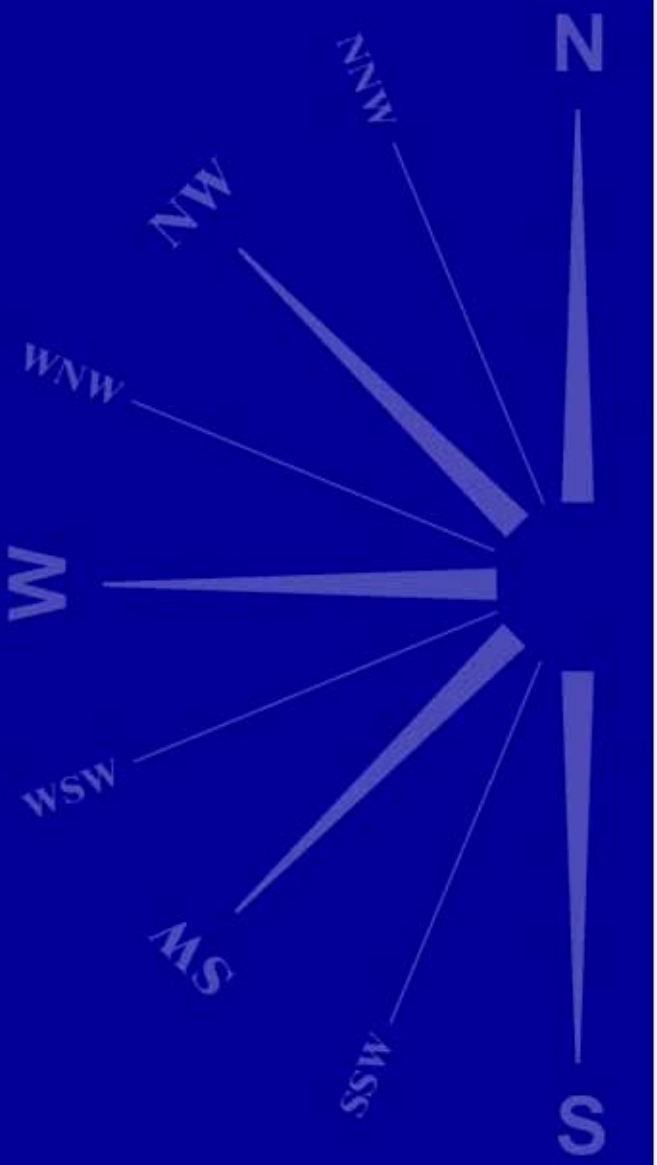
SEAFISH



Mini-Electronic Chart Display and Information System (Mini-ECDIS)

Operational and Performance Requirements With Reference to MGN 262 (M+F)

Mini-ECDIS™

mca
Maritime and Coastguard Agency

ISB
Invest to Save Budget

THE UNITED KINGDOM HYDROGRAPHIC OFFICE

Foreword

This document arises from an initiative led by the Sea Fish Industry Authority (Seafish), to improve navigational and operational safety within the fishing industry, by encouraging the use of approved electronic navigational equipment.

The document provides a definitive performance specification for electronic charting equipment.

The document is issued in conjunction with a Marine Guidance Note 262 issued by the Maritime and Coastguard Agency entitled "Acceptance of Mini-Electronic Chart Display and Information Systems (Mini-ECDIS) for Fishing Vessels and Small Vessels in Commercial Use (Code Boats) Under 24 metres in length".

When compared with ECDIS[Appendix1], this Mini-ECDIS specification provides more appropriate requirements for smaller vessels, including a reduced requirement for display size, and reduced requirements for the representation of colour. It also permits the use of a portable Mini-ECDIS backup systems.

The overall intention has been to follow as closely as possible the wording of two documents, the IMO Resolution Res A.817(19) as amended and The International Electrotechnical Commission International Standard IEC61174 Sections 1 to 4. Where wording has been derived from these documents it is shown in italics.

For reasons of clarity the order of clauses may differ from those provided in the source documents. Reference is therefore made in superscript to the source of the original clause. Where present, new clauses have been added in plain text. In some limited cases, where such clauses would be inappropriate for use within Mini-ECDIS, clauses have been omitted from the two source documents.

Acting in partnership with the Maritime and Coastguard Agency (MCA) and the United Kingdom Hydrographic Office (UKHO), this Seafish project was funded by the UK Treasury under the Invest to Save Budget.

Table of Contents

1 Scope

1.1 This document proposes minimum operational and performance requirements for a Mini-Electronic Chart Display and Information System to be known as Mini-ECDIS.

1.2 It is proposed that Mini-ECDIS will satisfy the requirements for carriage of up-to-date navigation charts on board fishing vessels and vessels in commercial use (code boats) under 24 metres in length.

1.3 Mini-ECDIS is based upon the defining regulatory framework provided for ECDIS including IMO Res A.817(19) as amended and IEC61174 but with important differing requirements in the areas of, but not limited to, display size and type, route planning and management, the provision of additional information, and permitted backup systems.

1.4 Wording of this document is written in italics where the text is identical to that of IMO Res A.817(19) as amended, or is identical to that of International Electrotechnical Commission International Standard IEC61174. Reference in superscript is made to the origin of the source text. Where text within IEC61174 is identical to that of the IMO document, reference is made only to IMO Res A.817(19) as amended.

2 Introduction

2.1 *The primary function of Mini-ECDIS is to contribute to the safety of navigation.* A817[19]1.1

2.2 *Mini-ECDIS with adequate back-up arrangements may be accepted as complying with the up-to-date charts* required by Chapter V of the 1974 SOLAS Convention (as amended). Part A 817[19]1.2

2.3 Mini-ECDIS shall *be capable of displaying all chart information necessary for safe and efficient navigation originated by, and distributed on the authority of, government authorized hydrographic offices.* A817[19]1.4

2.4 Mini-ECDIS shall *facilitate simple and reliable updating of the electronic navigational chart.* A817[19]1.5

2.5 Mini-ECDIS shall enable the mariner to execute in a convenient and timely manner all route planning, route monitoring and positioning currently performed on paper charts. A817[19]1.6

2.6 Mini-ECDIS shall *be capable of continuously plotting the ship's position.* A817[19]1.6

2.7 *Mini-ECDIS shall provide appropriate alarms or indications with respect to the information displayed or malfunction of the equipment* A817[19]1.8

2.8 When the relevant ENC chart information has not been published in the appropriate form, Mini-ECDIS equipment may be operated in the Raster Chart Display System (RCDS) mode as described in A817(19) as amended.

2.9 *It shall not be possible to alter the contents of the ENC.* A817[19]4.3

2.10 Any operator of Mini-ECDIS shall ensure that t*he chart information to be used in Mini-ECDIS should be the latest edition of that originated by a government authorized hydrographic office, and conform to IHO standards.* A817[19]4.1

2.11 The Mini-ECDIS should not be capable of being used for a purpose other than that for which it was designed.

2.12 Mini-ECDIS shall have a high level of reliability.

2.13 Mini-ECDIS shall be fit-for-purpose.

2.14 Mini-ECDIS shall meet the requirements of this performance standard.

3 Mini-ECDIS Definitions

For the purpose of this standard:

3.1 Mini-Electronic Chart Display and Information System (Mini-ECDIS) *means a navigation information system which with adequate back-up arrangements can be accepted as complying with the up-to-date chart as* required by Chapter V of the 1974 SOLAS Convention (as amended), by displaying selected information from a navigational chart *with positional information from navigation sensors to assist the mariner in route planning and route monitoring.* A817[19]2.1 This system may display additional location-related information.

3.2 *Electronic Navigational Chart (ENC) means the database, standardized as to content, structure and format, issued on the authority of government authorized hydrographic offices. The ENC contains all the chart information necessary for safe* surface *navigation and may contain supplementary information in addition to that contained in the paper chart (e.g. sailing directions) which may be considered necessary for safe navigation.* *A817[19]2.2*

3.3 *Raster Navigational Chart (RNC) means a facsimile of a paper chart originated by, or distributed on the authority of, a government-authorized hydrographic office. RNC is used in these standards to mean a single chart or a collection of charts.* IEC61174 Appendix H.2.1

3.4 *Raster Chart Display System (RCDS) means a navigation information system displaying RNCs with positional information from navigation sensors to assist the mariner in route planning and route monitoring and, if required, display additional navigation-related information.* IEC61174 Appendix H.2.1

3.5 *Standard Display means* that level of *information that should be shown when an* ENC *chart is first displayed on* Mini-ECDIS. *Depending upon the needs of the mariner, the level of the information it provides for route planning or route monitoring may be modified by the mariner.* A817[19]2.4.

3.6 *Display Base means* that level of *information which, when an ENC is displayed, cannot be removed from the display, consisting of information which is required*

at all times in all geographic areas and all circumstances. It is not intended to be sufficient for safe navigation. A817[19]2.5

3.7 *Further information on these definitions may be found in IHO Special Publication S-52, Appendix 3. (See Appendix 1)* A817[19]2.6

4 Chart Updates

4.1 Mini-ECDIS shall *be capable of accepting official updates to the ENC and/or RNC data provided in conformity with IHO standards.* A817[19]4.5

4.2 *The ENC and/or RNC and all updates to it shall be displayed without any degradation of information content.* A817[19]3.8 *Degradation shall be understood as degradation in information quantity as well as quality with respect to a standard test chart provided by government authorised hydrographic offices.* IEC61174-4.3.8

4.3 Mini-ECDIS shall *provide a means of ensuring and displaying that the ENC and/or RNC and all* applied *updates have been correctly loaded..* A817[19]3.9

4.4 *The ENC* and/or RNC *and all relevant updates* shall *be clearly distinguishable from other displayed information, such as that listed in* APPENDIX 3. A817[19]3.10

4.5 Mini-ECDIS shall *keep a record of updates including time of application to the* system*.* A817[19]4.7

4.6 *Updates* to *the ENC* and/or RNC *shall be stored separately*. A817[19]4.4

4.7 Mini-ECDIS shall *be capable of accepting updates to the ENC and/or RNC data entered manually with simple means for verification prior to the final acceptance of the data.* Manual updates shall *be distinguishable on the display from ENC* and/or RNC *information and its official updates and* shall *not affect display legibility.* A817[19]4.6

4.8 Mini-ECDIS shall allow the operator to review the update log in order to ascertain that updates have been included.

5 Display of ENC / RNC Information

5.1 *ENC information available for display during route planning and route monitoring should be subdivided into the following three categories, Display Base, Standard Display and All Other Information (see* APPENDIX 2*).* A817[19]3.2

5.2 *When displaying an ENC, Mini-ECDIS shall present only the Standard Display, at any time, by a single operator action.* A817[19]3.3

5.3 When Mini-ECDIS is activated *it shall provide the Standard Display at the largest scale available for the displayed area.* A817[19]3.4 *This is only applicable when the first* ENC *is displayed subsequent to power-up. The scale of an ENC is indicated by its compilation scale.* IEC61174-4.3.4

5.4 When displaying an ENC, it shall *be easy to add or remove* object types *from the Mini-ECDIS display. It should not be possible to remove* those object types

contained in the Display Base. A817[19]3.5 *The addition or removal of information shall be limited to categories of* object types and not to individual items or features*.* Part IEC61174-4.3.5

5.5 When displaying an ENC, it shall be possible to list on the display the types of object which are and are not being displayed.

5.6 When displaying an ENC, it shall be possible for the operator to select a safety contour from the depth contours available and Mini-ECDIS shall emphasise this safety contour over other contours on the display. A817[19]3.6

5.7 When displaying an RNC, facilities should be provided for an operator to highlight the following lines and areas to enable the Mini-ECDIS to generate alarms and indications:-

5.7.1 a safety contour,

5.7.2 the areas for which special conditions exist as described in Appendix 4.

5.8 When displaying an ENC, it shall *be possible for the operator to set a safety depth. Mini-ECDIS shall emphasise soundings equal to or less than the safety depth whenever spot soundings are being displayed* A817[19]3.7

5.9 When displaying an ENC or RNC, the largest scale data *for the area* displayed *shall always be used by the Mini-ECDIS for all alarms or indications of crossing the ship's safety contour and of entering a prohibited area, and for alarms and indications according to* APPENDIX 5*.* A817[19]10.3

Note: Clauses IMO A817[19]3.8,3.9,3.10 / IEC61174-4.3.8,3.9,3.10 have been grouped with other clauses relating to chart updates in the previous section.

6 Display of Own Ship

6.1 The display of own-ship position within Mini-ECDIS and other navigational information shall use a common reference.

6.2 Mini-ECDIS should be capable of displaying the ship’s track graphically e.g. by a line or by a dot as requested by the user. See Route Monitoring

7 Display Modes

7.1 *It shall always be possible to display the ENC in a "north-up" orientation* and RNC in a "map-up" orientation *although other orientations are permitted.* A817[19]7.1

7.2 Mini-ECDIS shall *provide for true motion mode,* although *other modes are permitted.* A817[19]7.2

7.3 *When true motion mode is in use, reset and generation of the neighbouring area shall take place automatically at a distance from the border* A817[19]7.3 which can be pre-set by the operator when using the equipment.

7.4 *It shall be possible to manually change the* displayed *chart area and the position of own ship relative to the edge of the display* A817[19]7.4 and in addition to change the display scale.

8 Colours and Symbols

8.1 *IHO recommend colours and symbols* shall *be used to represent* ENC and/or RNC *information* A817[19]8.1

8.2 The requirements of IHO document "S-52 Colour & Symbol Specifications for ECDIS" regarding colour corrections for CRT and other displays as detailed in Appendix 2 Sections 4 & 5 and Annexes B & C, and the requirements of IEC 61174 Section 6.7.3 do NOT apply to Mini-ECDIS.

8.3 *The colours and symbols other than those mentioned in 8.1 should be those used to describe the navigational elements and parameters listed in* APPENDIX 3 with respective navigational symbols as *published in* IEC61174 annex E A817[19]8.2

8.4 *Mini-ECDIS shall use the specified size of symbols, figures and letters as indicated in S-52 Appendix 2* A817[19]8.3

9 Display Requirements

9.1 Mini-ECDIS shall *be capable of displaying information for:* A817[19]9.1

9.1.1 route planning and supplementary navigation tasks; A817[19]9.1.1

9.1.2 route monitoring. A817[19]9.1.2

9.2 The real or virtual presentation shall encompass (or appear to encompass) a circle of at least 210mm in diameter.

9.3 The display shall be fit for purpose.

10 Route Planning

10.1 It shall be possible to carry out route planning by defining a route consisting of a series of waypoints joined by straight line legs. The use of curves between waypoints is also permitted.

10.2 It shall be possible to edit a route by means of facilities provided for adding, deleting and moving one or more waypoints.

10.3 *It should be possible to plan an* alternative *route in addition to the selected route.* A817[19]10.4.3

10.4 *The selected route should be clearly distinguishable from any* alternative *route.* A817[19]10.4.3

10.5 *An indication is required if the mariner plans a route across an own ship's safety contour.* A817[19]10.4.4

10.6 *An indication is required if the mariner plans a route across the boundary of a prohibited area or a geographic area for which special conditions exist (see Appendix 4).* A817[19]10.4.5

10.7 It shall be possible for the operator *to specify a limit of deviation from the planned route at which activation of an automatic off-track alarm shall occur.* A817[19]10.4.6

10.8 Mini-ECDIS shall provide a warning of the approach of a waypoint.

11 Route Monitoring

11.1 *The ship's position* shall *be derived from a continuous positioning system of an accuracy consistent with the requirements of safe navigation.* A817[19]10.5.6

11.2 *For route monitoring the selected route and own ship's position should appear whenever the display covers that area.* A817[19]10.5.1

11.3 It shall *be possible to display a sea area that does not have the ship on the display (e.g. for look ahead, route planning), while route monitoring.* Part A817[19]10.5.2

11.4 Automatic route monitoring functions e.g. the updating of ship's position and the provision of alarms and indications, shall remain active irrespective of whether the own ship is within the chart area currently being displayed.

11.5 Whenever the display does not include the own ship's position, *it shall be possible to return to the route monitoring display covering the own ship's position by a single operator action.* A817[19]10.5.2

11.6 Mini-ECDIS shall *give an alarm if, within a specified time set by the mariner,* the *own ship will cross the safety contour.* A817[19]10.5.3

11.7 Mini-ECDIS shall give an alarm, if within a specified time set by the mariner, the own ship will cross the boundary of a prohibited area or of a geographical area for which special conditions exist (see APPENDIX 4).

11.8 *An* off course *alarm shall be given when the specified limit for deviation from the planned route is exceeded.* A817[19]10.5.4

11.9 Provision shall be made for the connection of two or more position fixing devices from which the ship's position can be independently and continuously derived.

11.10 Mini-ECDIS shall *provide an alarm immediately when the input from the* currently selected *position fixing system is lost.* A817[19]10.5.7

11.11 Mini-ECDIS shall *identify and repeat, but only as an indication, any alarm or indication passed to it from a position fixing system.* A817[19]10.5.7

11.12 *An alarm shall be given by Mini-ECDIS if the ship, within a specified time or distance*, as set by the operator, *will reach a critical point on the planned route.* A817[19]10.5.8

11.13 *The positioning system and* the Mini-ECDIS *shall be on the same geodetic datum.* Mini-ECDIS shall *provide an alarm if this is not the case.* A817[19]10.5.9

11.14 *It shall be possible to display an* alternate *route in addition to the selected route. The selected route* shall be *clearly distinguishable from the other route(s). During a voyage it* shall *be possible for the operator to modify the selected sailing route, or to* select *an* alternate *route.* A817[19]10.5.10

11.15 It shall be possible to display *an adequate number of points, free movable electronic bearing lines, variable and fixed range markers and other symbols as may be required for navigation purposes and specified in* APPENDIX 3 A817[19]10.5.11

11.16 *It shall be possible to enter the geographical co-ordinates of any position and then display that position on demand.* A817[19]10.5.12 and to mark its position with a user selectable symbol.

11.17 It shall *be possible to select any screen* object *(feature, symbol or position) and display its geographical co-ordinates on demand*. A817[19]10.5.12

12 Voyage Recording

12.1 Mini-ECDIS shall *log the ship's track including position, date and time at one minute intervals for a period of at least 7 days.*

12.2 *It* shall *not be possible for the user of Mini-ECDIS to manipulate or change the recorded information.* A817[19]10.6.3

13 Display of Additional Information

13.1 Mini-ECDIS may be used for the display of geographical and/or text based information (e.g. Radar / AIS) in S57 or in any other format including the display of environmental and operational parameters (e.g. for the fishing, leisure and work-boat industries) provided that the requirements of this section are met.

13.2 The information shall not degrade from the ENC and/or RNC display where present, and is clearly distinguishable from it, See Part A817[19]6.1

13.3 A simple means shall be provided for the removal of any additional information from the presentation.

13.4 Where the data is geographical in nature, the information should be displayed in correct registration with the displayed ENC and /or RNC where present, in terms of scale, position and projection.

13.5 System reliability is not compromised by the added functionality and complexity required for the display of the additional information.

13.6 Where additional facilities have been provided for the recording and management of tracks, facilities shall be provided for the import and/or export of such tracks in a format whose details are in the public domain.

13.7 Such facilities must not compromise the requirements of Sections 11 and 12 of this specification.

14 Accuracy

14.1 *The accuracy of all calculations performed by* Mini-ECDIS *should be independent of the characteristics of the output device and should be consistent with the* ENC and/or RNC *accuracy.* A817[19]11.1

14.2 *Bearings and distances drawn on the display or those measured between features already drawn on the display should have an accuracy no less than that afforded by the resolution of the display.* A817[19]11.2

15 Connections

15.1 Facilities shall be provided for the connection of two or more channels of position fixing data input.

15.2 Mini-ECDIS shall not degrade the performance of any equipment, optional or mandatory, to which it is electrically connected.

15.3 Facilities may be provided for the electrical connection of Mini-ECDIS to other systems for the purpose of electronic reporting of internally generated information.

15.4 Connections to other equipment shall be in conformance with IEC61162

16 System Self-Test Facility

16.1 *Mini-ECDIS shall be provided with means for either automatically or manually carrying out on-board tests of major functions.* A817[19]11.2

16.2 *In case of a failure, the test should display information to indicate which module is at fault.* A817[19]13.1

16.3 *On board tests of major functions* shall include tests of *the integrity of sensor input. If there is any detectable reason why the information presented to the operator* may be *invalid, adequate and clear warnings should be given to the operator.* IEC61174-4.13.1

16.4 Mini-ECDIS shall *provide a suitable alarm or indication of system malfunction.* A817[19]13.1

17 Backup Arrangements

17.1 *Adequate backup arrangements shall be provided to ensure safe navigation in case of a* Mini-ECDIS *failure.* A817[19]14

17.2 *Facilities* shall *be provided enabling a safe take-over of the Mini-ECDIS functions to* prevent *a Mini-ECDIS failure* from developing *into a critical situation.* A817[19]14.1

18 Electrical Supply Considerations

18.1 *It shall be possible to operate Mini-ECDIS and all equipment necessary for its normal functioning when supplied by an emergency source of electrical power in accordance with the appropriate requirements of* Chapter V of 1974 SOLAS Convention (as amended)*.* A817[19]15.1

18.2 *Changing from one source of power supply to another or any interruption of the supply for a period of up to 45 seconds should not require the equipment to be manually re-initialized.* A817[19]15.2

18.3 Mini-ECDIS shall remain operational during an interruption of power for a period of up to 15 seconds.

19 Compliance

19.1 Mini-ECDIS shall fully conform to the requirements of IEC 60945

APPENDIX 1

Reference Publications

This specification and performance standard has been developed with reference to documents from the organisations below.

A The International Maritime Organization

4 Albert Embankment, London, SE1 7SR, United Kingdom

IMO Resolution A.817 (19)
Performance Standards for Electronic Chart Display and Information Systems (ECDIS)
As amended by:
Annex 5 to IMO resolution MSC.64 and
Annex 4 to IMO resolution MSC.86

B. The International Hydrographic Organization

Directing Committee, International Hydrographic Bureau, 4 Quai Antoine 1er, BP 445, MC 98011 Monaco Cedex, Principality of Monaco.

S-52: Specifications for Chart Content and Display Aspects of ECDIS
S-52 Appendix 1: Guidance on Updating the Electronic Navigational Chart
S-52 Appendix 2: Colour & Symbols Specifications for ECDIS
S-52 Appendix 2: Annex A. IHO ECDIS Presentation Library
S-52 Appendix 3: Glossary of ECDIS-Related Terms
S-52 Appendix 4: IHO Test Data Sets For ECDIS
S-57 IHO Transfer Standard for Digital Hydrographic Data

C. International Electrotechnical Commission

3 rue de Varembe, PO Box 131, CH-1211 Geneva 20, Switzerland

IEC 61174: Electronic Chart Display and Information Systems (ECDIS) - Operational and Performance Requirements, Method of Testing and Required Test Results.
IEC 60945: General Requirements for Shipborne Radio Equipment Forming Part of the Global Maritime Distress and Safety System and Marine Navigational Equipment.
IEC 61162: Digital Interfaces - Navigation and Radiocommunication Equipment On board Ship.
IEC 60068-2 Environmental Testing
1. Tests A: Cold
2. Tests B: Dry heat
6. Test Fc: Vibration (sinusoidal)
14.Test N: Change of temperature
27 Test Ea and guidance: Shock
30 Damp heat, cyclic (12 + 12-hour cycle)
32 Test Ed: Free fall (drop)

IEC Publication 60529 Degrees of protection provided by enclosures
IP57 -Total Immersion

APPENDIX 2

ENC Information for Display

Display Base

The display base is the set of objects types to be derived from an ENC*, which shall be permanently retained on the* Mini-ECDIS *display, irrespective of user or other action comprising:*

1. *Coastline (high water)*
2. *Own ship's safety contour, to be selected by the mariner*
3. *Indication of isolated underwater dangers of depths less than the safety contour which lie within the safe waters defined by the safety contour*
4. *Indication of isolated dangers which lie within the safe water defined by the safety contour such as bridges, overhead wires, etc., and including buoys and beacons whether or not these are being used as aids to navigation*
5. *Traffic routeing systems*
6. *Scale, range, orientation and display-mode*
7. *Units of depth and height.*

Standard display

The Standard display, is the set of object types to be derived from an ENC *which are to be displayed when the Mini-ECDIS is initially switched on, comprising:*

1. *Display Base*
2. *Drying line*
3. *Indication of fixed and floating aids to navigation*
4. *Boundaries of fairways, channels, etc.*
5. *Visual and radar conspicuous features*
6. *Prohibited and restricted areas*
7. *Chart scale boundaries*
8. *Indication of cautionary notes*

All Other Information.

All other information derived from an ENC *may be individually displayed on demand, which may include*

1. *Spot soundings*
2. *Submarine cables and pipelines*
3. *Ferry routes*
4. *Details of all isolated dangers*
5. *Details of aids to navigation*
6. *Contents of cautionary notes*
7. *ENC edition date*
8. *Geodetic datum*
9. *Magnetic variation*
10. *Graticule*
11. *Place names* A817[19]App2

APPENDIX 3

Navigational Elements and Parameters

1. *Own ship.*
   Past track with time marks for primary track.
   Past track with time marks for secondary track.
2. *Vector for course and speed made good.*
3. *Variable range marker and/or electronic bearing line.*
4. *Cursor.*
5. *Event.*
   Dead reckoning position and time (DR).
   Estimated position and time (EP).
6. *Fix and time.*
7. *Position line and time.*
8. *Transferred position line and time.*
   Predicted tidal stream or current vector with effective time and strength (in box).
   Actual tidal stream or current vector with effective time and strength (in box).
9. *Danger highlight.*
10. *Clearing line.*
11. *Planned course and speed to make good. Speed is shown in box.*
12. *Waypoint.*
13. *Distance to run.*
14. *Planned position with date and time.*
15. *Position and time of "wheelover".* A817[19]App3

APPENDIX 4

Areas for which Special Conditions Exist

Mini-ECDIS shall detect the following areas and shall provide an alarm or indication as detailed in section 9. When displaying an ENC the areas should be derived from the ENC, and when displaying an RNC the areas should be derived from those which have been defined by an operator as described in 5.7.2.

1. *Traffic separation zone*
2. *Traffic routeing scheme crossing or roundabout*
3. *Traffic routeing scheme precautionary area*
4. *Two-way traffic route*
5. *Deepwater route*
6. *Recommended traffic lane*
7. *Inshore traffic zone*
8. *Fairway*
9. *Restricted area*
10. *Caution area*
11. *Offshore production area*
12. *Areas to be avoided*
13. *Military practise area*
14. *Seaplane landing area*
15. *Submarine transit lane*
16. *Ice area*
17. *Channel*
18. *Fishing ground*
19. *Fishing prohibited*
20. *Pipeline area*
21. *Cable area*
22. *Anchorage area*
23. *Anchorage prohibited*
24. *Dumping ground*
25. *Spoil ground*
26. *Dredged area*
27. *Cargo transhipment area*
28. *Incineration area*
29. *Specially protected areas* A817[19]App4

APPENDIX 5

Alarms and Indications

The following alarms and indications shall be provided.

Requirements	Information
Alarm	Exceeding off - track limits
Alarm	Crossing safety contour
Alarm or Indication	Area with special conditions
Alarm	Deviation from route
Alarm	Approach to critical point
Alarm	Different geodetic datum
Alarm or Indication	Malfunction of ECDIS
Indication	Information overscale
Indication	Larger scale ENC available
Indication	Different reference system
Indication	Route planning across safety contour
Indication	Route planning across specified area
Indication	Positioning system failure
Indication	Position test failure

Note:

1. The requirements of Section 5.9 regarding the use of largest scale data available in the *ENC* for the calculation of alarm conditions should be observed.

2. The requirements of Section 5.7 regarding the provision of facilities for use with an RNC should be observed.

3. Alarm: An alarm or alarm system which announces by audible means, or audible and visual means, a condition requiring attention.

4. Indicator: Visual indication giving information about the condition of a system or equipment.

5. An alarm or indication shall not interrupt normal operation of Mini-ECDIS without user intervention.

APPENDIX 6

Mini-ECDIS Backup Requirements

1 Introduction

1.1 As prescribed in section 2.2 of this performance standard, adequate independent back-up arrangements should be provided to ensure safe navigation in case of Mini-ECDIS failure. Such back-up arrangements should include

1.1.1 facilities enabling a safe take-over of the Mini-ECDIS *functions in order to ensure that an Mini-ECDIS failure does not result in a critical situation;* A817[19]App6-1.1

1.1.2 *a means to provide for safe navigation for the remaining part of the voyage in case of* Mini-ECDIS *failure*. A817[19]App6-1.2

1.1.3 *the pre-requisite that a means to provide for safe navigation for the remaining part of the voyage is established prior to departure and is available during the voyage.* IEC61174 Annex G.1

1.2 *This annex does not address the use of official paper charts as a backup to Mini-ECDIS* IEC61174 Annex G.1

1.3 This Annex details a performance standard for a Mini-ECDIS Backup system.

2 Purpose

2.1 The purpose of a Mini-ECDIS Backup is to ensure that safe navigation is not compromised in the event of Mini-ECDIS failure. A817[19]App6-1.2

2.2 Provision shall be included for *a timely transfer to the back-up system during critical navigation situations.* A817[19]App6-1.2

2.3 *The back-up system shall allow the vessel to be navigated safely until the termination of the voyage.* A817[19]App6-1.2

3 Provision of Chart Information

3.1 *The chart information to be used should be the latest editions of that originated by a government hydrographic office, and based on IHO standards.* A817[19]App6-3.1.5.1

3.2 *It should not be possible to alter the contents of the electronic chart information.* A817[19]App6-3.1.5.2

3.3 The chart or chart data edition and issuing date should be indicated. A817[19]App6-3.1.5.3

4 Chart Updates

4.1 *The* chart *information displayed by the Mini-ECDIS back-up arrangements should be up-to-date for the entire voyage.* A817[19]App6-3.1.6

5 Display of Chart Information

5.1 Mini-ECDIS Backup shall *display in graphical (chart) form the relevant information of the hydrographic and geographic environment which is necessary for safe navigation.* A817[19]App6-3.1.1

5.2 The Mini-ECDIS backup shall *be capable of displaying at least the information equivalent to the standard display as defined in this performance standard.* A817[19]App6-3.1.4

5.3 Mini-ECDIS shall provide an indication:

5.3.1 if the information is displayed at a large scale than that contained in the database; and A817[19]App6-3.1.7.1

5.3.2 if own ship's position is covered by a chart at a larger scale than that provided by the system. A817[19]App6-3.1.7.2

5.4 *The display mode and generation of the neighbouring area should be in accordance with section 7 of this performance standard.* A817[19]App6-3.1.9

6 Colours and Symbols

6.1 Colours and Symbols used in the Mini-ECDIS Backup shall be based on IHO recommendations

7 Display of Additional Information

7.1 *If other navigational information e.g. radar are added* A817[19]App6-3.1.8 to the Mini-ECDIS Backup*, all the corresponding requirements of this performance standard should be met.* A817[19]App6-3.1.8

8 Display of Own Ship

Mini-ECDIS Backup shall provide:

8.1 *plotting* of *own ship's position automatically, or manually on a chart;* A817[19]App6-3.1.3.1

9 Route Planning

9.1 Mini-ECDIS Backup shall be capable of performing the route planning functions, including *adjusting a planned route manually or by transfer from a route planning device.* A817[19]App6-3.1.2.2

10 Route Monitoring

Mini-ECDIS Backup shall provide at least the following functions:

10.1 *taking courses, distances and bearings from the chart;* A817[19]App6-3.1.3.2

10.2 displaying a *planned route*; A817[19]App6-3.1.3.3

10.3 *displaying time labels along ship's track;* A817[19]App6-3.1.3.4

10.4 *plotting an adequate number of points, bearing lines, range markers, etc., on the chart.* A817[19]App6-3.1.3.5

11 Voyage Recording

11.1 *The back-up arrangements should be able to keep a record of the ship's actual track, including positions and corresponding times.* A817[19]App6-3.1.10

12 Accuracy

12.1 *Accuracy shall be in accordance with Section 14 of this performance standard.* A817[19]App6-3.2.2

13 Connections with Other Equipment

Min-ECDIS Backup shall

13.1 be capable of being *connected to systems providing continuous position-fixing capability; and* PART A817[19]App6-6.1.1

13.2 *not degrade the performance of any equipment providing sensor input.*

13.3 Connections to other equipment shall be in conformance with IEC61162

14 System Self-Test Facility

A Mini-ECDIS backup shall provide a suitable indication of system malfunction. A817[19]App6-3.3

15 Reliability and Compliance

15.1 Mini-ECDIS Backup shall be provided with a power supply which shall be separate from that utilised by Mini-ECDIS.

15.2 *The back-up arrangements shall provide reliable operation under prevailing environmental and normal operating conditions.* A817[19]App6-3.2.1

15.3 Mini-ECDIS Backup shall consist of either a permanently installed backup system or a portable backup system. The requirements for either option are detailed below.

15.3.1 Where a permanently installed Mini-ECDIS Backup is used it shall fully comply with the requirements of IEC60945 and

i. a backup-power supply should be made permanently and immediately available in the event of power failure, and

ii. a switching system to the backup power supply should be installed in accordance with IEC60945 Paragraph 4.3.3.

15.3.2 Where a portable Mini-ECDIS Backup system is used

it shall fully comply with the requirements of IEC 60068-2 Sections 1, 2, 6, 14, 27, 30 and 32 and with IEC 529. (See APPENDIX 1)

APPENDIX 7

Glossary of Terms

Abridged from the IHO glossary of ECDIS Related Terms (See APPENDIX 1).

accuracy
The extent to which a measured or enumerated value agrees with the assumed or accepted value.

alarm
A system which announces by audible means, or audible and visual means, a condition requiring attention.

Automatic Radar Plotting Aid (ARPA)
A system wherein radar targets are automatically acquired and tracked and collision situations computer assessed and warnings given.

back-up arrangement
Facilities enabling safe take-over of the functions and measures in the event of equipment failure.

bearing
The direction from a reference station, usually from 000 degrees at the reference direction, clockwise through 360 degrees.

chart
A map specifically designed to meet the requirements of marine navigation, showing depths of water, nature of bottom, elevations, configuration and characteristics of coast, dangers and *aids to navigatio*n.

chart datum
A permanently established surface from which soundings or tide heights are referenced. Short for chart sounding datum.

chart symbol
A character, letter, line style, or similar graphic representation used on a *chart* to indicate some *objec*t, characteristic, etc.

compilation scale
The *scale* at which an ENC or RNC was compiled.

course
The horizontal direction in which a vessel is intended to be steered, expressed as an angular distance from north clockwise through 360 degrees.

display
A visual presentation of data.
Note: For example, a presentation of a line of alphanumeric data, a window or the entire screen.

display resolution
Capability of depicting detail, represented by the smallest distance apart at which two objects can be seen to be separate.

display scale
The ratio between a distance on the display and a distance on the ground, normalised and expressed as for example 1/10,000 or 1:10,000.

electronic chart
Very broad term to describe the data, the software, and the electronic system, capable of displaying *chart information*. An electronic chart may or may not be equivalent to the paper chart required by *SOLAS*.

feature
Representation of a real world phenomenon. [ISO]
Note: For example, a particular cardinal buoy represented through a symbol on a chart.

heading
The direction in which a vessel is pointed, expressed as an angular distance from north clockwise through 360 degrees. A constantly changing value as a vessel yaws back and forth across the course due to the effects of sea, wind, etc. [Bowditch]

leg
A line connecting two *waypoints*.

map-up
The intended display orientation of an RNC when produced.

north up
Information shown on the *display* with the north direction upward. Note: The north-up display corresponds with the usual *orientation* of the nautical chart.

orientation
The mode in which information is being presented. Typical modes include:
north-up. - as shown on a nautical *chart*, north is at the top of the display.
ship's *head-up*. - based on the actual *heading* of the ship (e.g. ship's gyrocompass).
course-up display. - based on the *course* or *route* being taken.

overscale
To display chart information at a *display scale* larger than the *compilation scale.* Overscaling may arise from a deliberate overscaling by the mariner, or from automatic overscaling by Mini-ECDIS in compiling a *display* when the data included is of various *navigational purposes*. Note: An *indication* is provided only for the partial *overscale area* of the *display.*

own ship
The term which identifies the vessel upon which a system is operating.

raster

A regular array with information pertaining to each element (pixel) or group of elements.

route
A sequence of *waypoints* and *legs*.

scale
The ratio between the linear dimensions of a *chart*, map, drawing, etc., and the actual dimensions represented. [HD]

ship's head-up display
The information shown on the *display* is directed so that the vessel's *heading* is always pointing upward.

SOLAS
International Convention for the Safety of Life at Sea developed by IMO. The contracting governments undertake to promulgate all laws, decrees, orders and regulations and to take all other steps which may be necessary to give the present Convention full and complete effect, so as to ensure that, from the point of view of safety of life, a ship is fit for the service for which it is intended [SOLAS].

speed
In general, the rate of motion or distance per unit of time.

track
The intended path and past path of the ship.

true motion display
A *display* in which *own ship* and each target moves with its own true motion, while the position of all charted information remains fixed.

waypoint
A geographical location (e.g., latitude and longitude) indicating a significant event on a vessel's planned route (e.g., course alteration point, calling in point, etc.).

END

SEAFISH

Sea Fish Industry Authority
Seafish House, St Andrew's Dock, Hull, HU3 4QE, UK
Tel: +44 (0)1482 327837 Fax: +44 (0)1482 223310
Email: kingfisher@seafish.co.uk http://www.seafish.org

www.mini-ecdis.org.uk

ISBN 0-903941-02-3