



Maritime &
Coastguard
Agency

Small Vessel ECS Performance Standard (SV-ECS)

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Foreword

Equipment meeting the requirements of this performance standard are accepted by the Maritime and Coastguard Agency as a suitable arrangement which satisfies the chart carriage requirements stipulated within SOLAS Chapter V/19 for vessels for which MGN 319 (as amended) applies. This standard is not accepted as an alternative arrangement for vessels mandated to carry ECDIS under SOLAS Chapter V/19.

This performance standard should be read in conjunction with MGN 319 (as amended) which includes operational guidance for vessel operators, Masters, and Crew

The Maritime and Coastguard Agency may review the acceptance of this standard and after a systematic safety analysis may be extended to other vessel types and codes. Information on additional vessel types will be issued to industry by means of Marine Guidance Notice.



Part 1 – Performance Standard



Part 1 – Performance Standard

1.1 Scope

- 1.1.1 This document proposes minimum operational and performance requirements for an approved electronic chart system called Small Vessel – Electronic Chart System (SV-ECS).
- 1.1.2 When complying with the requirements of this performance standard, SV-ECS will satisfy the requirements for carriage of up-to-date navigation charts on board vessels identified within MGN 319 (as amended).
- 1.1.3 SV-ECS is based upon the defining regulatory framework provided for ECDIS including IMO Res MSC.530(106) 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.
- 1.1.4 Wording in this document which is identical to that of MSC.530(106) is referenced to the relevant paragraph from within the IMO document on which it is based. All non-referenced text refers to SV-ECS only.

1.2 Introduction

- 1.2.1 The primary function of SV-ECS is to contribute to the safety of navigation.^{MSC.530(106) 1.1}
- 1.2.2 SV-ECS 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).^{MSC.530(106) 1.2} on vessels and operations identified within MGN 319 (as amended).
- 1.2.3 SV-ECS shall be capable of displaying all nautical information necessary for safe and efficient navigation originated by, and distributed on the authority of, a government authorized hydrographic office or other relevant government institution, as required by SOLAS regulations V/19 and V/27.^{MSC.530(106) 1.3}
- 1.2.4 SV-ECS shall facilitate simple and reliable updating of the electronic navigational chart/ENDS (Electronic Navigational Data Service).^{MSC.530(106) 1.4}



- 1.2.5 SV-ECS aims to reduce the navigation workload when compared to the use of paper charts and paper nautical publications. To achieve this, an SV-ECS shall:
- Enable the mariner to execute all route planning, route monitoring and positioning functions in a convenient and timely manner.
 - Be capable of continuously indicating (section 1.7), monitoring (section 1.12) and recording (section 1.13) the ship's position ^{MSC.530(106) 1.5}
 - Provide appropriate alarms or indications with respect to the information displayed or malfunction of the equipment (See appendix 4) ^{MSC.530(106) 1.7}
- 1.2.6 It shall not be possible to alter the contents of the ENC/ENDS. ^{MSC.530(106) 4.3}
- 1.2.7 The SV-ECS should not be capable of being used for a purpose other than that for which it was designed. An SV-ECS may be within a Multi-Functional Display (MFD) but if it is, the MFD should meet the hardware requirements within this performance standard.
- 1.2.8 The SV-ECS should be protected to ensure end users cannot misuse or unintentionally amend software and its operating system.
- 1.2.9 SV-ECS shall meet the requirements of this performance standard.

1.3 Definitions

- 1.3.1 *Small Vessel – Electronic Chart System (SV-ECS)* means a navigation information system, conforming to these standards, displaying selected information from a system database with positional information from navigation sensors to assist the mariner in route planning and route monitoring and, if required display additional location-related information.
- 1.3.2 *Electronic Navigational Chart (ENC)* means the database, standardized as to content, structure and format, issued by or on the authority of a government, authorised hydrographic office, or other relevant government institution, and conforming to IHO standards. The ENC contains all the nautical chart information necessary for safe navigation. ^{MSC.530(106) 3.2}
- 1.3.3 *Electronic navigational data service (ENDS)* means a special-purpose database compiled from nautical chart and nautical publication data, standardized as to content, structure and format, issued for use with SV-ECS



by or on the authority of a government, authorized hydrographic office or other relevant government institution, and conforming to IHO standards; and, which is designed to meet the requirement of marine navigation and the nautical charts and nautical publications carriage requirements in SOLAS regulations V/19 and V/27. The navigational base layer of ENDS is the electronic navigational chart (ENC).^{MSC.530(106) 3.3}

- 1.3.4 *System database* means a database, in the manufacturer's internal SV-ECS format, resulting from the lossless transformation of the ENDS contents and its updates. It is this database that is accessed by SV-ECS for the display generation and other navigational functions and is equivalent to up-to-date ENDS.^{MSC.530(106) 3.4}
- 1.3.5 *Standard Display* is the display mode intended to be used as a minimum during route planning and route monitoring. The chart content is listed in appendix 1.^{MSC.530(106) 3.5}
- 1.3.6 *Display base* means the chart content as listed in appendix 1 and which cannot be removed from the display. It is not intended to be sufficient for safe navigation.^{MSC.530(106) 3.6}
- 1.3.7 Further information on these definitions may be found in IHO Special Publication S-32.^{MSC.530(106) 3.7}
- 1.3.8 The use of the word '*shall*' within this document identifies elements which have been identified as a requirement which cannot be deviated from.
- 1.3.9 The use of the word '*should*' within this document identifies elements which have been identified as best practice or a goal-based requirement which is to be complied with if reasonably practicable.

1.4 Charts and Chart Updates

- 1.4.1 SV-ECS shall, when used for primary navigation, use ENC charts supplied by an approved hydrographic office, are the latest edition and in conformity with the relevant IHO standards.
- 1.4.2 SV-ECS shall be capable of accepting official updates to the ENDS data provided in conformity with IHO standards.^{MSC.530(106) 4.4}



- 1.4.3 The ENC and all updates to it shall be displayed without any degradation of their information content.^{MSC.530(106) 5.11}
- 1.4.4 SV-ECS should provide a means to ensure that the ENDS and all updates to it have been correctly loaded into the system database.^{MSC.530(106) 5.12}
- 1.4.5 The ENC and all relevant updates shall be clearly distinguishable from other displayed information, including those listed in Appendix 2.^{MSC.530(106) 5.13}
- 1.4.6 SV-ECS shall keep a record of updates including time of application to the system.^{MSC.530(106) 4.6}
- 1.4.7 SV-ECS shall allow the operator to review the update log in order to ascertain that updates have been included.

1.5 Display of System Database information

- 1.5.1 System database 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 1).^{MSC.530(106) 5.2}
- 1.5.2 When displaying an ENC, SV-ECS shall present only the Standard Display, at any time, by a single operator action.^{MSC.530(106) 5.3}
- 1.5.3 When SV-ECS Standard Display is activated, it shall provide the Standard Display at the largest scale available for the displayed area. The scale of an ENC is indicated by its compilation scale.
- 1.5.4 It should be easy to add or remove information from the SV-ECS display. It should not be possible to remove information contained in the Display Base.^{MSC.530(106) 5.5}
- 1.5.5 For any operator-identified geographical position (e.g. by cursor picking), SV-ECS should display on demand the information about the chart objects associated with such a position.^{MSC.530(106) 5.6}
- 1.5.6 When displaying an ENC, it shall be possible for the operator to select a safety contour from the depth contours available and SV-ECS shall emphasise this safety contour over other contours on the display.^{MSC.530(106) 5.8}

However, if the safety contour in use becomes unavailable due to a change in



source data, the safety contour shall default to the next deeper contour, and an indication should be provided.^{MSC.530(106) 5.8.2, 5.8.3}

1.5.7 When displaying an ENC, it shall be possible for the operator to set a safety depth. SV-ECS should emphasise soundings equal to or less than the safety depth whenever spot soundings are selected for display.^{MSC.530(106) 5.9}

1.5.8 When displaying an ENC, the largest scale data for the area displayed shall always be used by the SV-ECS 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 4.

1.6 Display Scale

1.6.1 SV-ECS should provide an indication if:

- The user selected scale is larger than that contained in the ENC. (Over-scale)
- A larger scale chart for Own ship's position is available but is not being displayed.
- User selected scale is smaller than that contained in the ENC. Due to scale minimum being applied, information may be removed from the display. (Under-scale)

1.6.2 It should be possible to reset the display to that of the ENC compilation scale by a single operator action.

1.7 Display of Own Ship

1.7.1 The display of own-ship position within SV-ECS and other navigational information shall use a common reference.

1.7.2 SV-ECS 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.

1.8 Display Modes

1.8.1 It shall always be possible to display the ENC in a "north-up" orientation. Other additional orientations are permitted.^{MSC.530(106) 8.1}

1.8.2 SV-ECS shall provide for true motion mode. Other modes are permitted.^{MSC.530(106) 8.2}



1.8.3 When true motion mode is in use, reset and generation of the neighbouring area shall take place automatically at own ship's distance from the edge of the display as determined by the mariner.^{MSC.530(106) 8.3}

1.8.4 It shall be possible to manually change the displayed chart area and the position of own ship relative to the edge of the display.^{MSC.530(106) 8.4}

1.9 Colours and Symbols

1.9.1 IHO recommended colours and symbols shall be used to represent ENC information.^{MSC.530(106) 9.1}

1.9.2 The colours and symbols other than those mentioned in 1.9.1 should comply with the applicable requirements contained in the IMO standards¹ for navigational symbols.^{MSC.530(106) 9.2}

1.10 Display Requirements

1.10.1 SV-ECS shall be capable of displaying information for: ^{MSC.530(106) 10.1}

- route planning and supplementary navigation tasks; and^{MSC.530(106) 10.1.1}
- route monitoring.^{MSC.530(106) 10.1.2}

1.10.2 The effective size available on screen for the chart presentation during route monitoring should be at least.

A) 192mm x 192mm on vessels more than 15mtr in load line length and equal to or less than 24mtr in load line length

B) 150mm x 150mm on vessels equal to or less than 15mtr in load line length, except;

- a. Small commercial vessels (e.g. Workboat Code 3, Sport and Pleasure Vessel Code) certified to operate in Area Category 0 or 1, or;
- b. Other vessels, including fishing vessels certified to operate in GMDSS Sea Area A3 and/or A4,

¹ IMO Circular SN.1/Circ.243/Rev.2



where the screen size shall be at least 192mm x 192mm

- 1.10.3 The screen shall operate at the native resolution of the display to ensure optimal clarity and detail. The display must be easily readable from the main steering, or conning station, by an individual meeting the minimum eyesight levels stipulated within either the ENG 1 or ML5 medical requirement standards (as applicable), ensuring that critical navigational information is always accessible and legible. Additionally, the aspect ratio of the display must be maintained to prevent any distortion or stretching of data, preserving the integrity of the information presented
- 1.10.4 The screen should be capable of meeting the colour recommendations of IHO²
- 1.10.5 The screen orientation can be either landscape or portrait so long as the minimum effective screen relevant dimension for chart presentation remains in line with the requirements stipulated within 1.10.2.
- 1.10.6 The primary screen used for display of ENC's / ENDS shall be connected directly to the appropriate video output of the SV-ECS. The use of video matrix or KVM switch within an SV-ECS system shall be permitted only for additional screens displaying information that is not required for safe navigation.

1.11 Route Planning

- 1.11.1 It should be possible to carry out route planning, route monitoring in a simple and reliable manner.^{MSC.530(106) 11.1}
- 1.11.2 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.
- 1.11.3 It should be possible to adjust a planned route including: ^{MSC.530(106) 11.3.2}
- Alphanumerically and graphically adding waypoints to a route.
 - Alphanumerically or graphically deleting waypoints from a route;
and

² IHO Publication S-52 - Specifications for Chart Content and Display Aspects of ECDIS and S-101 – Portrayal Catalogue (see appendix 1) and S-98.



- Alphanumerically and graphically changing the position of a waypoint.

- 1.11.4 It should be possible to input names or own ID to routes and waypoints identified in 1.11.3
- 1.11.5 It should be possible to plan one or more alternative routes in addition to the selected route. The selected route should be clearly distinguishable from the other routes.^{MSC.530(106) 11.3.3}
- 1.11.6 A graphical indication is required if the mariner plans a route across an own ship's safety contour.^{MSC.530(106) 11.3.4}
- 1.11.7 A graphical indication is required if the mariner plans a route across the boundary of a user-selectable category of prohibited area or a geographic area for which special conditions exist (see Appendix 3).^{MSC.530(106) 11.3.5}
- 1.11.8 It shall be possible for the operator to specify a cross-track limit of deviation from the planned route at which an automatic off-track alarm should be activated.^{MSC.530(106) 11.3.8}

1.12 Route Monitoring

- 1.12.1 The ship's position shall be derived from an absolute positioning system such as a GNSS receiver which, where applicable, complies with the carriage requirements stipulated within SOLAS Chapter V/19 or the relevant code for which the vessel complies with.
- 1.12.2 Whenever possible a second independent absolute position reference system, preferably of a different type, should be provided.
- 1.12.3 In case the primary position reference system fails, the second position reference system, if fitted shall be used.
- 1.12.4 In such cases where multiple position sources are inputted into the SV-ECS, whilst not mandatory, the system may provide a visual indication of any discrepancies between the two sources
- 1.12.5 For route monitoring the selected route and own ship's position should appear whenever the display covers that area.^{MSC.530(106) 11.4.1}
- 1.12.6 It should 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. If this is done on the display used for route monitoring, the automatic route monitoring



- functions (e.g. updating ship's position and providing alerts and indications) should be continuous. It should be possible to return to the route monitoring display covering own ship's position immediately by single operation action.^{MSC.530(106) 11.4.2}
- 1.12.7 The SV-ECS shall include an alarm and distance alert function that, when selected, provides an alarm and related graphical indication if the ship will pass closer than a user-selected distance or time from the safety contour. The SV-ECS can utilise either user selected distance or time, or both as an alarm parameter.
 - 1.12.8 It should be possible to set the user defined time stipulated within section 1.12.7 This user defined time must be at least 10 seconds.
 - 1.12.9 SV-ECS shall give a warning, caution, or indication as selected by the mariner and related geographical indication, if within a specified time or distance set by the mariner, own ship will pass closer than a user-selected distance from the boundary of a user selectable prohibited area or of a geographical area for which special conditions exist (see Appendix 3).^{MSC.530(106) 11.4.4}
 - 1.12.10 An alarm shall be given when the specified cross track limit for deviation from the selected route, if defined by the mariner when route planning, is exceeded.^{MSC.530(106) 11.4.5}
 - 1.12.11 SV-ECS should provide a warning when the input from any position, heading or speed sources which may be connected to the SV-ECS is lost.
 - 1.12.12 It shall be possible to display an alternate route(s) 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 route or change to an alternate route.^{MSC.530(106) 11.4.14}
 - 1.12.13 It shall be possible to display a minimum of 10 points, free movable electronic bearing lines, variable and fixed range markers and other symbols required for navigation purposes and specified in Appendix 2.^{MSC.530(106) 11.4.15.2}
 - 1.12.14 It should be possible by a single operator action to place a Man Overboard position and symbol.
 - 1.12.15 The positioning system used to comply with 1.12.1 and the SV-ECS system database shall be on the same geodetic datum. SV-ECS shall provide a warning if this is not the case.^{MSC.530(106) 11.4.13}



- 1.12.16 It should be possible to enter the geographical coordinates of any position and then display that position on demand and to mark its position with a user selectable symbol. Also, it should be possible to select any point (features, symbol or position) on the display and read its geographical coordinates on demand.^{MSC.530(106) 11.4.16}
- 1.12.17 SV-ECS should provide the capability, via a human machine interface (HMI) appropriate to the SV-ECS design and intended mode of operation, to enter and plot manually obtained bearing and distance lines of position (LOP) and allow the user to manually or automatically calculate the resulting position of own ship. It should be possible to use the resulting position as an origin for dead reckoning.

1.13 Voyage Recording

- 1.13.1 SV-ECS shall log the ship's track at one-minute intervals which includes the following information:
- Position,
 - Heading (if connected to a heading reference system)
 - Course over ground
 - Speed over ground
 - Speed through the water (if connected to a speed log)
 - Date and time
- 1.13.2 It shall not be possible SV-ECS to manipulate or change the recorded information.^{MSC.530(106) 11.5.4}

1.14 Display of Other Navigational Information

- 1.14.1 SV-ECS shall be able to display other navigational information from other equipment, if fitted and connected to the SV-ECS, such as Radar overlays and AIS target information
- 1.14.2 SV-ECS may be able to display additional geographical and/or text-based information in S-57 or in any other format including the display of environmental and operational parameters (e.g. for the fishing, leisure and work-boat industries) from 3rd party service providers, provided that the requirements of this section are met.



- 1.14.3 The additional information shall not degrade the displayed system database, and it should be clearly distinguishable from the system database information.^{MSC.530(106) 7.1}
- 1.14.4 A simple means shall be provided for the removal of any additional navigational information (1.14.1) from the presentation.
- 1.14.5 Where the data is geographical in nature, the information should be displayed in correct registration with the displayed ENC where present, in terms of scale, position and projection.
- 1.14.6 System reliability is not compromised by the added functionality and complexity required for the display of the additional information.
- 1.14.7 Facilities shall be provided for the import and/or export of routes in a format whose details are in the public domain.
- 1.14.8 Such facilities must not compromise the requirements of Sections 11 and 12 of this specification.

1.15 Calculations and Accuracy

- 1.15.1 The accuracy of all calculations performed by SV-ECS should be independent of the characteristics of the output device and should be consistent with the system database accuracy.^{MSC.530(106) 12.1}
- 1.15.2 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.^{MSC.530(106) 12.2}
- 1.15.3 The system should be capable of performing and presenting the results of at least the following calculations:^{MSC.530(106) 12.3}
- True distance and azimuth between two geographical positions
 - geographic position from known position and distance/azimuth

1.16 Connections

- 1.16.1 SV-ECS shall not degrade the performance of any equipment providing sensor inputs, nor should the connection of optional equipment degrade the performance of SV-ECS below this standard.^{MSC.530(106) 15.1}



- 1.16.2 SV-ECS shall be connected to a position fixing system as required by section 1.12.1 of this standard.
- 1.16.3 If fitted on the vessel, the SV-ECS shall be connected to a heading reference system such as a gyro compass (e.g., mechanical or fibre optic) or marine transmitting heading device
- 1.16.4 If fitted on the vessel, the SV-ECS shall be connected to the speed and distance measuring device.
- 1.16.5 If fitted on the vessel, the SV-ECS should be connected to the AIS transceiver.
- 1.16.6 Facilities may be provided for the electrical connection of SV-ECS to other systems for the purpose of electronic reporting of internally generated information.
- 1.16.7 If fitted on the vessel, the SV-ECS may be connected to the radar.
- 1.16.8 Connections to equipment identified in this section shall be in conformance with one of the following standards, relevant to the type of connection used;
 - IEC61162 – Serial NMEA IEC 61162-1
 - IEC61162 (450) – NMEA over LAN IEC 61162-450
 - NMEA2000 – Canbus network IEC 61162-3
- 1.16.9 All IEC 61162-1 interfaces directed towards the SV-ECS must undergo galvanic opto-isolation, which can be implemented either internally or externally, to ensure optimal operational integrity and safety
- 1.16.10 SV-ECS may be connected to a wide area network (WAN) for the purpose of utilising chart correction IP services, but the connection shall not degrade the SV-ECS or any other equipment connected to it.

1.17 Performance Tests, Malfunctions Alerts and Indications

- 1.17.1 SV-ECS shall be provided with means for either automatically or manually carrying out on-board tests of major functions. In case of a failure, the test should display information to indicate which module is at fault.^{MSC.530(106) 13.1}
- 1.17.2 SV-ECS shall provide a suitable warning or indication of system malfunction.^{MSC.530(106) 13.2}



1.18 Backup Arrangements

1.18.1 Adequate backup arrangements shall be provided to ensure safe navigation in case of a SV-ECS failure, see Appendix 5. The backup arrangement can consist of one of the following solutions:

- a) a second SV-ECS complying fully with all elements of this performance standard as stipulated in Appendix 5 of this document
- b) a selection of paper charts, corrected and up-to-date, sufficient for the vessel to navigate to a safe haven.
- c) a portable device complying with the technical requirements stipulated in Appendix 5 of this document, sufficient for the vessel to navigate to a safe haven except for.
 - Small commercial vessels (e.g. Workboat Code 3, Sport and Pleasure Vessel Code) certified to operate In Area Category 0 - 1 or;
 - Other vessels, including fishing vessels certified to operate in GMDSS Sea Areas A3 - A4;

where the back-up arrangements stipulated in either option a) or b) shall apply

1.18.2 Where backup facilities are provided by means of option a) or c) of 1.18.1 then facilities shall be provided enabling a safe take-over of the SV-ECS functions to prevent SV-ECS/S-ECDIS failure from developing into a critical situation.^{MSC.530(106) 14.1.1}

1.18.3 A backup arrangement should provide means of safe navigation to a safe haven in the case of an SV-ECS failure.^{MSC.530(106) 14.1.2}

1.19 Power Supply

1.19.1 The SV-ECS and all equipment necessary for its normal functioning should be supplied by the vessels main power supply.

1.19.2 It shall be possible to operate SV-ECS and all equipment necessary for its normal functioning, and the backup arrangements by means of an alternative energy source.



1.20 Compliance

- 1.20.1 SV-ECS shall conform to the relevant requirements of IEC 60945 or other standard which encompasses the required tests to satisfy the following compliance goals:
- Can withstand expected vibration in required operational mode/area
 - Can withstand temperatures (including extreme) expected to be encountered in operational mode/area
 - Can withstand moisture/water ingress expected to be encountered in operational mode/area
 - Includes an industry standard/isolated COM ports which ensure a reliable sensor connection
 - Includes 1kV galvanic isolation from the ships power supply
- 1.20.2 SV-ECS shall be provided with an OEM self-declaration stating that both the hardware and software complies with the requirements of this performance standard.
- 1.20.3 Where the SV-ECS has different OEMs for software and hardware, the system shall be provided with a self-declaration from each OEM covering the relevant sections of this performance standard applicable to their provided product.
- 1.20.4 Where additional, non-SV-ECS OEM equipment is utilised to provide critical equipment identified in 1.10.5 (KVM switches) and 1.16.8 (Connections) the OEM, supplier, or installer of the additional equipment should provide a self-declaration confirming the equipment complies with the relevant sections of this performance standard.
- 1.20.5 The self-declaration shall also stipulate the operational environment limitations of the hardware (protected/exposed/portable).



Part 2 - Appendices



2 Appendices

2.1 Appendix 1 - ENC information for Display

Display Base

Display base to be permanently shown on the SV-ECS display, consisting of:

1. Coastline (high water)
2. Own ship's safety contour,
3. Isolated underwater dangers of depths less than the safety contour which lie within the safe waters defined by the safety contour
4. Isolated dangers which lie within the safe water defined by the safety contour such as bridges, overhead wires, etc.,
5. Scale, range, and north arrow
6. Units of depth and height; and
7. Display mode

Standard display

The Standard display is the set of object types to be derived from an ENC which are to be displayed when standard display is selected on the SV-ECS and comprises of;

1. Display Base
2. Drying line
3. Buoys, beacons, other aids to navigation and fixed structures
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
9. Traffic routing systems
10. Archipelagic sea lanes



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. Most recent chart update number
9. Geodetic datum
10. Magnetic variation
11. Graticule; and
12. Place names



2.2 Appendix 2 - 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.
9. Tidal data
 - Predicted tidal stream or current vector with effective time and strength
 - Actual tidal stream or current vector with effective time and strength
10. Danger highlight
11. Clearing line
12. Planned course and speed to make good
13. Waypoint
14. Distance to run.
15. Planned position with date and time.
16. Position and time of "wheel-over"



2.3 Appendix 3 - Areas for which Special Conditions Exist

SV-ECS shall detect the following usable selectable areas and shall provide a warning, caution, or indication as detailed in section 1.12.9 of the performance standard. When displaying an ENC the areas should be derived from the ENC.

1. Traffic separation zone
2. Inshore traffic zone
3. Restricted area
4. Caution area
5. Offshore production area
6. Areas to be avoided
7. User defined areas to be avoided
8. Military practice area
9. Seaplane landing area
10. Submarine transit lane
11. Fishing ground
12. Fishing prohibited
13. Pipeline area
14. Cable area
15. Anchorage area
16. Marine farm/aquaculture
17. Particularly sensitive sea area (PSSA)



2.4 Appendix 4 - Alarms and Indications

The following alarms and indications shall be provided.

Requirements	Information
Alarm	Pass closer than set distance from the safety contour
Warning or Caution, or Indication	Pass closer than set distance from an area with special conditions
Alarm	Deviation from route
Warning or Caution, or Indication	Pass closer than set distance from a danger in route monitoring mode
Warning	Positioning system failure
Warning	Approach to critical point
Warning	Different geodetic datum
Warning or Indication	Malfunction of ECDIS
Indication	Default safety contour
Indication	Information overscale
Indication	Larger scale ENC available
Indication	Information not displayed due to scale minimum
Indication	Different reference system
Indication	No ENC available
Indication	Customized display
Indication	Route planning closer than set distance from the safety contour
Indication	Route planning closer than set distance specified area
Indication	Monitored route pass closer than set distance from the safety contour
Indication	Monitored route pass closer than set distance from a specified area or danger
Indication	System test failure

Note:

1. The requirements of Section 1.5.8, regarding the use of largest scale data available in the ENC, should be observed for the calculation of Alert conditions.
2. Alert: Audible and/or visual announcement of a condition requiring attention. Priorities of alert are alarm, warning, and caution. An Alarm shall be audible *and* visual (e.g. flashing text) and require an action by the operator to acknowledge. Warnings and cautions shall be visual (e.g. flashing text) and may also be audible.
3. Indication: Visual indication giving information about the condition of a system or equipment that should remain in view on the screen until condition is resolved.
4. An alarm or indication shall not interrupt normal operation of SV-ECS without user intervention.



2.5 Appendix 5 - Back-up Requirements

2.5.1 As prescribed in 1.18 of this performance standard, a SV-ECS requires a suitable back up arrangement. This appendix gives clarification on the requirements required when utilising the options stated in 1.18.1

2.5.2 Option A – Additional SV-ECS

2.5.2.1 The additional SV-ECS shall comply fully with the following sections of the main performance standard.

- 1.4 up to and including 1.15
- 1.17
- 1.20

2.5.2.2 The additional SV-ECS shall comply with the following elements of 1.16 (Connections)

- 1.16.1
- 1.16.2
- 1.16.3
- 1.16.4
- 1.16.8
- 1.16.9
- 1.16.10

2.5.2.3 The additional SV-ECS shall comply with the following elements of section 1.19 (Power Supply)

- 1.19.1
- The additional SV-ECS and all equipment necessary as per this annex should also be supplied by an alternative power supply which is independent from the main vessel power supply prescribed in 1.19.1 of the performance standard and is of suitable capacity to ensure safe navigation to a safe haven. This alternative power supply can consist of connection to an emergency switchboard or appropriate battery supply.

2.5.3 Option B – Paper charts

2.5.3.1 When utilising paper charts these shall be corrected up-to-date and sufficient for the vessel to navigate to a safe haven

2.5.4 Option C – Portable-Device



- 2.5.4.1 A portable [device] being used as option C to comply with the backup requirements stipulated within 1.18.1 of the performance standard shall comply fully with the following sections of the performance standard. The portable device shall not be utilised for other tasks when in use for navigation.
- 1.4 up to and including 1.9
 - 1.11
 - 1.12
 - 1.13
 - 1.14
 - 1.15
 - 1.17
- 2.5.5 The portable device shall comply with the following elements of 1.10 (Display)
- 1.10.1
 - 1.10.3
 - 1.10.4
- 2.5.6 The effective size of the chart presentation for route monitoring should be at least 112mm x 112mm.
- 2.5.7 The display of a portable device utilised as the backup arrangement for SV-ECS shall be integrated into the form factor of the device.
- 2.5.8 The portable device shall comply with the following elements of 1.16 (Connections)
- 1.16.2
- 2.5.9 The portable device when complying with the requirements of 1.16.2 can utilise a connection to the ships GNSS receiver or utilise a suitable portable GNSS receiver.
- 2.5.10 The portable device shall comply with the following elements of 1.19 (Power Supply)
- 1.19.1
- 2.5.11 The operator shall ensure the portable device used to comply with the requirements of this Annex is suitable for its intended use and shall consist of hardware which complies with the following goal-based requirements:
- Can withstand expected vibration in required operational mode/area
 - Can withstand temperatures (including extreme) expected to be encountered in operational mode/area



- Can withstand moisture/water ingress expected to be encountered in operational mode/area

2.5.12 The use of additional hardware such as vibration mounts and protection cases are accepted as a method of fulfilling the goal-based requirement

2.5.13 The portable device and all equipment necessary to ensure normal operation shall also be supplied by an alternative power supply which is independent from the main vessel power supply prescribed in 1.19.1 of the performance standards. This alternative supply can include battery solutions of a suitable capacity to ensure safe navigation to a safe haven.





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