



Edition 3.0 2021-12  
COMMENTED VERSION

# 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**

INTERNATIONAL  
ELECTROTECHNICAL  
COMMISSION

---

ICS 47.020.70

ISBN 978-2-8322-5297-0

**Warning! Make sure that you obtained this publication from an authorized distributor.**

## CONTENTS

FOREWORD .....	9
1 Scope .....	11
2 Normative references .....	11
3 Terms, definitions <b>and abbreviated terms</b> .....	12
<b>3.1 Terms and definitions</b> .....	12
<b>3.2 Abbreviated terms</b> .....	19
4 General requirements for all displays on the bridge of a ship .....	19
4.1 Relationship to IMO standards .....	19
4.2 Application of IEC 60945 .....	21
4.2.1 Remark .....	21
4.2.2 General requirements .....	21
4.3 Arrangement of information .....	21
4.3.1 Consistency of layout <b>and logical grouping</b> .....	21
4.3.2 Consistent presentation of information .....	22
4.3.3 Separation of operational display area .....	22
4.4 Readability .....	22
4.4.1 Readability under all ambient light conditions .....	22
4.4.2 Legibility of alphanumeric data and text .....	25
4.4.3 Presentation of text <b>and icons</b> .....	25
<del>4.4.4 Icons .....</del>	<del>25</del>
4.5 Colours and intensity .....	26
4.5.1 Discrimination of colours – Requirement .....	26
4.5.2 Methods of test and required results .....	27
4.6 Symbols .....	27
4.6.1 Operational information .....	27
4.6.2 Electronic chart information .....	28
4.7 Colour coding <del>of information</del> .....	29
4.7.1 Colour coding for discrimination .....	29
4.7.2 Colour coding of information .....	29
4.7.3 Colour coding in combination with other attributes .....	29
4.7.4 Flashing of information .....	30
4.8 Integrity marking .....	30
4.8.1 Indication of source, validity and integrity status .....	30
4.8.2 Colour coding of validity and integrity .....	30
4.8.3 Indication of presentation failure .....	31
4.9 Alerts and indications .....	31
4.9.1 Operational status .....	31
4.9.2 List of alerts .....	32
4.9.3 Alert related information from multiple sources .....	33
4.9.4 Speech output for alarms and warnings .....	33
4.10 Presentation mode .....	33
4.10.1 Requirement .....	34
4.10.2 Methods of test and required results .....	35
4.11 User manuals, instructions and reference guides .....	35
4.11.1 Requirement .....	35
4.11.2 Methods of test and required results .....	35

5	Presentation of operational information .....	35
5.1	Application .....	35
5.2	Presentation of own ship information .....	35
5.2.1	Graphical representation of own ship – Requirement .....	35
5.2.2	Methods of test and required results .....	36
5.3	Presentation of chart information .....	36
5.3.1	Alteration of chart information .....	36
5.3.2	Colours and symbols for charted information .....	36
5.4	Presentation of radar information .....	37
5.4.1	Radar video images .....	37
5.4.2	Target trails .....	38
5.5	Presentation of target information .....	38
5.5.1	Providing target information .....	38
5.5.2	Consistent user interface for target information .....	39
5.5.3	Indication of exceeding target capacity .....	39
<del>5.5.4</del>	<del>Merging AIS targets from multiple source .....</del>	<del>39</del>
5.5.4	Presentation of repeated AIS reports .....	41
5.5.5	Filtering sleeping AIS targets .....	41
5.5.6	Activation of AIS targets .....	43
5.5.7	Graphical presentation of targets .....	43
5.5.8	Target selection .....	44
5.5.9	Indication of target derivation .....	45
5.5.10	Presentation of tracked radar target information .....	45
5.5.11	Presentation of reported AIS target information .....	46
5.5.12	Continual update of target information .....	47
5.5.13	Own ship's AIS information .....	48
5.5.14	Obscuring the operational display area .....	48
5.6	Operational alerts .....	48
5.6.1	Alert status .....	48
5.6.2	CPA/TCPA alarms .....	49
5.6.3	Acquisition/activation zones warnings .....	49
5.6.4	Lost target warnings .....	50
5.7	AIS and radar target association .....	50
<del>5.7.1</del>	<del>Target association .....</del>	<del>50</del>
5.7.1	Requirement .....	50
5.7.2	Methods of test and required results .....	51
5.8	AIS presentation <b>user selectors and their status indications</b> .....	51
5.8.1	Requirement .....	51
5.8.2	Methods of test and required results .....	52
5.9	Trial manoeuvre .....	54
5.9.1	Requirement .....	54
5.9.2	Methods of test and required results .....	54
5.10	Measurement .....	54
5.10.1	Measurement from own ship .....	54
5.10.2	Bearing and range measurements .....	54
5.11	Navigation tools .....	55
5.11.1	General requirements .....	55
5.11.2	Range rings .....	55

5.11.3	Variable range marker (VRM) .....	56
5.11.4	Bearing scale.....	56
5.11.5	Electronic bearing line (EBL) .....	57
5.11.6	Parallel index lines (PI).....	58
5.11.7	Offset measurement of range and bearing .....	59
5.11.8	User cursor.....	60
5.12	AIS data link message processing capacity .....	61
5.12.1	General .....	61
5.12.2	Requirements .....	61
5.12.3	Methods of test and required results .....	61
5.13	AIS data report .....	61
5.13.1	General .....	61
5.13.2	AIS data report capacity .....	61
5.13.3	AIS data report display .....	62
5.13.4	Graphical presentation of AIS AtoN dimensions .....	65
5.14	AIS locating device .....	65
5.14.1	General .....	65
5.14.2	AIS locating device capacity .....	66
5.14.3	AIS locating device display .....	66
5.15	AIS ASM .....	68
5.15.1	General .....	68
5.15.2	Categories .....	69
5.15.3	AIS ASM capacity .....	71
5.15.4	AIS ASM display.....	73
5.16	Presentation of AIS synthetic target .....	75
5.16.1	Requirement.....	75
5.16.2	Methods of test and required results .....	76
5.17	Presentation of association of DSC received call with a displayed AIS object.....	77
5.17.1	Requirement.....	77
5.17.2	Methods of test and required results .....	77
5.18	AIS ASM information extending reported AIS target information .....	78
5.19	Received AIS safety related messages .....	79
5.19.1	Requirements .....	79
5.19.2	Methods of test and required results .....	80
5.20	Sent AIS safety related messages.....	81
5.20.1	Requirements .....	81
5.20.2	Methods of test and required results .....	81
6	INS, radar and chart displays .....	82
6.1	General.....	82
6.1.1	Application.....	82
6.1.2	Multifunction displays .....	82
6.1.3	Simultaneous display of radar and chart data .....	82
6.1.4	Range scales.....	83
6.1.5	Operational display area.....	83
6.1.6	Motion display modes .....	83
6.1.7	Orientation modes .....	84
6.1.8	Off-centring .....	84
6.1.9	Stabilisation modes .....	85

6.2	Radar displays .....	85
6.2.1	Application.....	85
6.2.2	Radar video image.....	86
6.2.3	Brightness of radar information.....	86
6.2.4	Display of chart information on radar .....	86
6.2.5	Priority of radar information .....	87
6.2.6	Display of map graphics .....	88
6.3	Chart displays.....	88
6.3.1	Application.....	88
6.3.2	Display of chart information .....	88
6.3.3	IMO ECDIS display categories.....	89
6.3.4	Adding or removing information from the display.....	90
6.3.5	Safety contour .....	90
6.3.6	Safety depth .....	90
6.3.7	Chart scale .....	90
6.3.8	Display of radar and target information .....	91
6.3.9	Display of additional information .....	91
6.4	Composite task-oriented presentations .....	92
6.4.1	User-configured presentations .....	92
6.4.2	Information associated with the task-at-hand .....	92
6.5	Single and simple operator actions .....	92
6.5.1	Applicability .....	92
6.5.2	Requirement.....	93
6.5.3	Methods of test and required results .....	93
6.6	User and default settings .....	93
6.6.1	General .....	93
6.6.2	User-settings .....	93
6.6.3	Default settings .....	94
7	Physical requirements .....	94
7.1	General.....	94
7.2	Display adjustment.....	94
7.2.1	Contrast and brightness.....	94
7.2.2	Magnetic interference .....	95
7.2.3	Temporal stability .....	95
7.2.4	Physical controls and status indicators .....	96
7.3	Screen size.....	97
7.3.1	Requirement.....	97
7.3.2	Method of test and required results.....	97
7.4	Multicoloured display equipment .....	97
7.4.1	Requirement.....	97
7.4.2	Method of test and required results.....	98
7.5	Screen resolution.....	98
7.5.1	Requirement.....	98
7.5.2	Method of test and required results.....	98
7.6	Screen viewing angle .....	99
7.6.1	Requirement.....	99
7.6.2	Methods of test and required results .....	99

Annex A (normative) Presentation colours and symbols .....	100
A.1 Overview .....	100
A.2 Purpose .....	100
A.3 <b>Scope Use</b> .....	100
A.4 Application .....	100
A.5 Navigation-related symbols .....	100
Annex B (normative) Guidelines for the presentation of navigation-related terminology and abbreviations .....	140
B.1 Overview .....	140
B.2 Purpose .....	140
B.3 <b>Scope Use</b> of these guidelines .....	140
B.4 Application .....	140
B.5 Navigation related terminology and abbreviations .....	140
Annex C (informative) Guidance on display and dialogue design in <b>IMO MSC/Circ.982</b> .....	147
C.1 Overview .....	147
C.2 General .....	147
C.3 Requirements in <b>IMO MSC/Circ.982</b> related to the display design .....	147
Annex D (informative) Guidance on testing .....	149
D.1 Methods of test <del>derived from ISO 9241-12</del> .....	149
D.1.1 General .....	149
D.1.2 Observation .....	149
D.1.3 Inspection of documented evidence .....	149
D.1.4 Measurement .....	150
D.1.5 Analytical evaluation .....	150
D.2 Application of IEC 60945 .....	150
D.2.1 Display equipment category .....	150
D.2.2 Technical performance .....	150
D.2.3 Pre-conditioning for environmental tests .....	151
D.2.4 Methods of test <del>derived from ISO 9241-12</del> applied for IEC 60945 .....	151
D.3 Compliance with requirements .....	152
D.4 Simulation .....	153
D.5 Electronic chart data .....	153
Annex E (normative) Operational controls <b>and logical groupin</b> .....	154
E.1 Overview .....	154
E.2 Logical grouping of data and control functions .....	154
E.3 <b>Navigation related terminology and icons for common function controls (hot keys and shortcuts)</b> .....	155
Annex F (normative) Icons for presentation of the state of an alert .....	173
Annex G (normative) Testing for colours, intensity and flicker .....	175
G.1 Testing for colours and intensity .....	175
G.1.1 General .....	175
G.1.2 Test personnel .....	176
G.1.3 Method of test .....	176
G.2 Testing for flicker .....	177
G.2.1 Overview .....	177
G.2.2 Analytic model .....	177
G.2.3 Decision criteria .....	179

Annex H (normative) Single and simple operator actions .....	181
H.1 General.....	181
H.2 Tables for single and simple operator actions .....	181
Annex I (normative) Default settings .....	183
I.1 General.....	183
I.2 ECDIS default settings .....	183
I.3 Radar default settings .....	185
Annex J (normative) Implementation details of AIS ASM .....	186
J.1 General.....	186
J.2 AIS ASM .....	186
Annex K (informative) Overview of AIS Messages.....	195
K.1 General.....	195
K.2 Use case guidance on AIS ASM.....	197
Annex L (informative) Overview of the use AIS AtoN status field bits .....	198
Bibliography.....	199
List of comments.....	201
Table 1 – Ambient light conditions .....	23
Table 2 – Operational status of indications .....	32
Table 3 – User selectors for AIS presentation .....	51
Table 4 – AIS status indications .....	53
Table 5 – AIS data report capacity .....	62
Table 6 – AIS locating devices capacity .....	66
Table 7 – AIS ASM object capacity .....	71
Table 8 – Extended reported AIS target information from AIS ASM .....	79
Table A.1 – Own ship symbols .....	101
Table A.2 – Radar and AIS symbols.....	105
Table A.3 – Navigation symbols .....	125
Table A.4 – Navigation tools .....	130
Table A.5 – Other symbols.....	131
Table A.6 – Example of possible colour scheme .....	139
Table B.1 – List of standard terms and abbreviations.....	141
Table B.2 – List of standard units of measurement and abbreviations .....	146
Table C.1 – Paragraphs in MSC/Circ.982 associated with IEC 60945 requirements .....	147
Table C.2 – Other paragraphs in MSC/Circ.982 related to display design.....	148
Table C.3 – Other paragraphs in MSC/Circ.982 partially related to display design .....	148
Table D.1 – Methods of test applied for IEC 60945 .....	151
<del>Table E.1 – Top level grouping of data and control functions for radar applications .....</del>	<del>.....</del>
<del>Table E.2 – Top level grouping of data and control functions for charting.....</del>	<del>.....</del>
<del>Table E.3 – General control icons .....</del>	<del>.....</del>
<del>Table E.4 – Task-oriented measurement control icons .....</del>	<del>.....</del>
<del>Table E.5 – Radar specific control icons .....</del>	<del>.....</del>

Table E.1 – Logical grouping for radar, ECDIS and INS applications (based on MSC.1/Circ.1609) .....	156
Table E.2 – Examples of logical grouping for voluntary implementation.....	157
Table E.3 – General controls .....	160
Table E.4 – General navigation functions (based on MSC.1/Circ.1609).....	161
Table E.5 – Radar specific controls.....	164
Table E.6 – Control of chart display functions (based on MSC.1/Circ.1609) .....	165
Table E.7 – Control of chart functionality (based on MSC.1/Circ.1609) .....	170
Table E.8 – Database functions (based on MSC.1/Circ.1609) .....	170
Table E.9 – Route plan and monitoring functions (based on MSC.1/Circ.1609) .....	171
Table E.10 – Groups of functions (based on MSC.1/Circ.1609) .....	171
<del>Table F.1 – Alert management icons – basic.....</del>	<del>.....</del>
<del>Table F.2 – Alert management icons – additional qualifiers.....</del>	<del>.....</del>
Table G.1 – Values of predicted energy and special coefficients .....	180
Table H.1 – Access to functions, as defined before June 2019 (based on MSC.1/Circ.1609) .....	181
Table H.2 – Access to functions (based on MSC.1/Circ.1609).....	182
Table H.3 – Access to group of functions (based on MSC.1/Circ.1609) .....	182
Table I.1 – ECDIS settings configured in response to "Default" selection (based on MSC.1/Circ.1609) .....	183
Table I.2 – Radar control settings configured in response to "Default" selection (based on MSC.1/Circ.1609) .....	185
Table J.1 – Details of AIS ASM .....	186
Table K.1 – AIS Messages.....	195
Table K.2 – AIS ASM Messages .....	196
Table L.1 – AIS AtoN status field .....	198

## 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

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
- 2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

**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](http://www.iec.ch/members_experts/refdocs). The main document types developed by IEC are described in greater detail at [www.iec.ch/standardsdev/publications](http://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](http://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). **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*

~~IHO 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.1:2014Rev.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)*



# 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**



## CONTENTS

FOREWORD .....	9
1 Scope .....	11
2 Normative references .....	11
3 Terms, definitions and abbreviated terms .....	12
3.1 Terms and definitions.....	12
3.2 Abbreviated terms.....	19
4 General requirements for all displays on the bridge of a ship .....	19
4.1 Relationship to IMO standards .....	19
4.2 Application of IEC 60945.....	21
4.2.1 Remark.....	21
4.2.2 General requirements .....	21
4.3 Arrangement of information.....	21
4.3.1 Consistency of layout and logical grouping .....	21
4.3.2 Consistent presentation of information.....	22
4.3.3 Separation of operational display area.....	22
4.4 Readability.....	22
4.4.1 Readability under all ambient light conditions .....	22
4.4.2 Legibility of alphanumeric data and text.....	25
4.4.3 Presentation of text and icons.....	25
4.5 Colours and intensity .....	26
4.5.1 Discrimination of colours – Requirement.....	26
4.5.2 Methods of test and required results .....	27
4.6 Symbols.....	27
4.6.1 Operational information .....	27
4.6.2 Electronic chart information .....	28
4.7 Colour coding .....	29
4.7.1 Colour coding for discrimination.....	29
4.7.2 Colour coding of information .....	29
4.7.3 Colour coding in combination with other attributes .....	29
4.7.4 Flashing of information .....	29
4.8 Integrity marking.....	30
4.8.1 Indication of source, validity and integrity status .....	30
4.8.2 Colour coding of validity and integrity .....	30
4.8.3 Indication of presentation failure .....	30
4.9 Alerts and indications.....	31
4.9.1 Operational status .....	31
4.9.2 List of alerts.....	31
4.9.3 Alert related information from multiple sources .....	31
4.9.4 Speech output for alarms and warnings .....	31
4.10 Presentation mode.....	31
4.10.1 Requirement.....	31
4.10.2 Methods of test and required results .....	32
4.11 User manuals, instructions and reference guides .....	32
4.11.1 Requirement.....	32
4.11.2 Methods of test and required results .....	32
5 Presentation of operational information .....	32

5.1	Application .....	32
5.2	Presentation of own ship information .....	32
5.2.1	Graphical representation of own ship – Requirement .....	32
5.2.2	Methods of test and required results .....	33
5.3	Presentation of chart information .....	33
5.3.1	Alteration of chart information .....	33
5.3.2	Colours and symbols for charted information .....	33
5.4	Presentation of radar information .....	34
5.4.1	Radar video images .....	34
5.4.2	Target trails .....	35
5.5	Presentation of target information .....	35
5.5.1	Providing target information .....	35
5.5.2	Consistent user interface for target information .....	36
5.5.3	Indication of exceeding target capacity .....	36
5.5.4	Presentation of repeated AIS reports .....	37
5.5.5	Filtering sleeping AIS targets .....	38
5.5.6	Activation of AIS targets .....	38
5.5.7	Graphical presentation of targets .....	39
5.5.8	Target selection .....	40
5.5.9	Indication of target derivation .....	41
5.5.10	Presentation of tracked radar target information .....	41
5.5.11	Presentation of reported AIS target information .....	42
5.5.12	Continual update of target information .....	43
5.5.13	Own ship's AIS information .....	43
5.5.14	Obscuring the operational display area .....	44
5.6	Operational alerts .....	44
5.6.1	Alert status .....	44
5.6.2	CPA/TCPA alarms .....	44
5.6.3	Acquisition/activation zones warnings .....	45
5.6.4	Lost target warnings .....	45
5.7	AIS and radar target association .....	46
5.7.1	Requirement .....	46
5.7.2	Methods of test and required results .....	46
5.8	AIS presentation user selectors and their status indications .....	47
5.8.1	Requirement .....	47
5.8.2	Methods of test and required results .....	48
5.9	Trial manoeuvre .....	49
5.9.1	Requirement .....	49
5.9.2	Methods of test and required results .....	49
5.10	Measurement .....	49
5.10.1	Measurement from own ship .....	49
5.10.2	Bearing and range measurements .....	49
5.11	Navigation tools .....	50
5.11.1	General requirements .....	50
5.11.2	Range rings .....	50
5.11.3	Variable range marker (VRM) .....	50
5.11.4	Bearing scale .....	51
5.11.5	Electronic bearing line (EBL) .....	52
5.11.6	Parallel index lines (PI) .....	53

5.11.7	Offset measurement of range and bearing .....	54
5.11.8	User cursor.....	55
5.12	AIS data link message processing capacity.....	56
5.12.1	General .....	56
5.12.2	Requirements .....	56
5.12.3	Methods of test and required results .....	56
5.13	AIS data report .....	56
5.13.1	General .....	56
5.13.2	AIS data report capacity .....	56
5.13.3	AIS data report display .....	57
5.13.4	Graphical presentation of AIS AtoN dimensions .....	60
5.14	AIS locating device .....	60
5.14.1	General .....	60
5.14.2	AIS locating device capacity .....	61
5.14.3	AIS locating device display .....	61
5.15	AIS ASM .....	63
5.15.1	General .....	63
5.15.2	Categories.....	64
5.15.3	AIS ASM capacity .....	66
5.15.4	AIS ASM display.....	68
5.16	Presentation of AIS synthetic target.....	70
5.16.1	Requirement.....	70
5.16.2	Methods of test and required results.....	71
5.17	Presentation of association of DSC received call with a displayed AIS object.....	72
5.17.1	Requirement.....	72
5.17.2	Methods of test and required results.....	72
5.18	AIS ASM information extending reported AIS target information.....	73
5.19	Received AIS safety related messages .....	74
5.19.1	Requirements .....	74
5.19.2	Methods of test and required results .....	75
5.20	Sent AIS safety related messages.....	76
5.20.1	Requirements .....	76
5.20.2	Methods of test and required results .....	76
6	INS, radar and chart displays .....	76
6.1	General.....	76
6.1.1	Application.....	76
6.1.2	Multifunction displays .....	76
6.1.3	Simultaneous display of radar and chart data .....	77
6.1.4	Range scales.....	77
6.1.5	Operational display area .....	78
6.1.6	Motion display modes .....	78
6.1.7	Orientation modes .....	78
6.1.8	Off-centring .....	79
6.1.9	Stabilisation modes .....	79
6.2	Radar displays.....	80
6.2.1	Application.....	80
6.2.2	Radar video image.....	80
6.2.3	Brightness of radar information.....	81
6.2.4	Display of chart information on radar .....	81

6.2.5	Priority of radar information .....	82
6.2.6	Display of map graphics .....	82
6.3	Chart displays .....	83
6.3.1	Application .....	83
6.3.2	Display of chart information .....	83
6.3.3	IMO ECDIS display categories .....	84
6.3.4	Adding or removing information from the display .....	84
6.3.5	Safety contour .....	85
6.3.6	Safety depth .....	85
6.3.7	Chart scale .....	85
6.3.8	Display of radar and target information .....	86
6.3.9	Display of additional information .....	86
6.4	Composite task-oriented presentations .....	87
6.4.1	User-configured presentations .....	87
6.4.2	Information associated with the task-at-hand .....	87
6.5	Single and simple operator actions .....	87
6.5.1	Applicability .....	87
6.5.2	Requirement .....	88
6.5.3	Methods of test and required results .....	88
6.6	User and default settings .....	88
6.6.1	General .....	88
6.6.2	User-settings .....	88
6.6.3	Default settings .....	89
7	Physical requirements .....	89
7.1	General .....	89
7.2	Display adjustment .....	89
7.2.1	Contrast and brightness .....	89
7.2.2	Magnetic interference .....	90
7.2.3	Temporal stability .....	90
7.2.4	Physical controls and status indicators .....	91
7.3	Screen size .....	91
7.3.1	Requirement .....	91
7.3.2	Method of test and required results .....	92
7.4	Multicoloured display equipment .....	92
7.4.1	Requirement .....	92
7.4.2	Method of test and required results .....	92
7.5	Screen resolution .....	93
7.5.1	Requirement .....	93
7.5.2	Method of test and required results .....	93
7.6	Screen viewing angle .....	93
7.6.1	Requirement .....	93
7.6.2	Methods of test and required results .....	93
Annex A (normative)	Presentation colours and symbols .....	94
A.1	Overview .....	94
A.2	Purpose .....	94
A.3	Use .....	94
A.4	Application .....	94
A.5	Navigation-related symbols .....	94

Annex B (normative) Guidelines for the presentation of navigation-related terminology and abbreviations .....	130
B.1 Overview.....	130
B.2 Purpose .....	130
B.3 Use of these guidelines.....	130
B.4 Application.....	130
B.5 Navigation related terminology and abbreviations .....	130
Annex C (informative) Guidance on display and dialogue design in IMO MSC/Circ.982.....	137
C.1 Overview.....	137
C.2 General.....	137
C.3 Requirements in IMO MSC/Circ.982 related to the display design .....	137
Annex D (informative) Guidance on testing .....	139
D.1 Methods of test .....	139
D.1.1 General .....	139
D.1.2 Observation.....	139
D.1.3 Inspection of documented evidence .....	139
D.1.4 Measurement.....	140
D.1.5 Analytical evaluation.....	140
D.2 Application of IEC 60945.....	140
D.2.1 Display equipment category.....	140
D.2.2 Technical performance .....	140
D.2.3 Pre-conditioning for environmental tests .....	141
D.2.4 Methods of test applied for IEC 60945 .....	141
D.3 Compliance with requirements .....	142
D.4 Simulation.....	143
D.5 Electronic chart data.....	143
Annex E (normative) Operational controls and logical grouping.....	144
E.1 Overview.....	144
E.2 Logical grouping of data and control functions .....	144
E.3 Navigation related terminology and icons for common function controls (hot keys and shortcuts).....	146
Annex F (normative) Icons for presentation of the state of an alert.....	160
Annex G (normative) Testing for colours, intensity and flicker .....	161
G.1 Testing for colours and intensity .....	161
G.1.1 General .....	161
G.1.2 Test personnel.....	162
G.1.3 Method of test.....	162
G.2 Testing for flicker .....	163
G.2.1 Overview .....	163
G.2.2 Analytic model.....	163
G.2.3 Decision criteria.....	165
Annex H (normative) Single and simple operator actions .....	167
H.1 General.....	167
H.2 Tables for single and simple operator actions .....	167
Annex I (normative) Default settings .....	169
I.1 General.....	169
I.2 ECDIS default settings.....	169
I.3 Radar default settings.....	171

Annex J (normative) Implementation details of AIS ASM .....	172
J.1 General.....	172
J.2 AIS ASM .....	172
Annex K (informative) Overview of AIS Messages .....	181
K.1 General.....	181
K.2 Use case guidance on AIS ASM.....	183
Annex L (informative) Overview of the use AIS AtoN status field bits .....	184
Bibliography.....	185
Table 1 – Ambient light conditions .....	23
Table 2 – Operational status of indications .....	31
Table 3 – User selectors for AIS presentation .....	47
Table 4 – AIS status indications.....	48
Table 5 – AIS data report capacity .....	57
Table 6 – AIS locating devices capacity .....	61
Table 7 – AIS ASM object capacity .....	66
Table 8 – Extended reported AIS target information from AIS ASM .....	73
Table A.1 – Own ship symbols .....	95
Table A.2 – Radar and AIS symbols.....	99
Table A.3 – Navigation symbols.....	115
Table A.4 – Navigation tools .....	120
Table A.5 – Other symbols.....	121
Table A.6 – Example of possible colour scheme .....	129
Table B.1 – List of standard terms and abbreviations.....	131
Table B.2 – List of standard units of measurement and abbreviations .....	136
Table C.1 – Paragraphs in MSC/Circ.982 associated with IEC 60945 requirements .....	137
Table C.2 – Other paragraphs in MSC/Circ.982 related to display design.....	138
Table C.3 – Other paragraphs in MSC/Circ.982 partially related to display design .....	138
Table D.1 – Methods of test applied for IEC 60945 .....	141
Table E.1 – Logical grouping for radar, ECDIS and INS applications (based on MSC.1/Circ.1609).....	145
Table E.2 – Examples of logical grouping for voluntary implementation.....	146
Table E.3 – General controls .....	147
Table E.4 – General navigation functions (based on MSC.1/Circ.1609).....	148
Table E.5 – Radar specific controls.....	151
Table E.6 – Control of chart display functions (based on MSC.1/Circ.1609) .....	152
Table E.7 – Control of chart functionality (based on MSC.1/Circ.1609) .....	157
Table E.8 – Database functions (based on MSC.1/Circ.1609) .....	157
Table E.9 – Route plan and monitoring functions (based on MSC.1/Circ.1609) .....	158
Table E.10 – Groups of functions (based on MSC.1/Circ.1609).....	158
Table G.1 – Values of predicted energy and special coefficients .....	166
Table H.1 – Access to functions, as defined before June 2019 (based on MSC.1/Circ.1609).....	167
Table H.2 – Access to functions (based on MSC.1/Circ.1609).....	168

Table H.3 – Access to group of functions (based on MSC.1/Circ.1609) .....	168
Table I.1 – ECDIS settings configured in response to "Default" selection (based on MSC.1/Circ.1609) .....	169
Table I.2 – Radar control settings configured in response to "Default" selection (based on MSC.1/Circ.1609) .....	171
Table J.1 – Details of AIS ASM .....	172
Table K.1 – AIS Messages .....	181
Table K.2 – AIS ASM Messages .....	182
Table L.1 – AIS AtoN status field .....	184

## 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

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
- 2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

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](http://www.iec.ch/members_experts/refdocs). The main document types developed by IEC are described in greater detail at [www.iec.ch/standardsdev/publications](http://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](http://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)*

## SOMMAIRE

AVANT-PROPOS .....	195
1 Domaine d'application .....	197
2 Références normatives .....	197
3 Termes, définitions et abréviations .....	198
3.1 Termes et définitions .....	198
3.2 Abréviations .....	205
4 Exigences générales applicables à tous les affichages sur la passerelle d'un navire .....	205
4.1 Relations avec les normes de l'OMI .....	205
4.2 Application de l'IEC 60945 .....	207
4.2.1 Remarque .....	207
4.2.2 Exigences générales .....	207
4.3 Disposition des informations .....	208
4.3.1 Cohérence de la présentation et regroupement logique .....	208
4.3.2 Présentation cohérente des informations .....	209
4.3.3 Séparation de la zone d'affichage opérationnel .....	209
4.4 Lisibilité .....	209
4.4.1 Lisibilité dans toutes les conditions d'éclairage ambiant .....	209
4.4.2 Lisibilité des données alphanumériques et du texte .....	212
4.4.3 Présentation du texte et des icônes .....	212
4.5 Couleurs et intensité .....	213
4.5.1 Distinction des couleurs – Exigences .....	213
4.5.2 Méthodes d'essai et résultats exigés .....	214
4.6 Symboles .....	214
4.6.1 Informations opérationnelles .....	214
4.6.2 Informations relatives aux cartes électroniques .....	215
4.7 Codage couleur .....	216
4.7.1 Codage couleur pour la discrimination .....	216
4.7.2 Codage couleur des informations .....	216
4.7.3 Codage couleur en combinaison avec d'autres attributs .....	217
4.7.4 Clignotement des informations .....	217
4.8 Indication d'intégrité .....	217
4.8.1 Indication du statut de la source, de la validité et de l'intégrité .....	217
4.8.2 Codage couleur de la validité et de l'intégrité .....	218
4.8.3 Indication de défaillance de la présentation .....	218
4.9 Alertes et indications .....	218
4.9.1 Statut opérationnel .....	218
4.9.2 Liste des alertes .....	219
4.9.3 Informations relatives aux alertes provenant de plusieurs sources .....	219
4.9.4 Données vocales en sortie pour les alarmes et les mises en garde .....	219
4.10 Mode de présentation .....	219
4.10.1 Exigence .....	219
4.10.2 Méthodes d'essai et résultats exigés .....	219
4.11 Manuels de l'utilisateur, instructions et guides de référence .....	219
4.11.1 Exigence .....	219
4.11.2 Méthodes d'essai et résultats exigés .....	219

5	Présentation des informations opérationnelles .....	220
5.1	Application .....	220
5.2	Présentation des informations sur le navire porteur.....	220
5.2.1	Représentation graphique du navire porteur – Exigences .....	220
5.2.2	Méthodes d'essai et résultats exigés .....	220
5.3	Présentation des informations cartographiques .....	221
5.3.1	Altération des informations cartographiques .....	221
5.3.2	Couleurs et symboles pour informations cartographiques .....	221
5.4	Présentation des informations radar.....	222
5.4.1	Images vidéo radar .....	222
5.4.2	Sillages de cibles.....	223
5.5	Présentation des informations relatives à la cible.....	223
5.5.1	Fourniture d'informations relatives à la cible .....	223
5.5.2	Interface utilisateur cohérente pour les informations relatives à la cible .....	224
5.5.3	Indication de dépassement de capacité de cibles .....	224
5.5.4	Présentation de comptes rendus répétés .....	226
5.5.5	Filtrage de cibles AIS en veille.....	226
5.5.6	Activation de cibles AIS .....	227
5.5.7	Présentation graphique des cibles .....	227
5.5.8	Sélection de cible .....	229
5.5.9	Indication de dérivation de cible.....	229
5.5.10	Présentation des informations relatives aux cibles poursuivies par radar .....	229
5.5.11	Présentation des informations relatives aux cibles AIS signalées.....	230
5.5.12	Mise à jour continue des informations relatives à la cible.....	232
5.5.13	Informations AIS du navire porteur .....	232
5.5.14	Obscurcissement de la zone d'affichage opérationnel.....	232
5.6	Alertes opérationnelles .....	233
5.6.1	Statut des alertes .....	233
5.6.2	Alarmes relatives à CPA/TCPA.....	233
5.6.3	Mises en garde relatives aux zones d'acquisition/activation .....	234
5.6.4	Mises en garde relatives aux cibles perdues.....	234
5.7	Association de cibles AIS et de cibles radar .....	235
5.7.1	Exigence .....	235
5.7.2	Méthodes d'essai et résultats exigés .....	235
5.8	Sélecteurs d'utilisateur pour la présentation AIS et leurs indications de statut .....	236
5.8.1	Exigence .....	236
5.8.2	Méthodes d'essai et résultats exigés .....	237
5.9	Simulation de manœuvre .....	238
5.9.1	Exigence .....	238
5.9.2	Méthodes d'essai et résultats exigés .....	238
5.10	Mesure .....	238
5.10.1	Mesure à partir du navire porteur.....	238
5.10.2	Mesures de relèvement et de distance.....	239
5.11	Outils de navigation .....	239
5.11.1	Exigences générales .....	239
5.11.2	Cercles de distance .....	239
5.11.3	Marqueur de distance variable (VRM).....	240
5.11.4	Echelle de relèvement .....	241
5.11.5	Alidade électronique (EBL) .....	242

5.11.6	Alidades mécaniques (PI) .....	243
5.11.7	Mesure de décalage de la distance et du relèvement.....	244
5.11.8	Curseur utilisateur .....	245
5.12	Capacité de traitement des messages AIS de liaison de données .....	245
5.12.1	Généralités .....	245
5.12.2	Exigences.....	246
5.12.3	Méthodes d'essai et résultats exigés .....	246
5.13	compte rendu de données AIS .....	246
5.13.1	Généralités .....	246
5.13.2	Capacité des comptes rendus de données AIS .....	246
5.13.3	Affichage des comptes rendus de données AIS .....	247
5.13.4	Présentation graphique des dimensions des AIS AtoN.....	250
5.14	Dispositif de localisation AIS.....	251
5.14.1	Généralités .....	251
5.14.2	Capacité des dispositifs de localisation AIS .....	251
5.14.3	Affichage des dispositifs de localisation AIS .....	251
5.15	AIS ASM .....	254
5.15.1	Généralités .....	254
5.15.2	Catégories.....	255
5.15.3	Capacité des AIS ASM .....	257
5.15.4	Affichage des AIS ASM.....	258
5.16	Présentation des cibles AIS synthétiques.....	261
5.16.1	Exigence .....	261
5.16.2	Méthodes d'essai et résultats exigés .....	262
5.17	Présentation des associations d'appels DSC reçus à un objet AIS affiché.....	263
5.17.1	Exigence .....	263
5.17.2	Méthodes d'essai et résultats exigés .....	264
5.18	Informations relatives aux AIS ASM complétant les informations relatives aux cibles AIS signalées .....	264
5.19	Messages AIS reçus liés à la sécurité .....	265
5.19.1	Exigences.....	265
5.19.2	Méthodes d'essai et résultats exigés .....	266
5.20	Messages AIS envoyés liés à la sécurité.....	267
5.20.1	Exigences.....	267
5.20.2	Méthodes d'essai et résultats exigés .....	268
6	Affichages INS, radar et cartographiques.....	268
6.1	Généralités .....	268
6.1.1	Application.....	268
6.1.2	Affichages multifonctions .....	268
6.1.3	Affichage simultané de données radar et cartographiques .....	268
6.1.4	Echelles de distance.....	269
6.1.5	Zone d'affichage opérationnel.....	269
6.1.6	Modes d'affichage du mouvement.....	270
6.1.7	Modes d'orientation .....	270
6.1.8	Excentrement .....	271
6.1.9	Modes de stabilisation .....	271
6.2	Affichages radar.....	272
6.2.1	Application.....	272
6.2.2	Image vidéo radar.....	272

6.2.3	Luminosité des informations radar .....	272
6.2.4	Affichage d'informations cartographiques sur le radar .....	273
6.2.5	Priorité des informations radar .....	274
6.2.6	Affichage de graphiques de cartes .....	275
6.3	Affichages cartographiques .....	275
6.3.1	Application .....	275
6.3.2	Affichage des informations relatives aux cartes électroniques .....	275
6.3.3	Catégories d'affichage ECDIS de l'OMI .....	276
6.3.4	Ajout ou retrait d'informations de l'affichage .....	277
6.3.5	Isobathe de sécurité .....	277
6.3.6	Profondeur de sécurité .....	277
6.3.7	Echelle de carte .....	278
6.3.8	Affichage des informations radar et des informations relatives aux cibles .....	278
6.3.9	Affichage d'informations supplémentaires .....	279
6.4	Présentations composites orientées tâches .....	279
6.4.1	Présentations configurées par l'utilisateur .....	279
6.4.2	Informations associées à la tâche à accomplir .....	280
6.5	Actions uniques et simples de l'opérateur .....	280
6.5.1	Applicabilité .....	280
6.5.2	Exigence .....	280
6.5.3	Méthodes d'essai et résultats exigés .....	281
6.6	Paramètres de l'utilisateur et paramètres par défaut .....	281
6.6.1	Généralités .....	281
6.6.2	Paramètres de l'utilisateur .....	281
6.6.3	Default settings .....	281
7	Exigences physiques .....	282
7.1	Généralités .....	282
7.2	Réglage de l'affichage .....	282
7.2.1	Contraste et luminosité .....	282
7.2.2	Interférences magnétiques .....	283
7.2.3	Stabilité temporelle .....	283
7.2.4	Commandes physiques et indicateurs de statut .....	284
7.3	Taille d'écran .....	284
7.3.1	Exigence .....	284
7.3.2	Méthode d'essai et résultats exigés .....	285
7.4	Matériel d'affichage multicolore .....	285
7.4.1	Exigence .....	285
7.4.2	Méthode d'essai et résultats exigés .....	285
7.5	Résolution d'écran .....	285
7.5.1	Exigence .....	285
7.5.2	Méthode d'essai et résultats exigés .....	286
7.6	Angle d'observation de l'écran .....	286
7.6.1	Exigence .....	286
7.6.2	Méthodes d'essai et résultats exigés .....	286
Annexe A (normative)	Couleurs et symboles de présentation .....	287
A.1	Vue d'ensemble .....	287
A.2	Objet .....	287
A.3	Utilisation .....	287

A.4	Application .....	287
A.5	Symboles utilisés pour la navigation .....	287
Annexe B (normative)	Lignes directrices pour la présentation de la terminologie et des abréviations utilisés pour la navigation.....	323
B.1	Vue d'ensemble .....	323
B.2	Objet.....	323
B.3	Utilisation de ces lignes directrices .....	323
B.4	Application.....	323
B.5	Terminologie et abréviations relatives à la navigation .....	323
Annexe C (informative)	Recommandations de la MSC/Circ. 982 de l'OMI concernant la conception de l'affichage et des dialogues .....	332
C.1	Vue d'ensemble .....	332
C.2	Généralités .....	332
C.3	Exigences de la MSC/Circ.982 de l'OMI relatives à la conception des affichages .....	332
Annexe D (informative)	Recommandations pour les essais .....	334
D.1	Méthodes d'essai .....	334
D.1.1	Généralités .....	334
D.1.2	Observation .....	334
D.1.3	Examen de preuve documentée .....	334
D.1.4	Mesure .....	335
D.1.5	Evaluation analytique .....	335
D.2	Application de l'IEC 60945 .....	335
D.2.1	Catégorie de matériel d'affichage .....	335
D.2.2	Qualités techniques de fonctionnement .....	335
D.2.3	Préconditionnement pour les essais d'environnement .....	336
D.2.4	Méthodes d'essai appliquées pour l'IEC 60945 .....	336
D.3	Conformité aux exigences.....	338
D.4	Simulation.....	338
D.5	Informations relatives aux cartes électroniques.....	338
Annexe E (normative)	Commandes opérationnelles et regroupement logique.....	339
E.1	Vue d'ensemble .....	339
E.2	Regroupement logique des données et des fonctions de commande.....	339
E.3	Terminologie relative à la navigation et icône des commandes de fonction courantes (touches rapides et raccourcis).....	341
Annexe F (normative)	Icônes pour la présentation de l'état d'une alerte.....	355
Annexe G (normative)	Essais relatifs aux couleurs, à l'intensité et au scintillement.....	356
G.1	Essais relatifs aux couleurs et à l'intensité.....	356
G.1.1	Généralités .....	356
G.1.2	Personnel en charge des essais .....	357
G.1.3	Méthode d'essai .....	357
G.2	Essais de scintillement.....	358
G.2.1	Vue d'ensemble.....	358
G.2.2	Modèle analytique .....	358
G.2.3	Critères de décision.....	361
Annexe H (normative)	Actions uniques et simples de l'opérateur .....	363
H.1	Généralités .....	363
H.2	Tableaux des actions uniques et simples de l'opérateur.....	363
Annexe I (normative)	Default settings .....	366

I.1	Généralités .....	366
I.2	Paramètres par défaut des ECDIS .....	366
I.3	Paramètres par défaut des radars .....	368
Annexe J (normative)	Détails de la mise en œuvre des messages AIS propres aux applications .....	369
J.1	Généralités .....	369
J.2	AIS ASM .....	369
Annexe K (informative)	Vue d'ensemble des messages AIS .....	378
K.1	Généralités .....	378
K.2	Recommandations concernant les cas d'utilisation des AIS ASM .....	380
Annexe L (informative)	Vue d'ensemble de l'utilisation des bits du champ d'état AIS AtoN .....	382
Bibliographie.....		383
Tableau 1 –	Conditions d'éclairage ambiant.....	210
Tableau 2 –	Statut opérationnel des indications .....	218
Tableau 3 –	Sélecteurs d'utilisateur pour la présentation AIS.....	236
Tableau 4 –	Indications de statut AIS.....	237
Tableau 5 –	Capacité des comptes rendus de données AIS .....	246
Tableau 6 –	Capacité des dispositifs de localisation AIS .....	251
Tableau 7 –	Capacité des objets AIS ASM .....	257
Tableau 8 –	Informations étendues relatives aux cibles AIS signalées provenant de l'AIS ASM .....	265
Tableau A.1 –	Symboles représentant le navire porteur .....	288
Tableau A.2 –	Symboles représentant les cibles radar et les cibles AIS .....	292
Tableau A.3 –	Symboles de navigation .....	308
Tableau A.4 –	Outils de navigation on.....	313
Tableau A.5 –	Autres symboles.....	314
Tableau A.6 –	Exemple de combinaisons de couleurs possibles .....	322
Tableau B.1 –	Liste des termes et abréviations types.....	324
Tableau B.2 –	Liste des unités de mesure normalisées et des abréviations types .....	331
Tableau C.1 –	Paragraphes de la MSC/Circ.982 associés à des exigences de l'IEC 60945 .....	332
Tableau C.2 –	Autres paragraphes de la MSC/Circ.982 liés à la conception des affichages .....	333
Tableau C.3 –	Autres paragraphes de la MSC/Circ.982 en partie liés à la conception des affichages .....	333
Tableau D.1 –	Méthodes d'essai appliquées pour l'IEC 60945 .....	336
Tableau E.1 –	Regroupement logique pour les applications radar, ECDIS et INS (basé sur la MSC.1/Circ.1609).....	340
Tableau E.2 –	Exemples de regroupement logique pour une mise en œuvre volontaire.....	341
Tableau E.3 –	Commandes générales.....	342
Tableau E.4 –	Fonctions de navigation générales (basées sur la MSC.1/Circ.1609).....	343
Tableau E.5 –	Commandes spécifiques au radar .....	346
Tableau E.6 –	Commande des fonctions d'affichage cartographique (basée sur la MSC.1/Circ.1609) .....	347

Tableau E.7 – Commande de la fonctionnalité cartographique (basée sur la MSC.1/Circ.1609) .....	352
Tableau E.8 – Fonctions de base (basées sur la MSC.1/Circ.1609) .....	352
Tableau E.9 – Plan de route et fonctions d’affichage (basée sur la MSC.1/Circ.1609) .....	353
Tableau E.10 – Groupes de fonctions (basés sur la MSC.1/Circ.1609) .....	353
Tableau G.1 – Valeurs des coefficients d’énergie prédite et des coefficients spéciaux .....	361
Tableau H.1 – Accès aux fonctions, tel que défini avant juin 2019 (sur la base de la MSC.1/Circ.1609) .....	363
Tableau H.2 – Accès aux fonctions (sur la base de la MSC.1/Circ.1609) .....	364
Tableau H.3 – Accès au groupe de fonctions (sur la base de la MSC.1/Circ.1609) .....	365
Tableau I.1 – Paramètres d’ECDIS configurés en réponse à la sélection "Default" (sur la base de la MSC.1/Circ.1609) .....	366
Tableau I.2 – Paramètres des radars configurés en réponse à la sélection "Default" (sur la base de la MSC.1/Circ.1609) .....	368
Tableau J.1 – Détails des AIS ASM .....	369
Tableau K.1 – Messages AIS .....	378
Tableau K.2 – Messages AIS ASM .....	379
Tableau L.1 – Champ d’état AIS AtoN .....	382

## 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

## AVANT-PROPOS

- 1) La Commission Electrotechnique Internationale (IEC) est une organisation mondiale de normalisation composée de l'ensemble des comités électrotechniques nationaux (Comités nationaux de l'IEC). L'IEC a pour objet de favoriser la coopération internationale pour toutes les questions de normalisation dans les domaines de l'électricité et de l'électronique. À cet effet, l'IEC – entre autres activités – publie des Normes internationales, des Spécifications techniques, des Rapports techniques, des Spécifications accessibles au public (PAS) et des Guides (ci-après dénommés "Publication(s) de l'IEC"). Leur élaboration est confiée à des comités d'études, aux travaux desquels tout Comité national intéressé par le sujet traité peut participer. Les organisations internationales, gouvernementales et non gouvernementales, en liaison avec l'IEC, participent également aux travaux. L'IEC collabore étroitement avec l'Organisation Internationale de Normalisation (ISO), selon des conditions fixées par accord entre les deux organisations.
- 2) Les décisions ou accords officiels de l'IEC concernant les questions techniques représentent, dans la mesure du possible, un accord international sur les sujets étudiés, étant donné que les Comités nationaux de l'IEC intéressés sont représentés dans chaque comité d'études.
- 3) Les Publications de l'IEC se présentent sous la forme de recommandations internationales et sont agréées comme telles par les Comités nationaux de l'IEC. Tous les efforts raisonnables sont entrepris afin que l'IEC s'assure de l'exactitude du contenu technique de ses publications; l'IEC ne peut pas être tenue responsable de l'éventuelle mauvaise utilisation ou interprétation qui en est faite par un quelconque utilisateur final.
- 4) Dans le but d'encourager l'uniformité internationale, les Comités nationaux de l'IEC s'engagent, dans toute la mesure possible, à appliquer de façon transparente les Publications de l'IEC dans leurs publications nationales et régionales. Toutes divergences entre toutes Publications de l'IEC et toutes publications nationales ou régionales correspondantes doivent être indiquées en termes clairs dans ces dernières.
- 5) L'IEC elle-même ne fournit aucune attestation de conformité. Des organismes de certification indépendants fournissent des services d'évaluation de conformité et, dans certains secteurs, accèdent aux marques de conformité de l'IEC. L'IEC n'est responsable d'aucun des services effectués par les organismes de certification indépendants.
- 6) Tous les utilisateurs doivent s'assurer qu'ils sont en possession de la dernière édition de cette publication.
- 7) Aucune responsabilité ne doit être imputée à l'IEC, à ses administrateurs, employés, auxiliaires ou mandataires, y compris ses experts particuliers et les membres de ses comités d'études et des Comités nationaux de l'IEC, pour tout préjudice causé en cas de dommages corporels et matériels, ou de tout autre dommage de quelque nature que ce soit, directe ou indirecte, ou pour supporter les coûts (y compris les frais de justice) et les dépenses découlant de la publication ou de l'utilisation de cette Publication de l'IEC ou de toute autre Publication de l'IEC, ou au crédit qui lui est accordé.
- 8) L'attention est attirée sur les références normatives citées dans cette publication. L'utilisation de publications référencées est obligatoire pour une application correcte de la présente publication.
- 9) L'attention est attirée sur le fait que certains des éléments du présent document de l'IEC peuvent faire l'objet de droits de brevet. L'IEC ne saurait être tenue pour responsable de ne pas avoir identifié de tels droits de brevets.

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](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](http://www.iec.ch/standardsdev/publications).

Le comité a décidé que le contenu du présent document ne sera pas modifié avant la date de stabilité indiquée sur le site web de l'IEC sous [webstore.iec.ch](http://webstore.iec.ch) dans les données relatives au document recherché. À cette date, le document sera

- reconduit,
- supprimé,
- remplacé par une édition révisée, ou
- amendé.

**IMPORTANT – Le logo "colour inside" qui se trouve sur la page de couverture du présent document indique qu'elle contient des couleurs qui sont considérées comme utiles à une bonne compréhension de son contenu. Les utilisateurs devraient, par conséquent, imprimer cette publication en utilisant une imprimante couleur.**

# 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)*