

This is a preview of "IEC 62288 Ed. 2.0 en...". Click here to purchase the full version from the ANSI store.



Edition 2.0 2014-07

# 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

PRICE CODE

**XF**

---

ICS 47.020.70

ISBN 978-2-8322-1688-0

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

## CONTENTS

FOREWORD.....	7
1 Scope.....	9
2 Normative references .....	9
3 Terms and definitions .....	10
4 General requirements for all displays on the bridge of a ship .....	15
4.1 Relationship to IMO standards .....	15
4.2 Application of IEC 60945.....	16
4.2.1 Remark.....	16
4.2.2 General requirements .....	16
4.3 Arrangement of information.....	16
4.3.1 Consistency of layout .....	16
4.3.2 Consistent presentation of information.....	17
4.3.3 Separation of operational display area.....	17
4.4 Readability.....	17
4.4.1 Readability under all ambient light conditions .....	17
4.4.2 Legibility of alphanumeric data and text.....	19
4.4.3 Presentation of text .....	20
4.4.4 Icons .....	20
4.5 Colours and intensity .....	21
4.5.1 Discrimination of colours – Requirement.....	21
4.5.2 Methods of test and required results .....	21
4.6 Symbols.....	22
4.6.1 Operational information .....	22
4.6.2 Electronic chart information .....	22
4.7 Colour coding of information .....	23
4.7.1 Colour coding for discrimination.....	23
4.7.2 Colour coding of information .....	23
4.7.3 Colour coding in combination with other attributes .....	23
4.7.4 Flashing of information .....	24
4.8 Integrity marking .....	24
4.8.1 Indication of source, validity and integrity status .....	24
4.8.2 Colour coding of validity and integrity .....	24
4.8.3 Indication of presentation failure .....	25
4.9 Alerts and indications.....	25
4.9.1 Operational status .....	25
4.9.2 List of alerts.....	26
4.9.3 Alert related information from multiple sources .....	27
4.9.4 Speech output for alarms and warnings .....	27
4.10 Presentation mode.....	28
4.10.1 Requirement.....	28
4.10.2 Methods of test and required results .....	28
4.11 User manuals, instructions and reference guides .....	28
4.11.1 Requirement.....	28
4.11.2 Methods of test and required results .....	29
5 Presentation of operational information .....	29
5.1 Application.....	29

5.2	Presentation of own ship information .....	29
5.2.1	Graphical representation of own ship – Requirement .....	29
5.2.2	Methods of test and required results .....	29
5.3	Presentation of chart information .....	30
5.3.1	Alteration of chart information .....	30
5.3.2	Colours and symbols for charted information .....	30
5.4	Presentation of radar information .....	31
5.4.1	Radar video images .....	31
5.4.2	Target trails .....	32
5.5	Presentation of target information .....	32
5.5.1	Providing target information .....	32
5.5.2	Consistent user interface for target information .....	33
5.5.3	Indication of exceeding target capacity .....	33
5.5.4	Merging AIS targets from multiple source .....	33
5.5.5	Filtering sleeping AIS targets .....	34
5.5.6	Activation of AIS targets .....	35
5.5.7	Graphical presentation of targets .....	35
5.5.8	Target selection .....	37
5.5.9	Indication of target derivation .....	37
5.5.10	Presentation of tracked radar target information .....	37
5.5.11	Presentation of reported AIS target information .....	38
5.5.12	Continual update of target information .....	39
5.5.13	Own ship's AIS information .....	39
5.5.14	Obscuring the operational display area .....	39
5.6	Operational alerts .....	39
5.6.1	Alert status .....	39
5.6.2	CPA/TCPA alarms .....	40
5.6.3	Acquisition/activation zones warnings .....	40
5.6.4	Lost target warnings .....	41
5.7	AIS and radar target association .....	41
5.7.1	Target association .....	41
5.7.2	AIS presentation status .....	42
5.7.3	Trial manoeuvre .....	43
5.8	Measurement .....	43
5.8.1	Measurement from own ship .....	43
5.8.2	Bearing and range measurements .....	44
5.9	Navigation tools .....	44
5.9.1	General requirements .....	44
5.9.2	Range rings .....	44
5.9.3	Variable range marker (VRM) .....	45
5.9.4	Bearing scale .....	46
5.9.5	Electronic bearing line (EBL) .....	46
5.9.6	Parallel index lines (PI) .....	47
5.9.7	Offset measurement of range and bearing .....	48
5.9.8	User cursor .....	49
6	Radar and chart displays .....	50
6.1	General .....	50
6.1.1	Application .....	50
6.1.2	Multifunction displays .....	50

6.1.3	Simultaneous display of radar and chart data .....	51
6.1.4	Range scales.....	51
6.1.5	Operational display area.....	51
6.1.6	Motion display modes .....	52
6.1.7	Orientation modes .....	52
6.1.8	Off-centring .....	53
6.1.9	Stabilisation modes .....	53
6.2	Radar displays.....	54
6.2.1	Application.....	54
6.2.2	Radar video image.....	54
6.2.3	Brightness of radar information.....	54
6.2.4	Display of chart information on radar .....	55
6.2.5	Priority of radar information .....	56
6.2.6	Display of map graphics .....	56
6.3	Chart displays.....	57
6.3.1	Application.....	57
6.3.2	Display of chart information .....	57
6.3.3	IMO ECDIS display categories.....	57
6.3.4	Adding or removing information from the display.....	58
6.3.5	Safety contour .....	58
6.3.6	Safety depth .....	59
6.3.7	Chart scale .....	59
6.3.8	Display of radar and target information .....	59
6.3.9	Display of additional information .....	60
6.4	Composite task-oriented presentations .....	60
6.4.1	User-configured presentations.....	60
6.4.2	Information associated with the task-at-hand .....	61
7	Physical requirements .....	61
7.1	General.....	61
7.2	Display adjustment .....	61
7.2.1	Contrast and brightness.....	61
7.2.2	Magnetic interference .....	62
7.2.3	Temporal stability .....	62
7.2.4	Physical controls and status indicators .....	63
7.3	Screen size.....	63
7.3.1	Requirement.....	63
7.3.2	Method of test and required results.....	64
7.4	Multicoloured display equipment .....	64
7.4.1	Requirement.....	64
7.4.2	Method of test and required results.....	64
7.5	Screen resolution.....	64
7.5.1	Requirement.....	64
7.5.2	Method of test and required results.....	65
7.6	Screen viewing angle .....	65
7.6.1	Requirement.....	65
7.6.2	Methods of test and required results.....	65
Annex A (normative)	Presentation colours and symbols.....	66
A.1	Overview .....	66
A.2	Purpose.....	66

A.3	Scope .....	66
A.4	Application .....	66
A.5	Navigation-related symbols .....	66
Annex B (normative) Guidelines for the presentation of navigation-related terminology and abbreviations .....		99
B.1	Overview .....	99
B.2	Purpose .....	99
B.3	Scope of these guidelines .....	99
B.4	Application .....	99
B.5	Navigation related terminology and abbreviations .....	99
Annex C (informative) Guidance on display and dialogue design in MSC/Circ.982 .....		106
C.1	Overview .....	106
C.2	General.....	106
C.3	Requirements in MSC/Circ.982 related to the display design .....	106
Annex D (informative) Guidance on testing .....		108
D.1	Methods of test derived from ISO 9241-12 .....	108
D.1.1	General .....	108
D.1.2	Observation .....	108
D.1.3	Inspection of documented evidence .....	108
D.1.4	Measurement.....	109
D.1.5	Analytical evaluation.....	109
D.2	Application of IEC 60945.....	109
D.2.1	Display equipment category.....	109
D.2.2	Technical performance .....	109
D.2.3	Pre-conditioning for environmental tests .....	110
D.2.4	Methods of test derived from ISO 9241-12 applied for IEC 60945 .....	110
D.3	Compliance with requirements .....	112
D.4	Simulation.....	112
D.5	Electronic chart data .....	112
Annex E (normative) Operational controls .....		113
E.1	Overview .....	113
E.2	Logical grouping of data and control functions .....	113
E.3	Icons for common function controls .....	114
Annex F (normative) Icons for presentation of the state of an alert.....		117
Annex G (normative) Testing for colours, intensity and flicker .....		119
G.1	Testing for colours and intensity .....	119
G.1.1	General .....	119
G.1.2	Test personnel.....	120
G.1.3	Method of test .....	120
G.2	Testing for flicker .....	121
G.2.1	Overview .....	121
G.2.2	Analytic model.....	121
G.2.3	Decision criteria.....	123
Bibliography.....		125
Table 1 – Ambient light conditions .....		18
Table 2 – Operational status .....		26
Table 3 – AIS status .....		42

This is a preview of "IEC 62288 Ed. 2.0 en...". [Click here to purchase the full version from the ANSI store.](#)

Table A.1 – Own ship symbols .....	67
Table A.2 – Radar and AIS symbols .....	71
Table A.3 – Navigation symbols .....	84
Table A.4 – Navigation tools .....	91
Table A.5 – Other symbols .....	92
Table A.6 – Example of possible colour scheme .....	98
Table B.1 – List of standard terms and abbreviations .....	100
Table B.2 – List of standard units of measurement and abbreviations .....	105
Table C.1 – Paragraphs in MSC/Circ.982 associated with IEC 60945 requirements .....	106
Table C.2 – Other paragraphs in MSC/Circ.982 related to display design .....	107
Table C.3 – Other paragraphs in MSC/Circ.982 partially related to display design .....	107
Table D.1 – Methods of test applied for IEC 60945 .....	110
Table E.1 – Top-level grouping of data and control functions for radar applications .....	114
Table E.2 – Top-level grouping of data and control functions for charting .....	114
Table E.3 – General control icons .....	115
Table E.4 – Task-oriented measurement control icons .....	115
Table E.5 – Radar specific control icons .....	116
Table F.1 – Alert management icons – basic .....	117
Table F.2 – Alert management icons – additional qualifiers .....	118
Table G.1 – Values of predicted energy and special coefficients .....	124

## 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.

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

This standard supports the performance standards for the presentation of navigation-related information on shipborne navigational displays, adopted by the IMO in resolution MSC.191(79) in December 2004.

This second edition cancels and replaces the first edition published in 2008 and constitutes a technical revision.

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

- References to IBS have been removed as IMO has revoked MSC.64(67) Annex 1:1996, Performance standards for integrated bridge systems (IBS).

This is a preview of "IEC 62288 Ed. 2.0 en...". [Click here to purchase the full version from the ANSI store.](#)

- Subclause 4.9 (Alerts and indicators) has been revised to align the requirements with the IMO resolutions MSC.252(83), MSC.302(87) and A.1021(26) published since MSC.191(79), together with a new Annex F for alert related icons.
- Clause 5 (Presentation of operational information) has been revised with a new requirement added for merging AIS targets from multiple sources.
- Test methods have been reviewed and further guidance on testing added to Annex D. A new normative Annex G has been added for testing of colours, intensity and flicker.
- Annex A (Presentation of colours and symbols) has been revised with AIS AtoN symbols, AIS-SART symbol and wheel over position symbol redefined, and new symbols added for AIS SAR aircraft, AIS SAR vessel, MSI and AIS application specific messages.

The text of this standard is based on the following documents:

FDIS	Report on voting
80/733/FDIS	80/738/RVD

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

NOTE All text in this standard 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.).

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

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

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

A bilingual version of this publication may be issued at a later date.

**IMPORTANT – The 'colour inside' logo on the cover page of this publication 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 International Standard 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) and MSC.302(87).

## **2 Normative references**

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. 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*

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

IHO S-52 Annex A, *IHO ECDIS presentation library*

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, *Guidelines for the presentation of navigation related symbols, terms and abbreviations*

This is a preview of "IEC 62288 Ed. 2.0 en...". [Click here to purchase the full version from the ANSI store.](#)

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

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

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

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