteur AIS, mais pour laquelle les messages AIS sont diffusés à partir d'un autre emplacement (en général basé à terre). Une AtoN est physique lorsque les paramètres "fanion d'AtoN virtuelle = 0" et "indicateur de répétition = 0". Une AtoN est synthétique lorsque les paramètres "fanion d'AtoN virtuelle = 0" et "indicateur de répétition = 1, 2 ou 3".

- aéronefs AIS SAR;
- stations de base AIS.

L'état "en mauvais état" fournit une méthode conviviale pour détecter les AtoN cartographiées qui entraînent des problèmes de navigation significatifs. L'AtoN en mauvais état inclut le 2.10a "Off Posn", "Unlit", "Racon err", "Error" et "Missing".

Les comptes rendus de données AIS doivent être présentés au moyen d'un symbole approprié affiché en utilisant la position rapportée/prévue (voir l'Annexe A). Les exigences relatives à la présentation graphique des dimensions des AIS AtoN sont en 5.13.4.

Un compte rendu de données AIS sélectionné pour l'affichage de ses informations alphanumériques doit être identifié par le symbole 2.12 correspondant indiqué à l'Annexe A.

Pour chaque compte rendu de données AIS sélectionné, les informations suivantes doivent être présentées sous forme alphanumérique:

- a) Message 4, Compte rendu de station de base
 - identification (Nom provenant du Message AIS 24A, et/ou MMSI, tous deux au moins disponibles sur demande);
 - position signalée;

- si la réception des messages AIS liés à la sécurité est supportée, sur demande de l'utilisateur, lorsqu'ils sont disponibles, un lien vers ou le contenu complet des messages AIS reçus liés à la sécurité les plus récents et se rapportant au même MMSI (voir 5.19).
- b) Message 9, Compte rendu de position standard d'un aéronef de recherche et de sauvetage
- identification (Nom provenant du Message AIS 5 ou 24A, Indicatif d'appel provenant du Message AIS 5 ou 24B et MMSI, tous au moins disponibles sur demande);
 - position signalée et, lorsqu'elle est disponible, sa qualité (Précision de position sous la forme " ≤ 10 m" ou " > 10 m" et RAIM sous la forme "non utilisé" ou "utilisé");
 - altitude signalée et sa source, le cas échéant;
 - distance calculée de la cible (calcul 2D sans altitude);
 - relèvement calculé de la cible;
 - COG signalée;
 - SOG signalée;
 - si la réception des messages AIS liés à la sécurité est supportée, sur demande de l'utilisateur, lorsqu'ils sont disponibles, un lien vers ou le contenu complet des messages AIS reçus liés à la sécurité les plus récents et se rapportant au même MMSI (voir 5.19).
- c) Message 21, Compte rendu d'aide à la navigation
- identification (Nom, si non disponible alors MMSI, MMSI au moins disponible sur demande);
- NOTE 2 Le nom d'une AtoN est une combinaison des paramètres "Nom d'aide à la navigation" et "Nom de l'extension de l'aide à la navigation".
- position signalée et, lorsqu'elle est disponible, sa qualité (Précision de position sous la forme " ≤ 10 m" ou " > 10 m" et RAIM sous la forme "non utilisé" ou "utilisé") et source (Type de dispositif électronique de détermination de la position) ;
 - indication de type (nature);
 - statut d'AtoN (voir Annexe L);
 - dimensions, au moins disponible sur demande;
 - si la réception de messages AIS liés à la sécurité est supportée, un lien vers une liste ou le contenu complet de tous les messages AIS liés à la sécurité reçus du compte rendu de l'AIS AtoN (base = MMSI). Il doit au moins être possible de présenter le message AIS lié à la sécurité le plus récent AIS pour chaque AtoN. Les messages AIS liés à la sécurité reçus de l'AIS AtoN doivent être automatiquement retirés après une période d'attente de 18 min après réception ou après retrait de l'AtoN associée elle-même;
 - éventuellement pour les AtoN mobiles, si elles sont déduites d'un déplacement de position, COG/SOG calculée en cas de stabilisation sur le fond (ou CTW/STW calculée en cas de stabilisation sur la mer).

Si les informations reçues de compte rendu de données AIS sont incomplètes, les informations absentes doivent alors être clairement indiquées en tant que tel dans le champ de données associé.

Les informations pour un compte rendu de données AIS sélectionné doivent être affichées et mises à jour en continu, jusqu'à ce qu'une autre cible, un compte rendu de données AIS, un dispositif de localisation AIS ou une cible AIS synthétique soit sélectionné pour l'affichage d'informations ou, le cas échéant, jusqu'à ce que la zone de dialogue utilisateur soit fermée.

NOTE 3 Les informations peuvent être affichées dans une fenêtre séparée de dialogue avec l'utilisateur.

Tous les comptes rendus de données AIS doivent être considérés perdus après 6 fois l'intervalle nominal entre les comptes rendus pour les AtoN, les l'aéronef SAR et les stations de base, à partir du dernier compte rendu reçu.

NOTE 4 Les intervalles nominaux entre les comptes rendus sont indiqués dans l'UIT-R M.1371.

Pour les aéronefs AIS SAR et les stations de base AIS perdus, il ne doit y avoir aucun symbole de compte rendu de données AIS perdu et le symbole de compte rendu de données AIS doit être retiré automatiquement de l'affichage.

La dernière position signalée/prévue d'une AIS AtoN doit être clairement repérée par un symbole d'AIS AtoN perdue sur l'affichage comme indiqué à l'Annexe A, et la mise en garde d'AIS AtoN perdue doit être effectuée si la fonction de mise en garde en cas d'AIS AtoN perdue est activée. Si la fonction de mise en garde en cas d'AIS AtoN perdue est désactivée ou si l'AIS AtoN est au-delà d'une distance définie par l'utilisateur, il ne doit y avoir aucun symbole d'AIS AtoN perdu et le symbole d'AIS AtoN doit être retiré automatiquement de l'affichage.

Le symbole d'AIS AtoN perdue doit disparaître si le signal (ou message) correspondant à l'AIS AtoN est de nouveau reçu ou après l'acquittement de la mise en garde.

Un moyen ou une méthode permettant à l'utilisateur d'activer/de désactiver la fonction de mise en garde en cas d'AIS AtoN perdue doit être indiqué(e). Une indication claire doit permettre de savoir si la fonction de mise en garde en cas d'AIS AtoN perdue est désactivée. Si une AIS AtoN est située au-delà d'une distance définie par l'utilisateur, aucune mise en garde ne doit être générée.

L'activation/la désactivation de la fonction d'AIS AtoN perdue et les paramètres de distance définis par l'utilisateur peuvent être partagés avec la fonction de cible perdue (voir 5.6.4) et/ou la fonction de dispositif de localisation AIS perdu (voir 5.14.3.1).

5.13.3.2 Méthodes d'essai et résultats exigés

Utiliser le simulateur AIS et confirmer, par observation, que l'utilisateur peut ajouter et retirer des informations de la présentation par couche, mais pas comme des objets individuels.

Utiliser le simulateur AIS et confirmer, par observation, que les comptes rendus de données AIS sont affichés dans la position signalée/prévue et que le symbole est conforme à la définition de l'Annexe A.

Utiliser le simulateur AIS et confirmer, par observation, qu'un compte rendu de données AIS sélectionné pour l'affichage de ses informations alphanumériques est identifié par le symbole 2.12 correspondant indiqué à l'Annexe A.

Utiliser le simulateur AIS et confirmer, par observation, que pour chaque compte rendu de données AIS sélectionné, les informations exigées sont présentées sous forme alphanumérique ou que l'absence d'informations dans le champ de données associé est clairement indiquée.

Utiliser le simulateur AIS et confirmer, par observation, que pour chaque AIS AtoN, les messages AIS reçus liés à la sécurité sont automatiquement retirés après 18 min ou après le retrait de l'AtoN associée elle-même.

Utiliser le simulateur AIS et confirmer, par observation, que les informations affichées pour un compte rendu de données AIS sélectionné sont mises à jour en continu et que les informations affichées pour une cible sélectionnée, un compte rendu de données AIS, un dispositif de localisation AIS ou une cible AIS synthétique restent affichées jusqu'à ce qu'un autre compte rendu de données AIS soit sélectionné ou que la zone de dialogue utilisateur soit fermée.

Pour les essais suivants associés aux comptes rendus de données AIS perdues, le délai d'attente du compte rendu de données AIS perdues est égal à 6 fois l'intervalle nominal entre les comptes rendus pour les AtoN, à partir du dernier compte rendu reçu.

Utiliser le simulateur AIS pour simuler un aéronef AIS SAR perdu et une station de base AIS perdue et confirmer, par observation, qu'aucun symbole de compte rendu de données AIS

perdues n'est affiché et que le symbole de compte rendu de données AIS est retiré automatiquement de l'affichage.

Confirmer, par observation, qu'un moyen ou une méthode est fourni(e) à l'utilisateur pour activer/désactiver la fonction de mise en garde en cas d'AIS AtoN perdue, qu'une indication précisant clairement si la fonction de mise en garde en cas d'AIS AtoN perdue est désactivée, et qu'une distance définie par l'utilisateur est disponible pour commander la fonctionnalité de l'AIS AtoN perdue.

Utiliser le simulateur AIS pour simuler une AIS AtoN perdue et confirmer, par observation, que lorsque la fonction de mise en garde en cas d'AIS AtoN perdue est activée, la dernière position signalée/prévue d'une AIS AtoN est clairement repérée par un symbole d'AIS AtoN perdue sur l'affichage et que la mise en garde d'AIS AtoN perdue est créée.

Utiliser le simulateur AIS pour simuler un AIS AtoN perdue et confirmer, par observation, que lorsque la fonction d'AIS AtoN perdue est désactivée ou lorsque l'AIS AtoN est au-delà d'une distance définie par l'utilisateur, aucun symbole d'AIS AtoN perdue n'est affiché et que le symbole d'AIS AtoN est retiré automatiquement de l'affichage.

Utiliser le simulateur AIS et confirmer, par observation, que lorsqu'un signal (ou message) destiné à l'AIS AtoN est de nouveau reçu ou après l'acquittement de la mise en garde d'AIS AtoN perdue, le symbole d'AIS AtoN perdue disparaît.

5.13.4 Présentation graphique des dimensions des AIS AtoN

5.13.4.1 Exigences

Une présentation graphique des AIS AtoN physiques peut être prévue. Si elle est fournie, les exigences et essais suivants s'appliquent.

L'utilisateur doit disposer de moyens pour sélectionner et désélectionner l'affichage graphique de la silhouette des dimensions à échelle réelle des AIS AtoN physiques (symbole 2.10 d), en plus du symbole des AIS AtoN physiques associées tel que spécifié à l'Annexe A. La taille de cette silhouette doit être la représentation à l'échelle réelle basée sur les dimensions signalées. La silhouette à échelle réelle ne doit être présentée que lorsque la plus grande des valeurs ABCD est d'au moins 9 mm, à la distance d'observation nominale de 1 m.

Le matériel peut fournir des moyens sélectionnables par l'utilisateur pour sélectionner ou désélectionner automatiquement l'affichage de la silhouette d'une AIS AtoN à échelle réelle, sur la base de conditions fixées par le fabricant. L'utilisateur doit pouvoir désactiver la fonctionnalité de sélection automatique.

5.13.4.2 Méthodes d'essai et résultats exigés

Utiliser le simulateur AIS pour envoyer des objets AIS AtoN physiques, y compris la silhouette à échelle réelle et:

- a) confirmer, par observation, que la silhouette à échelle réelle et le symbole correspondant sont conformes à ceux spécifiés à l'Annexe A;
- b) confirmer, par observations que des moyens sont prévus pour sélectionner et désélectionner la présentation graphique des dimensions des AIS AtoN;
- c) confirmer, par mesure, que la dimension de la silhouette de l'AIS AtoN est correcte pour l'échelle de l'affichage;
- d) confirmer, par observation, que la silhouette à échelle réelle de l'AIS AtoN n'est pas présentée lorsqu'aucune des valeurs ABCD n'est à au moins 9 mm, à la distance d'observation nominale de 1 m;
- e) s'ils sont fournis, confirmer, par observation, que les moyens sélectionnables par l'utilisateur pour sélectionner ou désélectionner automatiquement l'affichage de la

silhouette d'une AIS AtoN à échelle réelle, remplissent les conditions décrites dans le manuel de l'utilisateur.

5.14 Dispositif de localisation AIS

5.14.1 Généralités

Une présentation des dispositifs de localisation AIS peut être prévue. Si elle est fournie, les exigences et essais suivants s'appliquent.

5.14.2 Capacité des dispositifs de localisation AIS

5.14.2.1 Exigences

Le matériel doit offrir la possibilité d'afficher un nombre minimal de dispositifs de localisation AIS les plus proches du navire porteur et conformes au Tableau 6 si aucun nombre plus élevé n'est spécifié dans une norme de matériel individuelle.

Le manuel de l'utilisateur doit mentionner les capacités de traitement et d'affichage des dispositifs de localisation AIS. De plus, le manuel de l'utilisateur doit décrire les conséquences opérationnelles du traitement et de l'affichage des dispositifs de localisation AIS si la capacité atteint la valeur maximale prévue pour chaque cas lorsque des dispositifs de localisation AIS supplémentaires sont reçus.

Une indication, ou une alerte (par exemple une précaution) si des normes de matériels individuels la spécifie, doit être donné(e) lorsque la capacité de traitement ou d'affichage des dispositifs de localisation AIS a été dépassée.

Tableau 6 – Capacité des dispositifs de localisation AIS

Exigence	Capacité
Capacité d'affichage minimale des dispositifs de localisation AIS	20
Capacité de traitement minimale des dispositifs de localisation AIS	20

5.14.2.2 Méthodes d'essai et résultats exigés

Les méthodes d'essai et les résultats exigés sont les suivants:

- a) confirmer, par exemple du manuel de l'utilisateur, que ce dernier spécifie les capacités de traitement et d'affichage des dispositifs de localisation AIS et qu'au moins les capacités minimales sont fournies;
- b) utiliser le simulateur AIS et confirmer, par observation, qu'une indication, ou une alerte (par exemple une précaution) si des normes de matériels individuels la spécifie, est donné(e) lorsque la capacité de traitement ou d'affichage des dispositifs de localisation AIS a été dépassée, que les dispositifs de localisation AIS affichés sont les plus proches et que l'EUT fonctionne conformément à la description du manuel de l'utilisateur;
- c) confirmer, par examen du manuel de l'utilisateur, que ce dernier décrit les conséquences opérationnelles du traitement et de l'affichage des dispositifs de localisation AIS si la capacité de traitement ou d'affichage atteint la valeur maximale prévue pour chaque cas lorsque des dispositifs de localisation AIS supplémentaires sont reçus.

5.14.3 Affichage des dispositifs de localisation AIS

5.14.3.1 Exigence

Il doit être possible d'ajouter ou de retirer des dispositifs de localisation AIS de l'affichage par le biais d'une seule couche (voir Tableau 3) et il peut être possible d'ajouter ou de retirer des

dispositifs de localisation AIS de l'affichage par sous-couche (AIS-SART, EPIRB-AIS et AIS MOB), mais pas comme des objets individuels.

Les dispositifs de localisation AIS doivent être présentés au moyen d'un symbole approprié affiché en utilisant la position prévue (voir Annexe A).

Un dispositif de localisation AIS sélectionné pour l'affichage de ses informations alphanumériques doit être identifié par le symbole 2.12 correspondant indiqué à l'Annexe A.

Pour chaque dispositif de localisation AIS sélectionné, les informations suivantes doivent être présentées sous forme alphanumérique:

a) messages 1 et 14, pour les dispositifs de localisation AIS.

- identification (Nom, provenant du Message AIS 24A, ID HEX à 15 caractères (applicable pour RLS AIS), du Message 14 et/ou MMSI, tous au moins disponibles sur demande);
- position signalée, son âge (basé sur l'heure actuelle et le paramètre "Horodatage" du Message AIS 1) et, lorsqu'elle est disponible, sa qualité (Précision de position sous la forme "<= 10m" ou "> 10m" et RAIM sous la forme "non utilisé" ou "utilisé");
- *distance* calculée de la cible;
- *relèvement* calculé de la cible;
- COG signalée (ou CTW calculée si l'affichage est la stabilisation sur le fond). Dans l'affichage de la stabilisation sur la mer, la COG signalée doit au moins être disponible sur demande;
- SOG signalée (ou STW calculée si l'affichage est la stabilisation sur le fond). Dans l'affichage de la stabilisation sur la mer, la SOG signalée doit au moins être disponible sur demande;
- statut de navigation signalé (actif ou soumis à des essais);
- sur demande de l'utilisateur, lorsqu'il est disponible pour AIS-SART et AIS MOB, le texte du dernier Message AIS 14 unique reçu associé au même MMSI, et pour EPIRB-AIS, le texte des deux derniers Messages AIS 14 uniques reçus associés au même MMSI. Les Messages AIS 14 reçus ayant une source et un contenu identiques doivent remplacer les messages existants afin d'éviter toute duplication. Le Message AIS 14 reçu doit être automatiquement retiré lorsque le dispositif de localisation AIS associé est retiré.

NOTE 1 Des exemples de contenu textuel d'un Message AIS 14 pour des dispositifs de localisation AIS sont: "SART ACTIVE", "SART TEST", "MOB ACTIVE", "MOB TEST", "EPIRB ACTIVE", "EPIRB TEST" et l'ID HEX à 15 caractères d'une balise Cospas-Sarsat.

Si les informations reçues du dispositif de localisation AIS sont incomplètes, les informations absentes doivent alors être clairement indiquées en tant que tel dans le champ de données associé.

Les informations pour un dispositif de localisation AIS sélectionné doivent être affichées et mises à jour en continu, jusqu'à ce qu'une autre cible, un compte rendu de données AIS, un dispositif de localisation AIS ou une cible AIS synthétique soit sélectionné pour l'affichage d'informations ou, le cas échéant, jusqu'à ce que la zone de dialogue utilisateur soit fermée.

NOTE 2 Les informations peuvent être affichées dans une fenêtre séparée de dialogue avec l'utilisateur.

Les dispositifs de localisation AIS doivent être considérés comme perdus 6 min après le dernier compte rendu reçu.

NOTE 3 Les intervalles nominaux entre les comptes rendus sont indiqués dans l'UIT-R M.1371.

La dernière position prévue d'un dispositif de localisation AIS doit être clairement repérée par un symbole de dispositif de localisation AIS perdu sur l'affichage comme indiqué à l'Annexe A, et la mise en garde de dispositif de localisation AIS perdu doit être donné si la fonction de mise en garde en cas de dispositif de localisation AIS perdu est activée. Si la fonction de mise en

garde en cas de dispositif de localisation AIS perdu est désactivée ou si le dispositif de localisation AIS est au-delà d'une distance définie par l'utilisateur, ou si le dispositif de localisation AIS est soumis à des essais, il ne doit y avoir aucun symbole de dispositif de localisation AIS perdu et le symbole de dispositif de localisation AIS doit être retiré automatiquement de l'affichage.

Le symbole de dispositif de localisation AIS perdu doit disparaître si le signal (ou message) correspondant au dispositif de localisation AIS est de nouveau reçu ou après l'acquittement de la mise en garde.

Un moyen ou une méthode permettant à l'utilisateur d'activer/de désactiver la fonction de mise en garde en cas de dispositif de localisation AIS perdu doit être indiqué(e). Une indication claire doit permettre de savoir si la fonction de mise en garde en cas de dispositif de localisation AIS perdu est activée ou désactivée. Si un dispositif de localisation AIS est situé au-delà d'une distance définie par l'utilisateur, aucune mise en garde ne doit être générée.

L'activation/la désactivation de la fonction dispositif de localisation AIS perdu et les paramètres de distance définis par l'utilisateur peuvent être partagés avec la fonction de cible perdue (voir 5.6.4) et/ou la fonction de compte rendu de données AIS perdues (voir 5.13.3.1).

5.14.3.2 Méthodes d'essai et résultats exigés

Utiliser le simulateur AIS et confirmer, par observation, que l'utilisateur peut ajouter et retirer des informations de la présentation par couches et éventuellement par sous-couches, mais pas comme des objets individuels.

Utiliser le simulateur AIS et confirmer, par observation, que les dispositifs de localisation AIS sont affichés dans la position prévue et que le symbole est conforme à la définition de l'Annexe A.

Utiliser le simulateur AIS et confirmer, par observation, qu'un dispositif de localisation AIS sélectionné pour l'affichage de ses informations alphanumériques est identifié par le symbole 2.12 correspondant indiqué à l'Annexe A.

Utiliser le simulateur AIS et confirmer, par observation, que pour chaque dispositif de localisation AIS sélectionné, les informations exigées sont présentées sous forme alphanumérique ou que l'absence d'informations dans le champ de données associé est clairement indiquée.

Utiliser le simulateur AIS et confirmer, par observation, que les informations affichées pour un dispositif de localisation AIS sélectionné sont mises à jour en continu et que les informations affichées pour un dispositif de localisation AIS sélectionné restent affichées jusqu'à ce qu'une autre cible, un compte rendu de données AIS, un dispositif de localisation AIS ou une cible AIS synthétique soit sélectionné ou que la zone de dialogue utilisateur soit fermée.

Pour les essais suivants associés aux comptes rendus AIS perdus, le délai d'attente pour l'état du compte rendu AIS perdu est 6 min après le dernier compte rendu reçu.

Confirmer, par observation, qu'un moyen ou une méthode est fourni(e) à l'utilisateur pour activer/désactiver la fonction de mise en garde en cas de dispositif de localisation AIS perdu, qu'une indication précisant clairement si la fonction de mise en garde en cas de dispositif de localisation AIS perdu est désactivée, et qu'une distance définie par l'utilisateur est disponible pour commander la fonctionnalité du dispositif de localisation AIS perdu.

Utiliser le simulateur AIS pour simuler un dispositif de localisation AIS perdu et confirmer, par observation, que lorsque la fonction de mise en garde en cas de dispositif de localisation AIS perdu est activée, la dernière position prévue d'un dispositif de localisation AIS est clairement

repérée par un symbole de dispositif de localisation AIS perdu sur l'affichage et que la mise en garde de dispositif de localisation AIS perdu est créée.

Utiliser le simulateur AIS pour simuler un dispositif de localisation AIS perdu et confirmer, par observation, que lorsque la fonction de dispositif de localisation AIS perdu est désactivée ou lorsque le dispositif de localisation AIS est au-delà d'une distance définie par l'utilisateur, aucun symbole de dispositif de localisation AIS perdu n'est affiché et que le symbole de dispositif de localisation AIS est retiré automatiquement de l'affichage.

Utiliser le simulateur AIS et confirmer, par observation, que lorsqu'un signal (ou message) destiné au dispositif de localisation AIS est de nouveau reçu ou après l'acquittement de la mise en garde de dispositif de localisation AIS perdu, le symbole de dispositif de localisation AIS perdu disparaît.

Utiliser le simulateur AIS pour envoyer un dispositif de localisation AIS avec un Message AIS 14 associé et laisser le processus de perte et de retrait du dispositif de localisation AIS se dérouler. Renvoyer le dispositif de localisation AIS après qu'il a été retiré et confirmer, par observation, qu'aucune information ne reste disponible à partir du Message AIS 14 associé.

5.15 AIS ASM

5.15.1 Généralités

Les AIS ASM utilisés dans le présent document sont spécifiés dans la SN.1/Circ.289 de l'OMI. Un objet AIS ASM représente des informations reçues d'un ou plusieurs AIS ASM associés au même objet AIS ASM identifié de manière unique. Voir l'Annexe J pour obtenir les combinaisons d'AIS ASM pour former un seul objet AIS ASM.

Les AIS ASM sont identifiés de manière unique par leur identificateur d'application (AI), qui est la combinaison du code de zone désigné (DAC) et de l'identificateur de fonction (FI). Le DAC de tous les AIS ASM décrits dans le présent document est fixé à 1.

Les objets AIS ASM utilisés dans le présent document sont identifiés par l'AI et l'un des éléments suivants:

- "ID de rattachement de message" et les six premiers chiffres du MMSI de la source (FI = 18);
- "ID de rattachement de message" et les six premiers chiffres du MMSI de la source (FI = 19);
- "Position centrale du poste à quai (latitude)", "Position centrale du poste à quai (longitude)" (FI = 20);
- "Position d'observation (latitude)" et "Position d'observation (longitude)" (FI = 21);
- "ID de rattachement de message" et les six premiers chiffres du MMSI de la source (FI = 22);
- "ID de rattachement de message" et MMSI complet de la source (FI = 23);
- "Latitude (à partir de l'emplacement du site)" et "Longitude (à partir de l'emplacement du site)" (FI = 26 et 31);
- "ID de rattachement de message" et les six premiers chiffres du MMSI de la source (FI = 27 et 28);
- "Position #1 en latitude" et "Position #1 en longitude" (FI = 32).

NOTE 1 Pour la station de base AIS en tant que source, les six premiers chiffres du MMSI de la source sont $0_1 0_2 M_3 I_4 D_5 X_6$ de $0_1 0_2 M_3 I_4 D_5 X_6 X_7 X_8 X_9$. Ceci laisse les trois derniers chiffres $X_7 X_8 X_9$ disponibles en vue d'une éventuelle transmission répétée des AIS ASM par de multiples sources coordonnées par l'opérateur sur la côte.

NOTE 2 Le MMSI de l'AIS ASM identifie la source de transmission. Par exemple, à des fins de redondance ou pour augmenter la distance, plusieurs stations de base AIS ou stations AIS AtoN ayant différents MMSI ne peuvent pas transmettre le même objet AIS ASM.

Certains AIS ASM appliquent un concept de "fin de validité". Ce concept repose sur la combinaison suivante d'attributs liés à la validité des AIS ASM, lorsqu'ils sont fournis et selon le FI:

- fin de "Durée" après "Date et heure de début" (FI = 22 ou 27);
- fin de "Durée (prévision)" après "Temps de prévision valide" (FI = 26);
- fin de "Délai d'attente des données (à partir de l'emplacement du site)" (FI = 26); ou
- fin de "Signal suivant attendu" (FI = 19).

NOTE 3 La période de validité peut inclure l'heure actuelle ou peut débuter dans le futur.

Les AIS ASM de description textuelle (FI = 29 et 30) fournissent des informations supplémentaires liées à un objet AIS ASM (FI = 18, 19, 22, 23, 27 et 28). Si les paramètres "ID de rattachement de message" et "MMSI de la source" provenant de l'AIS ASM de description textuelle correspondent à un objet AIS ASM existant, le texte est combiné en objet AIS ASM.

5.15.2 Catégories

Il existe trois catégories d'objets AIS ASM. Pour certaines catégories d'objets AIS ASM, l'utilisateur peut gérer le stockage en retirant des objets AIS ASM individuels du stockage. L'utilisateur peut retirer et exclure des objets AIS ASM du stockage en définissant des critères. Il peut également contrôler l'affichage des objets AIS ASM du stockage en définissant des critères d'affichage. Ces critères peuvent être, par exemple, par couche, par distance ou par catégorie.

Pour toutes les catégories d'objets AIS ASM, seuls les objets AIS ASM disponibles à partir du stockage peuvent être affichés. Le retrait d'un objet AIS ASM du stockage entraîne également son retrait de l'affichage.

NOTE De nombreux objets liés à l'AIS, par exemple les cibles AIS, ont une règle de fonctionnalité utilisateur pour le retrait du stockage et pour l'ajout/retrait de l'affichage. L'AIS ASM n'applique pas une seule règle de fonctionnalité utilisateur pour le retrait du stockage et pour l'ajout/retrait de l'affichage.

Les trois catégories d'objets AIS ASM sont:

- 1) adressage sélectif (FI = 18, 20, 23, 28, 30 et 32);
 - a) transmis par adressage à un seul navire identifié par le MMSI (Message AIS 6, ID destination);
 - b) la transmission est répétée jusqu'à ce que la source mette fin à la répétition ou que la destination ait acquitté l'AIS ASM reçu (Message AIS 7);
 - c) il n'y a aucun délai d'attente pour le retrait automatique de l'AIS ASM reçu;
 - d) un retrait automatique de l'objet AIS ASM FI = 23 ou FI = 28 se produit après réception d'un message d'annulation selon la SN.1/Circ.289 de l'OMI;
 - e) lorsque la limite de capacité de stockage est atteinte, l'objet AIS ASM le plus ancien est remplacé par le nouvel objet AIS ASM. L'objet AIS ASM le plus ancien est l'objet pour lequel la dernière réception de tout AIS ASM associé est la plus ancienne;
 - f) un objet AIS ASM individuel peut être retiré du stockage par l'utilisateur;
 - g) des objets AIS ASM éventuellement reçus peuvent être exclus et les objets AIS ASM peuvent être automatiquement retirés du stockage par l'utilisateur en sélectionnant des critères appropriés. Des exemples de critères sont:
 - i) distance sélectionnée: lorsque l'objet est à l'extérieur de la plage définie, alors l'exclure de la réception et le retirer du stockage;
 - ii) sélectionné par sous-couches (voir l'Annexe J): lorsque l'objet est désélectionné, alors l'exclure de la réception et le retirer du stockage;
 - iii) sélectionné par source (MMSI de la source): lorsque l'objet est désélectionné, alors l'exclure de la réception et le retirer du stockage;

- iv) sélectionné par FI: lorsque l'objet est désélectionné, alors l'exclure de la réception et le retirer du stockage;
 - v) temps sélectionné depuis la réception: lorsque le temps s'est écoulé, alors exclure l'objet de la réception et le retirer du stockage.
- 2) radiodiffusion générale – En fonction de la date (FI = 19, 22, 26 et 27; incluant la "fin de validité");
- a) transmis par radiodiffusion générale (Message AIS 8) avec la combinaison d'informations AIS ASM reçues (c'est-à-dire l'objet AIS ASM) et incluant les informations liées au concept de "fin de validité";
 - b) la transmission est répétée jusqu'à la fin de validité;
 - c) des objets AIS ASM éventuellement reçus peuvent être exclus et les objets AIS ASM peuvent être automatiquement retirés du stockage par l'utilisateur en sélectionnant des critères appropriés. Des exemples de critères sont:
 - i) distance sélectionnée: lorsque l'objet est à l'extérieur de la plage définie, alors l'exclure de la réception et le retirer du stockage;
 - ii) sélectionné par sous-couches (voir l'Annexe J): lorsque l'objet est désélectionné, alors l'exclure de la réception et le retirer du stockage;
 - iii) sélectionné par source (MMSI de la source): lorsque l'objet est désélectionné, alors l'exclure de la réception et le retirer du stockage;
 - iv) sélectionné par FI: lorsque l'objet est désélectionné, alors l'exclure de la réception et le retirer du stockage;
 - v) temps sélectionné depuis la réception: lorsque le temps s'est écoulé, alors exclure l'objet de la réception et le retirer du stockage.
 - d) un retrait automatique de l'objet AIS ASM se produit à la fin de la validité ou après réception d'un message d'annulation selon la SN.1/Circ.289 de l'OMI;
 - e) lorsque la limite de capacité de stockage est atteinte, le comportement est tel que décrit par le fabricant dans le manuel de l'utilisateur.
- 3) radiodiffusion générale – Autres (FI = 19, 21, 22, 26, 27, 29 et 31; n'incluant pas la "fin de validité").
- a) transmis par radiodiffusion générale (Message AIS 8) avec la combinaison d'informations AIS ASM reçues (c'est-à-dire l'objet AIS ASM) et n'incluant pas les informations liées au concept de "fin de validité";
 - b) la transmission est répétée tant que les informations sont valides;
 - c) le délai d'attente pour le retrait automatique des objets AIS ASM du stockage est 18 min après la dernière réception d'AIS ASM pour un seul objet AIS ASM;
 - d) lorsque la limite de capacité de stockage est atteinte, l'objet AIS ASM le plus ancien est remplacé par le nouvel objet AIS ASM ;
 - e) des objets AIS ASM éventuellement reçus peuvent être exclus et les objets AIS ASM peuvent être automatiquement retirés du stockage par l'utilisateur en sélectionnant des critères appropriés. Des exemples de critères sont:
 - i) distance sélectionnée: lorsque l'objet est à l'extérieur de la plage définie, alors l'exclure de la réception et le retirer du stockage;
 - ii) sélectionné par sous-couches (voir l'Annexe J): lorsque l'objet est désélectionné, alors l'exclure de la réception et le retirer du stockage;
 - iii) sélectionné par source (MMSI de la source): lorsque l'objet est désélectionné, alors l'exclure de la réception et le retirer du stockage;
 - iv) sélectionné par FI: lorsque l'objet est désélectionné, alors l'exclure de la réception et le retirer du stockage.

5.15.3 Capacité des AIS ASM

5.15.3.1 Exigences

Si la mise en œuvre des AIS ASM est prévue, le matériel doit donner la possibilité de traiter et d'afficher un nombre minimal d'objets AIS ASM conformément au Tableau 7.

Tableau 7 – Capacité des objets AIS ASM

Catégorie d'objet AIS ASM	Capacité d'affichage minimale	Capacité de traitement minimale
A adressage sélectif et destiné au navire porteur	10	10
A radiodiffusion générale – En fonction de la date	20	20
A radiodiffusion générale – Autres	12	12
Il convient que les capacités de stockage pour chaque catégorie soient supérieures ou égales aux capacités d'affichage pour chaque catégorie.		

Le manuel de l'utilisateur doit spécifier les capacités de traitement et d'affichage des objets AIS ASM pour chaque catégorie. De plus, le manuel de l'utilisateur doit décrire les conséquences opérationnelles du traitement et de l'affichage des objets AIS ASM actuels et nouveaux du point de vue de l'utilisateur si la capacité atteint la valeur maximale prévue pour chaque cas spécifié dans le Tableau 7 lorsque des objets AIS ASM supplémentaires sont reçus.

Pour les catégories AIS ASM "A adressage sélectif" et "A radiodiffusion générale – Autres" lorsque la limite de capacité est atteinte, à réception des AIS ASM pour un nouvel objet AIS ASM, l'objet AIS ASM le plus ancien doit être remplacé dans le stockage par le nouvel objet AIS ASM.

Une indication, ou une alerte (par exemple une précaution) si des normes de matériels individuels la spécifient, doit être donné(e) lorsque la capacité de traitement ou d'affichage des AIS ASM a été dépassée.

Pour les objets AIS ASM de la catégorie "A adressage sélectif", l'utilisateur doit pouvoir retirer les objets AIS ASM individuels du stockage.

Les objets AIS ASM doivent être automatiquement retirés du stockage après réception d'un message d'annulation conformément à la SN.1/Circ.289 de l'OMI.

La fonctionnalité d'exclusion des AIS ASM reçus et de retrait des objets AIS ASM du stockage peut éventuellement est fournie par des critères. Si elle est fournie, le manuel de l'utilisateur doit décrire la fonctionnalité, y compris les détails des critères sélectionnables par l'utilisateur. La fonctionnalité doit opérer sur la base des critères décrits dans le manuel de l'utilisateur.

Les objets AIS ASM de la catégorie "A radiodiffusion générale – En fonction de la date" doivent être automatiquement retirés du stockage après la fin de validité (voir 5.15.1).

Les objets AIS ASM de la catégorie "A radiodiffusion générale - Autres" doivent être automatiquement retirés du stockage 18 min après le dernier AIS ASM reçu lié à l'objet AIS ASM.

NOTE L'intervalle nominal supposé entre les comptes rendus est de 6 min.

EXEMPLE Un avis de zone existe tant que des comptes rendus le concernant sont reçus au moins une fois au cours de la période d'attente de 18 min, tant qu'il reste dans les limites de sa période de validité spécifiée (c'est-à-dire jusqu'à la fin de la "durée" débutant à partir du paramètre "Date et heure de début de zone") et tant qu'il n'est pas annulé (c'est-à-dire que "durée = 0").

5.15.3.2 Méthodes d'essai et résultats exigés

Les méthodes d'essai et les résultats exigés sont les suivants:

- a) confirmer, par examen du manuel de l'utilisateur, que ce dernier spécifie les capacités de traitement et d'affichage des objets AIS ASM et qu'au moins les capacités minimales conformes au Tableau 7 sont fournies;
- b) confirmer, par examen du manuel de l'utilisateur, que ce dernier décrit les conséquences opérationnelles du traitement et de l'affichage des objets AIS ASM si la capacité atteint la valeur maximale prévue pour chaque cas lorsque des objets AIS ASM supplémentaires sont reçus;
- c) utiliser le simulateur AIS et confirmer, par observation que pour les catégories AIS ASM "A adressage sélectif" et "A radiodiffusion générale – Autres" lorsque la limite de capacité est atteinte à réception des AIS ASM pour un nouvel objet AIS ASM, l'objet AIS ASM le plus ancien est remplacé dans le stockage par le nouvel objet AIS ASM;
- d) utiliser le simulateur AIS et confirmer, par observation, qu'une indication, ou une alerte (par exemple une précaution) si des normes de matériels individuels la spécifie, est donné(e) lorsque la capacité de traitement ou d'affichage des objets AIS ASM a été dépassée, et que l'EUT fonctionne conformément à la description du manuel de l'utilisateur;
- e) utiliser le simulateur AIS et confirmer, par observation, que les objets AIS ASM de la catégorie AIS ASM "A adressage sélectif" peuvent être retirés du stockage par sélection de l'utilisateur d'un objet AIS ASM individuel;
- f) utiliser le simulateur AIS et confirmer, par observation, que les objets AIS ASM sont automatiquement retirés du stockage après réception d'un message d'annulation conformément à la SN.1/Circ.289 de l'OMI;
- g) si elle est fournie, confirmer, par examen du manuel de l'utilisateur, que ce dernier décrit la fonctionnalité d'exclusion des AIS ASM reçus et de retrait des objets AIS ASM du stockage, y compris les détails des critères sélectionnables par l'utilisateur;
- h) si elle est fournie, utiliser le simulateur AIS et confirmer, par observation, que la fonctionnalité d'exclusion des AIS ASM reçus et de retrait des objets AIS ASM du stockage opère sur la base des critères sélectionnables par l'utilisateur suivant la description du manuel de l'utilisateur, et non sur la base d'objets AIS ASM individuels;
- i) utiliser le simulateur AIS et sélectionner l'affichage de tous les cas fournis et confirmer, par observation, que les objets AIS ASM de la catégorie AIS ASM "A radiodiffusion générale - En fonction de la date" sont retirés après la fin de validé;
- j) utiliser le simulateur AIS et sélectionner l'affichage de tous les cas fournis et confirmer, par observation, que les objets AIS ASM de la catégorie AIS ASM "A radiodiffusion générale - Autres" sont retirés automatiquement 18 min après le dernier AIS ASM reçu lié à l'objet AIS ASM.

5.15.4 Affichage des AIS ASM

5.15.4.1 Exigence

Une présentation au cas par cas pour chaque identificateur de fonction d'AIS ASM et chaque sous-couche d'affichage (voir Tableau J.1) peut être prévue.

Si la mise en œuvre d'AIS ASM est prévue, le manuel de l'utilisateur doit préciser les identificateurs de fonction d'AIS ASM et les sous-couches d'affichage pris en charge (voir Tableau J.1).

Il doit être possible d'ajouter ou de retirer des objets AIS ASM de l'affichage, par couche ou sous-couche comme défini dans le Tableau J.1 mais pas comme des objets individuels.

Le matériel peut éventuellement permettre à l'utilisateur de sélectionner les objets AIS ASM à afficher, en définissant des critères. Des exemples de critères sont:

- a) distance sélectionnée: lorsque l'objet est à l'extérieur, alors ne pas l'afficher;

- b) sélectionné par source (MMSI de la source): lorsque l'objet est désélectionné, alors ne pas l'afficher;
- c) temps sélectionné depuis la réception: lorsque le temps s'est écoulé, alors ne pas afficher l'objet.

Les objets AIS ASM doivent être présentés au moyen d'un ou plusieurs symboles affichés en utilisant la position signalée. Pour la sélection des symboles appropriés, voir l'Annexe J. La forme du symbole doit être celle définie dans l'Annexe A.

NOTE Pour certains objets AIS ASM, plusieurs symboles sont exigés pour y présenter les informations.

Lorsque les paramètres de l'utilisateur entraînent la présentation de multiples symboles ponctuels AIS ASM différents dans la même position, un symbole doit être présenté de la façon suivante afin de représenter tous les symboles ponctuels AIS ASM dans cette position:

- lorsque les multiples symboles ponctuels AIS ASM différents ne comprennent que deux des symboles 5.6 (informations sur la marée et le niveau d'eau), 5.7 (station de signaux) et/ou 5.13 (compte rendu d'environnement) du Tableau A.5, ou plus, le symbole représenté doit être 5.13 (sans ajout facultatif du symbole 3.4 (courant de marée));
- lorsque les multiples symboles ponctuels AIS ASM différents comprennent au moins deux symboles différents incluant au moins un symbole qui n'est pas le symbole 5.6, 5.7 ou 5.13, le symbole représenté doit être le symbole 5.18 (objets AIS ASM colocalisés).

Il doit être possible de sélectionner un objet AIS ASM pour afficher ses informations alphanumériques, à partir d'une liste d'objets AIS ASM disponibles et en sélectionnant le symbole correspondant de l'objet AIS ASM.

Lors de la sélection du symbole unique qui représente de multiples objets AIS ASM, les détails de tous les objets AIS ASM représentés doivent être fournis à l'utilisateur.

Un objet AIS ASM sélectionné pour l'affichage de ses informations alphanumériques doit être identifié, pour les objets à géométrie à base de points, par le symbole 2.12 indiqué à l'Annexe A et, pour les objets à géométrie à base de lignes et de surfaces, le manuel de l'utilisateur doit décrire la méthode utilisée pour identifier la sélection.

Pour chaque objet AIS ASM sélectionné pour l'affichage de ses informations alphanumériques, les valeurs des champs applicables et disponibles contenus dans le Tableau J.1 et l'ID source (c'est-à-dire le MMSI) doivent être présentées au moins sous forme alphanumérique. Le champ de description textuelle ne doit être affiché que si du contenu est disponible.

La présentation alphanumérique de la raison d'un AIS ASM "Avis de zone" (FI = 22 ou 23) repose sur le paramètre "Description d'avis". Pour les valeurs 0 à 125 du paramètre "Description d'avis", la présentation alphanumérique est le texte normalisé du tableau de la SN.1/Circ.289 de l'OMI. Pour la valeur 127 du paramètre "Description d'avis", la présentation alphanumérique est le contenu du paramètre "Texte associé".

La date de visualisation ou la plage de dates de visualisation doit déterminer les objets dépendant d'une date qui sont à afficher. Cette date ou plage de dates doit être sélectionnable par l'utilisateur. Lorsque des informations cartographiques sont présentes, la date de visualisation ou la plage de dates de visualisation doit alors être commune à ces informations (cartes ENC S-57, par exemple). Si un objet AIS ASM dépendant de la date ne fournit pas une information de début de validité, il doit être considéré valide jusqu'à la fin de la validité.

Une indication permanente doit être donnée lorsque la date de visualisation ou la plage de dates de visualisation n'inclut pas la date actuelle. Lorsqu'une indication équivalente est exigée pour les informations cartographiques, une seule indication commune doit être présentée.

Les objets AIS ASM qui intègrent le concept de "fin de validité" ne doivent être présentés graphiquement que lorsque la date de visualisation ou la plage de dates de visualisation coïncide avec la période de validité.

Les objets AIS ASM ne doivent pas déclencher d'alertes.

5.15.4.2 Méthodes d'essai et résultats exigés

Confirmer, par examen du manuel de l'utilisateur, qu'il précise les identificateurs de fonction d'AIS ASM et les sous-couches d'affichage pris en charge (voir le Tableau J.1).

Si l'équipement permet à l'utilisateur de sélectionner, en définissant des critères, les objets AIS ASM à afficher, utiliser le simulateur AIS et confirmer, par observation, que les critères sélectionnés sont utilisés pour l'affichage des objets AIS ASM.

Utiliser le simulateur AIS et confirmer, par observation, que l'utilisateur peut ajouter et retirer des objets AIS ASM de la présentation par couches ou sous-couches comme défini dans le Tableau J.1 mais pas comme des objets individuels.

Utiliser le simulateur AIS et confirmer, par observation, que pour chaque cas supporté et disponible dans le Tableau J.1, les objets AIS ASM sont affichés dans la position signalée, que le symbole est tel que défini à l'Annexe J et que la forme des symboles est telle que définie à l'Annexe A.

Utiliser le simulateur AIS pour créer des cas d'objets AIS ASM ponctuels multiples qui sont supportés et qui sont dans la même position (au moins, lorsqu'ils sont supportés, les cas de: Hauteur libre + Données relatives au poste à quai; Vent + Conditions atmosphériques; Vent + Niveau d'eau; Fenêtre de marée + Niveau d'eau) et confirmer, par observation, pour chaque cas que le symbole 5.13 ou 5.18 est affiché conformément aux exigences du 5.15.4.1.

Utiliser le simulateur AIS et confirmer, par observation, qu'il est possible de sélectionner un objet AIS ASM pour l'affichage de ses informations alphanumériques à partir de la liste des objets AIS ASM disponibles et en sélectionnant le symbole correspondant de l'objet AIS ASM.

Utiliser le simulateur AIS et confirmer, par observation, que lors de la sélection d'un seul symbole représentant de multiples objets AIS ASM, les détails de tous les objets AIS ASM représentés sont accessibles à l'utilisateur.

Utiliser le simulateur AIS et confirmer, par observation, qu'un objet AIS ASM sélectionné pour l'affichage de ses informations alphanumériques est identifié, pour les objets à géométrie à base de points, par le symbole 2.12 indiqué à l'Annexe A et, pour les objets à géométrie à base de lignes et de surfaces, par la méthode décrite dans le manuel de l'utilisateur.

Utiliser le simulateur AIS et confirmer, par observation, que pour chaque objet AIS ASM sélectionné pour l'affichage de ses informations alphanumériques, les valeurs des champs applicables et disponibles contenus dans le Tableau J.1 et l'ID source (c'est-à-dire le MMSI) sont présentées et que le champ de description textuelle n'est affiché que si du contenu est disponible.

Utiliser le simulateur AIS et confirmer, par observation, que pour chaque AIS ASM "Avis de zone" (FI = 22 ou 23), la raison est basée sur le paramètre "Description d'avis", que pour des valeurs de 0 à 125 du paramètre "Description d'avis", la présentation alphanumérique est le texte normalisé de la SN.1/Circ.289 de l'OMI et que pour la valeur 127 du paramètre "Description d'avis", la présentation alphanumérique est le contenu du paramètre "Texte associé".

Confirmer, par observation, que la date de visualisation et la plage de dates de visualisation sont sélectionnables par l'utilisateur et que lorsque des informations cartographiques sont

présentes, la date de visualisation ou la plage de dates de visualisation sont alors communes à ces informations.

Confirmer, par observation, qu'une indication permanente est donnée lorsque la date de visualisation ou la plage de dates de visualisation n'inclut pas la date actuelle et que lorsque des informations cartographiques sont présentes, cette indication est commune à l'indicateur de ces informations.

Utiliser le simulateur AIS et confirmer, par observation, que la présentation graphique des objets AIS ASM qui intègrent le concept de "fin de validité" n'est effectuée que lorsque la date de visualisation ou la plage de dates de visualisation coïncide avec la période de validité.

Utiliser le simulateur AIS et confirmer, par observation, que les objets AIS ASM ne déclenchent aucune alerte.

5.16 Présentation des cibles AIS synthétiques

5.16.1 Exigence

Une présentation des cibles AIS synthétiques peut être prévue. Si la présentation des cibles AIS synthétiques est fournie:

- a) le manuel de l'utilisateur doit mentionner les capacités de traitement et d'affichage des cibles AIS synthétiques. La capacité de traitement doit être d'au moins 40 cibles AIS synthétiques et la capacité d'affichage d'au moins 20 cibles AIS synthétiques;
- b) il doit être possible d'ajouter ou de retirer des cibles AIS synthétiques de l'affichage en une seule couche, mais pas comme des objets individuels;
- c) des moyens peuvent être prévus pour filtrer les cibles AIS synthétiques affichées, par exemple sur la base de la distance, de la vitesse ou de la route si les informations sont disponibles;
- d) les cibles AIS synthétiques doivent être affichées dans la position prévue. Le symbole doit être celui défini dans l'Annexe A;

NOTE 1 Les informations de vitesse sont incluses dans le FI = 17 (Cible synthétique/générée par VTS). En revanche, elles ne sont pas incluses dans le FI = 22 ou FI = 23 (Avis de zone).

- e) une cible AIS synthétique sélectionnée pour l'affichage de ses informations alphanumériques doit être identifiée par le symbole correspondant indiqué à l'Annexe A;
- f) pour chaque cible AIS synthétique sélectionnée pour l'affichage de ses informations alphanumériques, les informations suivantes doivent être présentées:
 - 1) lorsque FI = 17, l'identificateur de cible;
 - 2) la position signalée;
 - 3) la distance calculée entre le navire porteur et la cible AIS synthétique;
 - 4) le relèvement calculé entre le navire porteur et la cible AIS synthétique;
 - 5) lorsque FI = 17, la COG signalée (ou la CTW calculée si l'affichage est la stabilisation sur la mer). Dans l'affichage de la stabilisation sur la mer, la COG signalée doit au moins être disponible sur demande;
 - 6) lorsque FI = 17, la SOG signalée (ou la STW calculée si l'affichage est la stabilisation sur la mer). Dans l'affichage de la stabilisation sur la mer, la SOG signalée doit au moins être disponible sur demande;
 - 7) des informations supplémentaires, si elles sont disponibles, doivent être données à l'utilisateur sur demande.

Si les informations reçues de la cible AIS synthétique sont incomplètes, les informations absentes doivent alors être clairement indiquées en tant que tel dans le champ de données associé.

Les informations pour une cible AIS synthétique sélectionnée doivent être affichées et mises à jour en continu, jusqu'à ce qu'une autre cible, un compte rendu de données AIS, un dispositif de localisation AIS ou une cible AIS synthétique soit sélectionné pour l'affichage d'informations ou, le cas échéant, jusqu'à ce que la zone de dialogue utilisateur soit fermée.

NOTE 2 Les informations peuvent être affichées dans une fenêtre séparée de dialogue avec l'utilisateur.

- g) Les cibles AIS synthétiques doivent être automatiquement retirées 18 min après le dernier compte rendu reçu;

NOTE 3 L'intervalle nominal supposé entre les comptes rendus est de 6 min.

- h) si cela est applicable, les cibles AIS synthétiques doivent être automatiquement retirées après l'heure et la date de fin spécifiées ou après la réception d'un message d'annulation;
- i) les cibles AIS synthétiques ne doivent pas déclencher d'alertes;
- j) une indication, ou une alerte (par exemple une précaution) si des normes de matériels individuels la spécifie, doit être donné(e) lorsque la capacité de traitement ou d'affichage des cibles AIS synthétiques a été dépassée.

5.16.2 Méthodes d'essai et résultats exigés

Lorsque la présentation des cibles AIS synthétiques est fournie:

- a) confirmer, par observation, que le manuel de l'utilisateur spécifie les capacités de traitement et d'affichage des cibles AIS synthétiques et qu'au moins les capacités minimales sont fournies;
- b) utiliser le simulateur AIS et confirmer, par observation, qu'il est possible d'ajouter ou de retirer des cibles AIS synthétiques de l'affichage en une seule couche, mais pas comme des objets individuels;
- c) s'ils sont fournis, utiliser le simulateur AIS et confirmer, par observation, que des moyens sont prévus pour filtrer les cibles AIS synthétiques affichées, par exemple sur la base de la distance, de la vitesse ou de la route;
- d) utiliser le simulateur AIS et confirmer, par observation, qu'une cible AIS synthétique est affichée dans la position prévue et que la cible AIS synthétique ne peut pas être traitée, par exemple par une mise à jour de la position de navigation à l'estime. Confirmer, par observation, que le symbole est celui défini à l'Annexe A;
- e) utiliser le simulateur AIS et confirmer, par observation, qu'une cible AIS synthétique sélectionnée pour l'affichage de ses informations alphanumériques est identifiée par le symbole correspondant indiqué à l'Annexe A;
- f) utiliser le simulateur AIS et confirmer, par observation, que pour chaque cible AIS synthétique sélectionnée, les informations suivantes sont présentées sous forme alphanumérique:
 - 1) lorsque FI = 17, l'identificateur de cible;
 - 2) la position signalée;
 - 3) la distance calculée entre le navire porteur et la cible AIS synthétique;
 - 4) le relèvement calculé entre le navire porteur et la cible AIS synthétique;
 - 5) lorsque FI = 17, la COG signalée (ou la CTW calculée si l'affichage est la stabilisation sur la mer). Dans l'affichage de la stabilisation sur la mer, la COG signalée est au moins disponible sur demande;
 - 6) lorsque FI = 17, la SOG signalée (ou la STW calculée si l'affichage est la stabilisation sur la mer). Dans l'affichage de la stabilisation sur la mer, la SOG signalée est au moins disponible sur demande;
 - 7) des informations supplémentaires, lorsqu'elles sont disponibles sur demande de l'utilisateur.

Confirmer, par observation, que les informations absentes sont clairement indiquées comme telles dans le champ de données associé.

Confirmer, par observation, que les informations affichées pour une cible AIS synthétique sélectionnée sont mises à jour en continu et que les informations affichées pour une cible AIS synthétique sélectionnée restent affichées jusqu'à ce qu'une autre cible AIS, un compte rendu de données AIS, un dispositif de localisation AIS ou une cible AIS synthétique soit sélectionnée ou que la zone de dialogue utilisateur soit fermée;

- g) utiliser le simulateur AIS et confirmer, par observation, qu'une cible AIS synthétique est automatiquement retirée 18 min après le dernier compte rendu reçu;
- h) utiliser le simulateur AIS et confirmer, par observation, que, si cela est applicable, une cible AIS synthétique est automatiquement retirée après la date et l'heure de fin spécifiées ou après réception d'un message d'annulation;
- i) utiliser le simulateur AIS et confirmer, par observation, que les cibles AIS synthétiques ne déclenchent aucune alerte;
- j) utiliser le simulateur AIS et confirmer, par observation, qu'une indication, ou une alerte (par exemple une précaution) si des normes de matériels individuels la spécifie, est donné(e) lorsque la capacité de traitement ou d'affichage des cibles AIS synthétiques a été dépassée.

5.17 Présentation des associations d'appels DSC reçus à un objet AIS affiché

5.17.1 Exigence

Une présentation des associations d'appels DSC reçus peut être prévue. Si la présentation des associations d'appels DSC reçus est fournie:

- a) les appels DSC reçus doivent être associés à un objet AIS sur la base du MMSI. Si le matériel n'a aucun objet AIS avec le même MMSI, l'appel DSC reçu ne doit alors pas être présenté graphiquement;

NOTE 1 Les objets AIS types pour cette association comprennent les cibles AIS, les dispositifs de localisation AIS et les cibles AIS synthétiques.

- b) le manuel de l'utilisateur doit mentionner les capacités de traitement et d'affichage des associations d'appels DSC reçus. La capacité de traitement doit être d'au moins 40 associations d'appels DSC reçus et la capacité d'affichage d'au moins 20 associations d'appels DSC reçus;
- c) il peut être possible d'ajouter ou de retirer des appels DSC reçus de l'affichage en une seule couche, mais pas comme des objets individuels;
- d) si un objet AIS, pour lequel une association d'un appel DSC reçu est disponible, est affiché et, lorsque cela est applicable, si la couche d'association d'appels DSC reçus est activée, le symbole 5.16 approprié indiqué à l'Annexe A doit alors être affiché;
- e) si un objet AIS, pour lequel une association d'un appel DSC reçu est disponible, est sélectionné pour l'affichage de ses informations alphanumériques, les informations reçues pour l'association de l'appel DSC reçu doivent alors être facilement disponibles;

NOTE 2 L'objet AIS associé à l'appel DSC reçu contient lui-même un grand nombre d'informations mises à jour qui sont disponibles à partir de l'objet AIS sélectionné en question.

NOTE 3 Des exemples d'informations alphanumériques disponibles à partir des sentences DSC, DSE et ECI sont: type d'appel DSC, catégorie d'appel de détresse, nature de la détresse, heure de réception.

- f) l'utilisateur doit avoir la possibilité de retirer une association d'un appel DSC reçu de la base de données;
- g) une association d'un appel DSC reçu doit être automatiquement retirée de la base de données 8 h après le dernier compte rendu reçu;

NOTE 4 L'exigence ci-dessus suppose qu'il s'agit d'un compte rendu unique.

- h) l'association d'appels DSC reçus à un objet AIS ne doit pas déclencher d'alertes;
- i) une indication, ou une alerte sans annonce sonore (c'est-à-dire une précaution) si des normes de matériels individuels la spécifient, doit être donné(e) lorsque la capacité de traitement ou d'affichage pour l'association d'appels DSC reçus a été dépassée.

5.17.2 Méthodes d'essai et résultats exigés

Lorsque la présentation d'association d'appels DSC reçus est fournie:

- a) utiliser les simulateurs DSC et AIS pour générer des appels DSC reçus et confirmer, par observation, qu'une association d'appel DSC reçu est connectée à un objet AIS sur la base du MMSI. Utiliser l'agencement de simulateurs et confirmer, par observation, que si le matériel n'a aucun objet avec le même MMSI, l'association de l'appel DSC reçu est alors ignorée;
- b) confirmer, par observation, que le manuel de l'utilisateur spécifie les capacités de traitement et d'affichage de l'association d'appels DSC reçus et qu'au moins les capacités minimales sont fournies;
- c) utiliser les simulateurs DSC et AIS pour générer des appels DSC reçus et confirmer, par observation, qu'il est possible d'ajouter ou de retirer une association d'appels DSC reçus de l'affichage en une seule couche, mais pas comme des objets individuels;
- d) utiliser les simulateurs DSC et AIS pour générer un appel DSC reçu et confirmer, par observation, que si un objet AIS, pour lequel une association d'appel DSC reçu est disponible, est affiché et si la couche d'association d'appel DSC reçu est activée, le symbole 5.16 indiqué à l'Annexe A est alors affiché;
- e) utiliser les simulateurs DSC et AIS pour générer un appel DSC reçu et confirmer, par observation, que si une cible, pour laquelle l'association d'appel DSC reçu est disponible, est sélectionnée pour l'affichage de ses informations alphanumériques, les informations reçues pour l'association d'appel DSC reçu sont alors facilement disponibles;
- f) utiliser les simulateurs DSC et AIS pour générer un appel DSC reçu et confirmer, par observation, que l'utilisateur peut retirer l'association d'appel DSC reçu de la base de données;
- g) utiliser les simulateurs DSC et AIS pour générer un appel DSC reçu et confirmer, par observation, que l'association d'appel DSC reçu est automatiquement retirée 8 h après le dernier compte rendu reçu;
- h) utiliser les simulateurs DSC et AIS pour générer des appels DSC reçus et confirmer, par observation, que l'association d'appels DSC reçus ne déclenche pas d'alerte;
- i) utiliser les simulateurs DSC et AIS pour générer des appels DSC reçus et confirmer, par observation, qu'une indication, ou une alerte sans annonce sonore (c'est-à-dire une précaution) si des normes de matériels individuels la spécifie, est donné(e) lorsque la capacité de traitement ou d'affichage d'association d'appels DSC reçus a été dépassée.

5.18 Informations relatives aux AIS ASM complétant les informations relatives aux cibles AIS signalées

5.18.1.1 Exigence

Une présentation des informations relatives aux AIS ASM complétant les informations relatives aux cibles AIS signalées peut être prévue. Le Tableau 8 spécifie les informations relatives aux cibles AIS signalées complétées par les messages AIS ASM, ainsi que les identificateurs de fonctions (FI) des messages AIS ASM qui complètent les informations relatives aux cibles AIS signalées (voir 5.5.11).

Si la présentation des informations relatives aux AIS ASM complétant les informations relatives aux cibles AIS signalées est fournie, les informations étendues relatives aux cibles AIS signalées du Tableau 8 doivent être associées aux informations relatives aux cibles AIS ASM signalées (voir 5.5.11) et doivent être disponibles sur demande sous forme alphanumérique.

NOTE Les AIS ASM (DAC = 001, FI = 16 ou FI = 24) sont disponibles pour être envoyés par le matériel AIS, sur décision interne ou demande externe. L'intervalle supposé entre les comptes rendus est toutes les 6 min.

Tableau 8 – Informations étendues relatives aux cibles AIS signalées provenant de l'AIS ASM

Informations étendues relatives aux cibles AIS signalées (SN.1/Circ.289 de l'OMI)	AIS ASM FI de la source
Dernier port d'appel	24
Prochain port d'appel	24
Tirant d'air	24
Diesel	24
Tonnage brut	24
Mazout lourd	24
Classe de glace	24
Charge ou ballast	24
Mazout léger	24
Type de navire (registre Lloyd)	24
Nombre de passagers	16,24
Second port d'appel	24
Puissance en chevaux mesurée sur l'arbre	24
Statut du matériel SOLAS	24
Quantité totale de mazout lourd en tonnes	24
Voie de travail VHF	24

5.18.1.2 Méthodes d'essai et résultats exigés

Lorsqu'une présentation des informations relatives aux AIS ASM complétant les informations relatives aux cibles AIS signalées est fournie, utiliser la simulation AIS pour générer chaque information relative aux cibles AIS signalées du Tableau 8 et confirmer, par observation, que l'information est disponible sur demande.

5.19 Messages AIS reçus liés à la sécurité

5.19.1 Exigences

Une présentation des messages AIS reçus liés à la sécurité peut être prévue. Si elle est fournie, ces exigences s'appliquent sauf spécification contraire d'une norme de matériel individuelle.

Les messages AIS reçus liés à la sécurité se composent de messages AIS liés à la sécurité envoyés par les cibles AIS, les stations de base AIS et l'aéronef AIS SAR. La présentation des messages AIS liés à la sécurité est indépendante de la présentation graphique de la cible AIS, de la station de base AIS ou de l'aéronef AIS SAR.

L'utilisateur doit être en mesure d'étiqueter les messages individuels liés à la sécurité pour une conservation permanente (conservé). Ces messages ne doivent pas être écrasés par de nouveaux messages. Lorsque cela n'est plus nécessaire, ou lorsque la capacité de stockage disponible pour les messages conservés est atteinte, l'utilisateur doit être en mesure de supprimer l'étiquette sur ces messages qui peuvent alors être écrasés dans le déroulement normal.

Le manuel de l'utilisateur doit spécifier la capacité de traitement des messages AIS reçus liés à la sécurité. La capacité de traitement doit être d'au moins 60 messages AIS liés à la sécurité subdivisés en 20 derniers messages à adressage sélectif, 20 derniers messages à radiodiffusion générale et 20 messages conservés par l'utilisateur. Les messages AIS liés à la

sécurité envoyés par les dispositifs de localisation AIS et les AIS AtoN sont traités et gérés séparément (voir 5.14 et 5.13).

Les messages AIS reçus liés à la sécurité doivent être associés à une source sur la base du MMSI.

Si une cible AIS, une station de base AIS ou un aéronef AIS SAR, pour lequel (laquelle) un message AIS reçu lié à la sécurité non lu est disponible ou si le contenu d'un message AIS reçu lié à la sécurité est sélectionné pour affichage, est affiché(e), le symbole approprié indiqué à l'Annexe A (symbole 5.16) doit alors être affiché après sélection de l'utilisateur. Il ne doit pas être possible de retirer de la présentation des symboles individuels associés aux sources de messages AIS reçus liés à la sécurité.

Le présent document ne spécifie aucune exigence de synchronisation de cette fonctionnalité entre des matériels individuels (par exemple et l'AIS et les radars).

Les utilisateurs doivent disposer d'un moyen (par exemple une liste de messages reçus) leur permettant de récupérer et de visualiser individuellement le champ "texte lié à la sécurité" et l'heure UTC, si disponible, de réception par le matériel d'affichage des au moins 20 derniers messages AIS reçus liés à la sécurité à adressage sélectif et des 20 derniers messages AIS reçus liés à la sécurité à radiodiffusion générale, et des au moins 20 messages AIS reçus liés à la sécurité conservés par l'utilisateur. Ce moyen doit permettre à l'utilisateur de sélectionner l'objet AIS associé sur la base du MMSI pour une présentation alphanumérique de l'information.

Les utilisateurs doivent disposer d'un moyen pour retirer tout ou partie des messages AIS reçus liés à la sécurité. Après un changement d'un seul ou de tous les messages AIS reçus liés à la sécurité stockés à l'état "conservé" ou "lu" ou après un retrait manuel ou automatique d'un seul ou de tous les messages AIS liés à la sécurité reçus et non lus, le symbole associé 5.16 indiqué dans l'Annexe A ne doit plus être affiché.

Les messages AIS reçus liés à la sécurité ayant une source et un contenu identiques doivent remplacer les messages existants qu'ils dupliquent et doivent garder le statut d'origine du message AIS reçu lié à la sécurité (conservé, lu ou non lu). L'heure de réception doit être fixée sur la base du message AIS lié à la sécurité reçu en dernier.

Le plus ancien message AIS reçu non conservé lié à la sécurité doit être automatiquement retiré lorsque la capacité de stockage des derniers messages reçus est atteinte et qu'un nouveau message AIS lié à la sécurité est reçu.

Une indication doit être donnée pour savoir que des messages AIS liés à la sécurité reçus et non lus sont disponibles.

Une indication des messages AIS liés à la sécurité reçus et non lus ou conservés doit également être donnée.

5.19.2 Méthodes d'essai et résultats exigés

Si la présentation des messages AIS reçus liés à la sécurité provenant des cibles AIS, des stations de base AIS et de l'aéronef AIS SAR est prévue, appliquer les essais suivants, sauf spécification contraire par une norme de matériel individuelle:

- a) confirmer, par observation, que le manuel de l'utilisateur spécifie la capacité de traitement des messages AIS reçus liés à la sécurité et qu'au moins les capacités minimales sont fournies;

- b) utiliser le simulateur AIS pour envoyer la capacité de stockage du matériel plus un message AIS reçu lié à la sécurité et confirmer, par observation, que:
- la capacité de stockage des messages AIS liés à la sécurité est au moins les 20 derniers messages à adressage sélectif et les 20 derniers messages à radiodiffusion générale plus au moins 20 messages conservés;
 - le plus ancien message reçu a été automatiquement retiré;
 - chaque message AIS reçu lié à la sécurité est initialement à l'état "non lu";
 - une indication est donnée pour savoir que des messages AIS liés à la sécurité reçus et "non lus" sont disponibles;
 - les messages AIS reçus liés à la sécurité sont associés aux sources sur la base du MMSI;
 - un message AIS lié à la sécurité reçu en double et ayant une source et un contenu identiques remplace le message existant et garde le statut d'origine (conservé, lu ou non lu) ;
 - une fois activés par l'utilisateur, les cibles AIS, les stations de base AIS et/ou les aéronefs AIS SAR avec des messages AIS liés à la sécurité reçus et non lus sont indiqués par les symboles appropriés en lien avec les symboles affichés de cible AIS, station de base AIS et/ou aéronef AIS SAR;
 - une fois activé par l'utilisateur, une cible AIS, une station de base AIS et/ou un aéronef AIS SAR pour lequel le contenu d'un message AIS reçu lié à la sécurité est sélectionné pour affichage, est indiqué par un symbole approprié en lien avec le symbole affiché de cible AIS, station de base AIS ou aéronef AIS SAR;
 - il n'est pas possible de retirer des symboles de messages AIS reçus liés à la sécurité des cibles AIS, stations de base AIS et aéronef AIS SAR sur la base de messages AIS reçus liés à la sécurité individuels.
- c) confirmer, par observation, qu'il est possible de retirer tout ou partie des messages AIS reçus liés à la sécurité;
- d) confirmer, par observation, qu'un message AIS lié à la sécurité en double remplace le message existant en conservant le statut d'origine de ce dernier (conservé, lu ou non lu), et que l'heure de réception est fixée sur la base du message AIS lié à la sécurité reçu en dernier;
- e) confirmer, par observation, que le contenu alphanumérique et l'heure de réception de chaque message AIS reçu lié à la sécurité sont disponibles pour visualisation, ainsi que l'indication d'état (non lu/lu/conservé) applicable pour le message AIS reçu lié à la sécurité individuel;
- f) confirmer, par observation, qu'après un changement de tous les messages AIS reçus liés à la sécurité stockés à l'état "lu" ou "conservé", l'indication de disponibilité de messages AIS liés à la sécurité reçus et non lus n'est plus affichée;
- g) confirmer, par observation, que l'utilisation du moyen prévu permet à l'utilisateur de sélectionner l'objet AIS associé sur la base du MMSI pour une présentation alphanumérique de l'information;
- h) confirmer, par observation, qu'après un changement d'un seul ou de tous les messages AIS reçus liés à la sécurité stockés à l'état "conservé" ou "lu" ou après un retrait manuel ou automatique d'un seul ou de tous les messages AIS liés à la sécurité reçus et non lus, les symboles associés (5.16, voir Annexe A) ne sont plus affichés.

5.20 Messages AIS envoyés liés à la sécurité

5.20.1 Exigences

Une fonction d'envoi de messages AIS liés à la sécurité peut être prévue. Si elle est fournie, ces exigences s'appliquent sauf spécification contraire d'une norme de matériel individuelle.

Il doit être impossible d'envoyer des messages AIS liés à la sécurité à adressage sélectif, à des cibles AIS qui ont signalé l'indicateur DTE = 1 (non disponible).

NOTE L'indicateur d'équipement terminal de données (DTE) a pour but d'indiquer à une application côté réception que, s'il est fixé à "disponible", la station émettrice est au moins conforme aux exigences minimales relatives au clavier et à l'affichage.

5.20.2 Méthodes d'essai et résultats exigés

Si la fonction d'envoi de messages AIS liés à la sécurité est fournie et sauf spécification contraire par une norme de matériel individuelle, confirmer, par observation, que lorsqu'un message AIS lié à la sécurité est envoyé à une cible AIS et que l'état de la cible AIS adressée est DTE = 1, une indication est donnée selon laquelle le message AIS lié à la sécurité envoyé peut ne pas être affiché au niveau du destinataire.

6 Affichages INS, radar et cartographiques

6.1 Généralités

6.1.1 Application

NOTE Voir l'IEC 62388 pour des essais équivalents à ceux de l'Article 6 concernant le matériel radar.

Les dispositions du présent Article 6 s'appliquent aux affichages autonomes, associés à des systèmes radar ou chargés de présenter des informations relatives aux cartes électroniques (ECDIS, par exemple) et au matériel d'affichage multifonction lors d'un affichage radar ou cartographique.

6.1.2 Affichages multifonctions

6.1.2.1 Exigence

(MSC191/7.1.1) *Si le matériel d'affichage est capable de prendre en charge la présentation de plusieurs fonctions ou modes opérationnels, la fonction primaire prise en charge par la présentation doit être clairement indiquée (par exemple, radar, carte, etc.). Il doit être possible de sélectionner la présentation associée à la fonction primaire (la présentation radar, par exemple) (voir 6.2) ou la présentation de carte (ECDIS, par exemple) (voir 6.3) par une action simple de l'opérateur.*

6.1.2.2 Méthodes d'essai et résultats exigés

Si un matériel d'affichage est capable de prendre en charge la présentation de plusieurs fonctions:

- a) confirmer, par observation, que la fonction primaire du matériel d'affichage est clairement indiquée;
- b) confirmer, par observation, que la présentation associée à la fonction primaire peut être sélectionnée par une action simple de l'opérateur.

6.1.3 Affichage simultané de données radar et cartographiques

6.1.3.1 Exigence

(MSC191/7.1.2) *Si une image vidéo radar et des informations relatives aux cartes électroniques sont affichées ensemble, la carte et l'image vidéo radar doivent utiliser le même système de référence et les mêmes critères de coordonnées, y compris, selon le cas, le zéro, le CCRP et le mode de stabilisation, et doivent utiliser les mêmes échelles, projection et orientation. Tout décalage entré par l'utilisateur, en plus de l'alignement d'installation (par rapport au CCRP et/ou à la référence de cap, par exemple), doit être indiqué. Les détails sur le décalage doivent être facilement disponibles pour l'utilisateur.*

NOTE Les normes de fonctionnement pour systèmes et matériels de navigation individuels fournissent les exigences fonctionnelles relatives aux décalages.