



USER MANUAL

**Electronic Chart Display and Information
System (ECDIS)**

NES-3000

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MODIFY RECORD

No	Modify by	Date	Paragraph	Version	Reason
1	Q/A	2025/03/12		10	Software update

TABLE OF CONTENTS

1. Introduction.....	1
1.1 System Introduction.....	1
1.2 System Composition	1
1.3 Limitations and recommendations for use	2
1.4 Manual Specify.....	3
1.5 Reference Standards	4
1.6 Software Name and Version.....	6
1.7 The Standard/Specification Edition	6
2. Activation of ECDIS	8
2.1 Start / Exit / Rebooting System.....	8
2.1.1 Start the System	8
2.1.2 Exit the System.....	8
2.1.3 Rebooting ECDIS	8
2.2 First Start ECDIS Settings	8
2.2.1 USB-dongle and License (Install, Update)	9
2.2.2 DPI settings	9
2.2.3 Setup initial settings.....	11
2.3 Identification key and licenses.....	12
2.3.1 New license	13
2.3.2 Removable media.....	13
3. Basic Operational Procedures	15
3.1 Manipulators.....	15
3.2 Tool selection	15
3.3 Moving the chart.....	16
3.4 Chart scaling	16
3.5 Chart and object information	17
3.5.1 Magnetic declination	18
3.5.2 Tidal currents	19

3.5.3 Graphic information	19
3.6 Bearing and distance measurement (ERBL)	19
3.7 Lens	21
3.8 On-screen keyboard	21
3.9 Context menu activation	23
3.10 Text input	23
3.11 Entering numeric values	24
3.12 Check box usage	25
3.13 Drop-down lists	25
3.14 Tables	26
3.15 Selecting a date or date range	28
3.16 Setting the time	29
3.17 Entering passwords	30
3.18 Hot keys	30
4. User interface	33
4.1 Main screen elements	33
4.2 Main window	35
4.3 Single action controls	36
4.4 Main menu	37
4.5 Settings menu chart	39
4.6 Navigational data panel	40
4.6.1 Panel's content adjustment	41
4.7 Quick Settings	41
4.8 Multitask window	42
4.9 Cursor data widget	43
4.10 Alerts area	43
4.11 Permanent indication area	43
4.11.1 Scale indicator	45
4.11.2 Chart viewing date	47

4.12 Bottom temporary panels	47
4.13 Scale independent indicators	47
4.14 Danger Course Indicator	48
4.15 XTD Indicator	49
5. System Setting	51
5.1 User Interface settings	51
5.2 Settings Management	52
5.3 Units	54
5.4 Certificates/Licenses	55
5.5 Software licenses	56
5.6 System password	56
5.7 Network settings.....	57
5.7.1 DHCP	58
5.7.2 Manual Network Settings.....	58
6. Own Ship Setting.....	59
6.1 Vessel registration data.....	59
6.2 Vessel dimensions	61
6.3 Vector settings.....	65
7. ENC Management	68
7.1 ENC management functions.....	69
7.1.1 Installing/deleting Schema Administrator certificates.....	71
7.1.2 Installing/deleting Cell Permits.....	72
7.1.3 Installing/deleting ENC	73
7.2 ENC cell updates.....	76
7.2.1 Installing updates.....	76
7.2.2 To view updates.....	77
7.3 Installation Logbook	79
7.4 ENC Status Report.....	80
7.4.1 Short Report	80

7.4.2 Full Report	81
7.4.3 Report Export.....	82
7.5 ENC Status Report.....	83
7.5.1 Portrayal	83
7.5.2 Chart Objects.....	85
7.5.3 Standard Display	89
7.5.4 Navigational Settings	89
7.6 SSE messages.....	92
8. Manual Update	94
8.1 Adding objects to the chart.....	94
8.2 Object editing	98
8.3 History of changes.....	100
9. Mariner's Objects.....	101
9.1 Types of user objects	102
9.1.1 Clearing Line (Danger Bearing)	102
9.1.2 Danger Highlight.....	103
9.1.3 Event	103
9.1.4 Manufacturer's Feature.....	104
9.1.5 Mariner's Note	105
9.1.6 Mariner's Feature.....	105
9.1.7 Position.....	105
9.1.8 Tidal Stream or Current Vector	106
9.1.9 User-Added Electronic Chart Information	106
9.2 Creating User Object.....	106
9.3 User Chart Import.....	107
9.4 User Chart Export.....	107
9.5 Markers	107
9.5.1 Setting Markers.....	109
9.5.2 Marker Management.....	109

9.6 Event	109
9.7 Go to	111
9.8 SAR (Search and Rescue)	112
9.8.1 Square Search Pattern	112
9.8.2 Sector Pattern.....	114
9.8.3 Parallel Tracks Pattern	116
9.9 Geodesic calculator	118
9.10 Manual Position Fix (Manual observations).....	119
9.10.1 Available Position Fix Methods:	120
9.10.2 Steps for Manual Position Fix	120
9.10.3 Viewing the Navigation Log	123
9.10.4 Return to GNSS location correction.....	124
9.11 Dead reckoning	124
9.11.1 DR Mode Functionality	125
9.12 DR/Manual Input	128
9.12.1 Coordinates Correction.....	128
9.13 Safety Depth, Safety Contour and Air draft	129
9.14 Safety Zone	131
10. Route	134
10.1 Route Plan.....	134
10.1.1 Route elements.....	134
10.1.2 ENC by route	137
10.1.3 Create New Route	139
10.1.4 Critical Points (EP by route).....	142
10.1.5 Route Check.....	143
10.1.6 Route Edit.....	148
10.1.7 Route Delete.....	149
10.1.8 Route Import.....	149
10.1.9 Route Export.....	150

10.1.10 Timetable	152
10.1.11 Route Activate	153
10.2 Route Monitor	155
10.2.1 Route monitoring panel:.....	155
10.2.2 Voyage timeline	156
10.3 Navigation log.....	158
10.3.1 Operational Mark	158
10.3.2 Export of ESL.....	160
11. Sensor Management	162
11.1 Sensor Type	162
11.2 Sensor Setting	162
11.3 Navigational sensors setup	164
11.3.1 Ethernet connection	165
11.3.2 Serial Port Connection	166
11.3.3 NMEA Monitor	166
11.3.4 Additional settings.....	167
11.4 Position Source	167
11.4.1 Position sensor features	168
11.4.2 Track Vector Generation.....	168
11.4.3 Differential Receiver Warnings	169
11.5 Heading Source.....	170
11.5.1 Heading sensor features.....	170
11.5.2 When Heading Sensor Data Is Unavailable.....	171
11.5.3 Functions Enabled by the Heading Sensor.....	171
11.6 Speed Source.....	171
11.6.1 Setup and operating features	172
11.6.2 Functions Enabled by the Speed Sensor.....	172
11.7 ECDIS and AIS.....	173
11.8 ECDIS and Echo	173

11.8.1 Alerts	175
11.8.2 Depth Data Display.....	176
11.8.3 Navigation log entry	177
11.9 ECDIS and ARPA.....	179
11.10 ECDIS and BAM.....	179
11.11 ECDIS and BNWAS	180
11.12 ECDIS and Pelorus	180
11.13 ECDIS and VDR.....	181
11.14 ECDIS and Route sensor	183
11.15 ECDIS and DDCS	184
11.16 ECDIS and NAVTEX	185
11.17 ECDIS and Weather Instrument.....	190
11.17.1 Weather Instrument purpose	190
11.17.2 Weather Instrument Settings	190
11.17.3 Weather Instrument operation features	190
12. INS.....	195
12.1 INS settings.....	195
12.2 INS messages	196
13. Discrepancy.....	197
13.1 Position discrepancy	197
13.2 Heading misclosure	199
13.3 Speed Log misclosure	200
14. Target Management	202
14.1 General	202
14.2 AIS Target	202
14.2.1 Sensor configuration.....	202
14.2.2 AIS operation features	203
14.2.3 Target information.....	207
14.2.4 Guard zone	208

14.2.5 CPA/TCPA.....	208
14.2.6 Lost targets	209
14.2.7 Own ship's AIS	209
14.2.8 Data transmission to the AIS transponder	210
14.2.9 Targets table.....	211
14.2.10 AIS Messages.....	213
14.2.11 Incoming messages.....	213
14.2.12 Sending messages (Outgoing messages)	215
14.2.13 ASM (Application Specific Messages)	217
14.2.14 Targets table.....	218
14.3 ARPA Target	219
14.4 ARPA operation features.....	219
14.4.1 Displaying target data	219
14.4.2 Guard Zone	220
14.4.3 CPA/TCPA.....	220
14.4.4 Lost targets	220
14.4.5 ARPA and AIS targets association	221
15. Alarm Management	223
15.1 Alert categories	223
15.1.1 Alert Display.....	224
15.1.2 Alarm acknowledgement	224
15.1.3 Alarm and warning statuses	224
15.2 Alerts log	225
15.2.1 Alerts List Display	226
16. Logbook.....	228
16.1 Track Log	228
16.2 ENC log.....	230
16.3 Alerts log	230
16.4 Settings log.....	231

16.5 Events log.....	232
16.6 Manual Observations Log	233
16.7 Manual Observations Log Export	234
17. Ground check	236
17.1 Ground check settings.....	236
17.2 Hazard indication.....	238
17.2.1 Display on the chart.....	238
17.2.2 Hazard indication	240
17.2.3 Charted hazards	240
18. Anchor Monitoring.....	241
19. ECDIS Maintenance and Information	244
19.1 ECDIS Information	244
19.1.1 Exporting the system log	245
19.1.2 User Permit export.....	245
19.2 ECDIS software update	246
20. Master-Backup Settings.....	248
20.1 Critical Settings for Each Node.....	248
20.2 Navigational Sensor Data Across the Bridge	248
20.3 Backup Sensors Connection	248
20.3.1 Ethernet Sensors Connection.....	248
20.3.2 Serial Port Sensors Connection.....	249
20.4 Backup node limitations	249
20.5 Master Backup Synchronization	249
21. BackUp and Restoration.....	251
21.1 Backup	251
21.2 Restore from backup	252
21.3 delete a backup	253
22. Radar Overlay (Optional).....	254
22.1 Creating an RLI source	254

22.2 Setting up the RLI source	254
22.3 Radar overlay	258
22.4 Removing an RLI source	260
23. Water level stations (Optional).....	261
23.1 Connection	261
23.2 Graph of water level fluctuations	262
24. Bridge(Optional)	264
24.1 Purpose	264
24.2 ECDIS connection to the Navigation Bridge and setup	264
24.3 ECDIS role management	266
24.3.1 Assigning a Master role	266
24.3.2 Transfer Master role to Backup.....	267
24.3.3 Request for Master role	267
24.4 Synchronization.....	268
24.5 ENC Synchronization	268
24.5.1 Synchronize Settings:	269
25. System Logs.....	271
25.1 Device management activities log	271
25.1.1 Log File Location	271
25.1.2 Logging Service	272
25.1.3 Service Configuration Details	272
25.1.4 Managing the ssg-node460audit Service.....	273
25.1.5 Software update log.....	274
25.2 Remote Syslog Server Connection	274
25.2.1 Sending Audit Service Logs.....	274
25.2.2 Sending System Syslog Logs to a Remote Syslog Server	275
25.2.3 Configure the Firewall.....	276
25.3 Configuring the Remote Syslog Server (if applicable)	276
25.3.1 Syslog configuration example	277

25.4 Reference Documentation.....	278
26. Remote Assistant Function.....	278
26.1 Implementation Overview.....	278
26.2 Remote Desktop Connection Process.....	279
26.2.1 ECDIS Side Settings.....	279
26.2.2 Support PC Side Setup.....	280
27. Annex	284
27.1 Appendix A. List of Abbreviations.....	284
27.2 Appendix B. ECDIS standard settings.....	287
27.3 Appendix C. Errors in applying underwater landforms to ENC	291
27.4 Appendix D. Alert Mark Description Table:.....	293
27.5 Appendix E. Alert and Indication List.....	294
27.6 Appendix F. IEC 61162 interfaces.....	296
27.7 Appendix G. Brief Guide to UFW.....	298
27.8 Appendix H. Destination multicast addresses and port numbers	300
27.9 Appendix I. Display Description.....	302
27.10 Appendix J. List of Device Type	303
27.11 Appendix K. Bug Report.....	305

1. Introduction

This manual describes the functions of the NES-3000 series ECDIS (Electronic Chart Display and Information System) (here after referred as NES-3000), and details the operations related to the corresponding functions .

1.1 System Introduction

ECDIS NES-3000 is a navigation system complying with international standards, which displays not only map information, but also information from GPS (Global Positioning System), GYRO (Gyro Compass), Log, ARPA (Automatic Radar Plotting System), AIS (Automatic Identification System) and other sensors. The system can also communicate with BAM, VDR and BNWAS via network connection. The system can receive navigational information from various sensors and graphical information about the vessel's position, which allows for safe navigation .

ECDIS NES-3000 can operate under Windows (Windows XP, Windows 7, etc.), Linux, etc., the main functions of the system are: map management, manual updating, map editing, route planning, route monitoring, logging, target management, alarm management, etc. The system supports vector and raster maps (see table 1). ECDIS NES-3000 supports vector and raster maps (see table 1).

ECDIS operation zone (including backup system and RCDS mode) - between 85°N and 85°S. The zone beyond 85° is not to be processed.

Table 1 Chart Format

Abbreviation	Full Name	Comments
ENC	Electronic navigation maps	Vector map supporting S-57 and S-63 encrypted maps
ARCS	Admiralty Raster Map Service	Raster map supporting ARCS format

1.2 System Composition

The system consists of software and hardware parts. The hardware part of NES-3000 consists of 3 blocks: processor block, display block and control block. (see fig.)

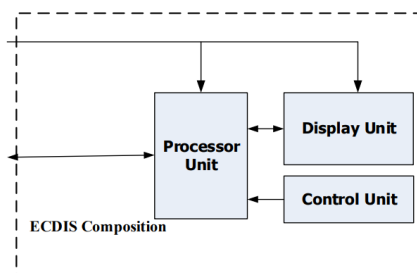


Figure 1 System Composition

➤ Processor unit

To ensure system stability, the processor uses an embedded computer that can operate in adverse conditions and a high-speed SSD hard disk drive.

➤ Display unit

The system utilizes a dedicated navigation display that meets the relevant requirements of IEC 60945 and IEC 62288.

➤ Control unit

The system utilizes a keypad capable of adapting to unfavorable shipboard conditions.

1.3 Limitations and recommendations for use

The International Hydrographic Organization notes that any navigational chart adequately reflects the navigational and hydrographic situation only at the time of hydrographic survey. Due to high variability of the bottom relief in the coastal zone of the sea, narrows, places of intensive river flow, as well as due to the influence of surge and tidal phenomena, the depths may differ from those indicated on the map.

The following limitations should be kept in mind when operating ECDIS:

- When navigating in water areas near high shores or artificial structures, the accuracy of observations can be significantly reduced due to the deterioration of the geometric factor of position lines, caused by the inability to observe part of the satellites. At the same time, differential correction in some cases may worsen the result of vessel position determination. ECDIS NES-3000 automatically monitors the quality of the geometric factor of the position lines based on GNSS receiver data and generates a warning signal when the limit value of the integral index of the geometric factor is exceeded.

- Due to the low signal-to-noise ratio at the GNSS antenna input, there are instances of signal degradation while maintaining the observational validity sign produced by the GNSS receiver. This manifests itself in the form of a shift of the vessel position plotted on the EOC and visually resembles the drift of the vessel under the action of the current. In ECDIS NES-3000 the rate of coordinate change is controlled, but it does not automatically detect the occurrence of such a situation if the rate of coordinate change is close to its normal parameters when the vessel is moving or maneuvering. SN Circular 255, issued by the IHO, and included in the ISMS (International Safety Management Code) standard shipboard procedures, recommends the use of overlaying a radar image on an electronic chart to detect such situations in a timely manner.

- When moving along the transects, it is recommended to always compare the plotted position with the transect lines plotted on the electronic map, which will allow timely detection of unstable GNSS operation.

- GNSS receivers have a function of filtering random emissions of navigation parameters from a series of measurements, which improves the quality of generation of coordinates and velocity vector of the vessel relative to the ground when moving with a constant course. It should be taken into account that on the circulation the ship's heading changes much faster than the heading angle, which is the direction of the velocity vector produced by the GNSS receiver and directed tangentially to the trajectory on the circulation. For this reason, the results of automatic control of the mapped hazards by ECDIS during the circulation should be critically considered, as ESC scanning is performed in a strip or sector ahead of the vessel in the direction of the heading angle, and in case of a narrow sector a part of the water area may be left out of the control zone.

- In the cases described above, to control the position of the ship in relation to navigational hazards and on the fairway, shore-based SNO, navigational radar should be used and not rely solely on ECDIS readings.

1.4 Manual Specify

The use agreements of this manual are listed as below.

- Define “key” as physical key;
- Define “button” as the graph shown in the interface of the system;
- Define “click” as mouse click left button;
- Define “double click” as double click the mouse left button;
- Define “right click” as click the mouse right button.

Table 2 Relevant Terms

No.	Terms and Abbreviations [Definitions]
1	Electronic Chart Display and Information System (ECDIS) [a navigation information system which comply with IMO resolution MSC.232(82) and the requirements of the IEC 61174]
2	Electronic Navigational Chart (ENC) [The data base, standardized as to content, structure and format, issued for use with ECDIS on the authority of government authorized hydrographic offices. The ENC data base comply with IHO S-57 and the requirements of its appendix B.]
3	System Electronic Navigational Chart (SENC) [In ECDIS means a database, in the manufacturer's internal ECDIS format, resulting from the lossless transformation of the entire ENC contents and its updates. The SENC may also contain information added by the mariner and information from other sources.]
4	Radar /ARPA [A system complies with IMO resolution MSC.192(79) and the requirements of the IEC 622388 and IEC 62252.]
5	Automatic Identification System (AIS) [An automatic communication and identification system complies with IMO resolution MSC.74(69) appendix 3 and the requirements of the IEC 61993-2(AIS Class A for instance) and IEC 62287(AIS Class B for instance).]

6	Raster Navigational Chart (RNC) [A scanned version of the original paper chart which issued by the government authorized navigation bureau an or its agency. It can be a signal chart or a chart dataset]
7	Raster Chart Display System (RCDS) In the ECDIS, RCDIS is a chart to display raster chart (RNC). It not only can receive navigation information from navigation position sensor but also can help navigate the route and navigation route monitoring. Besides, it can display other navigation information as need.]
8	Electronic Position Fixing System (EPFS) [An external sensor capable of providing own ship position and speed measured over the ground.]
9	Distance to Closest Point of Approach (CPA) [Predicted target range at the closest point of approach.]
10	Time to Closest Point of Approach (TCPA) [Predicted time to CPA.]
11	Consistent Common Reference Point (CCRP) [Location on own ship, to which all horizontal measurements such as own ship position, heading, attitude, and target range, bearing, relative course, relative speed, closest point of approach (CPA) or time to closest point of approach (TCPA) are referenced, typically the conning position of the ship. An alternative location (or multiple locations) may be used as necessary where clearly indicated or distinctively obvious, for example, the origin of the reference axis of the ship.]
12	Route [In ECDIS, a sequence of WAYPOINTS and LEGS.]
13	Course [The voyage direction]
14	Leg [In ECDIS a line connecting two WAYPOINTS]
15	Electronic Bearing Line (EBL) [A single line originating from CCRP, from a position offset from CCRP, or from a geographically fixed position to measure the ship-to-object or object-to-object bearing.]
16	Variable Range Marker (VRM) [A circle to measure the ship-to-object or object-to-object distance.]

1.5 Reference Standards

Table 3 Reference Standards

IHO Standards
✓ IHO S-57/3.1.3, IHO transfer standard for digital hydrographic data, supplement 3, 2014. ✓ IHO S-57, appendix B.1. ENC product specification, ✓ IHO S-57, appendix B.1, annex A. Use of the object catalogue for ENC, 2018 ✓ IHO S-52:2014, Specifications for chart content and display aspects of ECDIS edition 6.1 ✓ IHO S-52, appendix 1:2012, Guidance on Updating the Electronic Navigational Chart edition 4.0 ✓ S-52 Annex A: IHO ECDIS Presentation Library Edition 4.0(.3) ✓ S-52 Annex A: IHO ECDIS Presentation Library Edition 4.0 (.3) - October 2014 (With Clarifications up to December 2020) ✓ IHO S-63, IHO data protection scheme, Edition 1.2.1: 2020 ✓ IHO S-64, Test data sets for ECDIS
IEC Standards
✓ IEC 60945, <i>Maritime navigation and radiocommunication equipment and systems - General requirements - Test methods and required test results</i> ✓ IEC 61162-1, ed. 5.0 2016-08, <i>Maritime navigation and radiocommunication equipment and systems -Digital interfaces -Part 1: One speaker and multiple listeners</i> ✓ IEC 61162-2, ed1.0: 1998, <i>Maritime navigation and radiocommunication equipment and systems -Digital interfaces -Part 2: One speaker and multiple listeners, high-speed transmission</i> ✓ IEC 61162-3, ed.1.2 2014-07, <i>Maritime navigation and radiocommunication equipment and systems - Digital interfaces - Part 3: Serial data transmission instrument network</i> ✓ IEC 61174, ed. 4.0: 2015, <i>Navigation and radio communication equipment and systems - Electronic Cartographic Navigation and Information System (ECDIS) - operational and performance requirements, test methods and necessary test results</i> ✓ IEC 62288, ed 3.0: 2020, <i>Maritime navigation and radio communication equipment and systems - Presentation of navigation information on shipboard navigation displays - General requirements - Test methods and required test results</i> ✓ IEC 62388, ed1.0: 2007, <i>Maritime navigation and radiocommunication equipment and systems - Shipboard radars - Performance requirements, test methods and required test results.</i> ✓ IEC 61162-450:2018, <i>Maritime navigation equipment and radiocommunication facilities. Digital interfaces. Part 450. Multiple transmitters and multiple receivers. Ethernet interconnection</i> ✓ IEC 61162-460:2018 + AMD1:2020 CSV, <i>Maritime navigation and radio communication equipment. Digital interfaces. Part 460. Multiple transmitters and multiple receivers. Interconnection over Ethernet. Safety and security</i>

- ✓ IEC 61996-1:2013, *Maritime navigation and radiocommunication equipment - Voyage data recorder (VDR) - Part 1: Performance requirements, test methods and required test results*
- ✓ IEC 62923-1, ed. 1.0 2018-08, *Maritime navigation and radio communication equipment and systems. Bridge warning control. Part 1. Functional and performance requirements, test methods and required test results*
- ✓ IEC 62923-2, ed. 1.0 2018-08, *Maritime navigation and radio communication equipment and systems. Bridge warning control. Part 2. Alert and cluster identifiers and other supplementary reference points*
- ✓ ISO 8601, *Data elements and exchange formats - Information exchange - Representation of dates and times*

IMO Standards

- ✓ IMO MSC.232 (82):2006, *Revised performance standards for electronic chart display and information systems (ECDIS),*
- ✓ IMO SN.1/Circ.266:2007, *Maintenance of electronic chart display and information system (ECDIS) software,*
- ✓ SN.1/Circ.243/Rev/2:2019, *Guidelines for the presentation of navigation-related symbols, terms and abbreviations*
- ✓ MSC.1/Circ.1609/:2019, *Guidelines for the standardization of user interface design for navigation equipment*
- ✓ 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/Circ.982:2000, *Guidelines on ergonomic criteria for bridge equipment and layout.*

1.6 Software Name and Version

The software name of the NES-3000 is **ECDIS NSR**, and the current version is **V.3.1.2.1**.

1.7 The Standard/Specification Edition

NES-3000 is complied with the following Standards or Specifications.

➤ IMO Resolution MSC232 (82)

Adoption of the revised performance standards for electronic chart display and information systems (ECDIS). IHO Standards URL: www.iho.int

➤ IEC 61174 Ed.4.0 (2015)

Electronic chart display and information system (ECDIS) - Operational and performance requirements, methods of testing and required test results.

➤ **IEC62288 Ed.5.0 (2014)**

Presentation of navigation-related information on shipborne navigational displays - General requirements, methods of testing and required test results.

➤ **IEC 61162-1 Ed.4.0 (2010)**

Maritime navigation and radiocommunication equipment and systems

–Digital interfaces - Part 1: Single talker and multiple listeners.

➤ **IEC 61162-2 Ed.1.0 (1998)**

Maritime navigation and radiocommunication equipment and systems

–Digital interfaces - Part 2: Single talker and multiple listeners, high-speed transmission.

➤ **IEC 61162-3 Ed.1.1 (2011)**

Maritime navigation and radiocommunication equipment and systems

–Digital interfaces - Part 3: Serial data instrument network.

➤ **IHO S-52 Ed.6.1 (2015)**

Specifications for chart content and display aspects of ECDIS.

➤ **IHO S-52 PresLib ed4.0 (2014)**

IHO ECDIS presentation library.

➤ **IHO S-57 Ed.3.1 (2000)**

Transfer standard for digital hydrographic data.

➤ **IHO S-61 ed1.0 (1999)** Raster chart product specification.

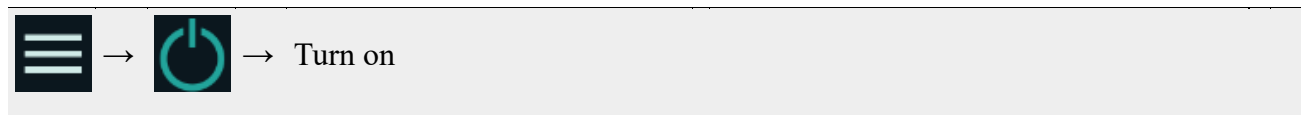
➤ **IHO S-63 Ed.1.2.0 (2015)** IHO data protection scheme.

➤ **IHO S-64 ed3.0.1 (2015)** IHO test data sets for ECDIS.

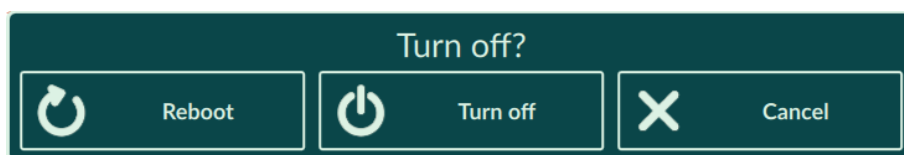
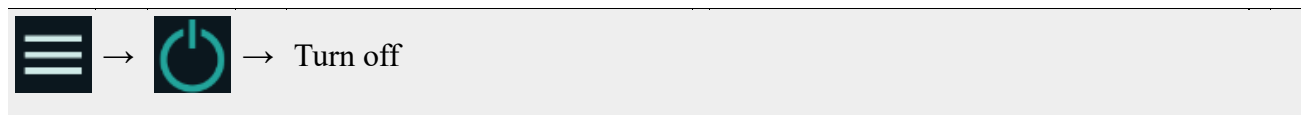
2. Activation of ECDIS

2.1 Start / Exit / Rebooting System

2.1.1 Start the System

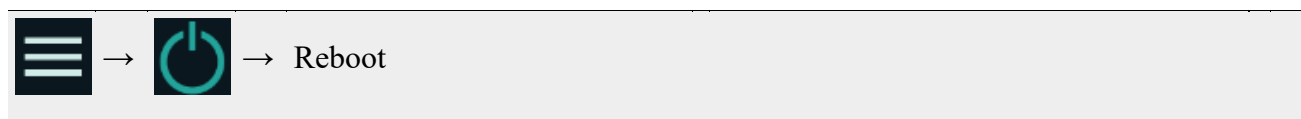


2.1.2 Exit the System



Turning off causes the device to shut down with ECDIS.

2.1.3 Rebooting ECDIS



Rebooting causes the device to reboot with ECDIS.

2.2 First Start ECDIS Settings

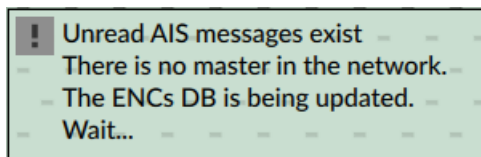
When ECDIS is launched for the first time, the text of the license agreement will be displayed.

Agree: accept the terms of the agreement.

Continue: ECDIS loading: the license is checked and the splash is displayed.

When ECDIS is powered on or restarted, ENC cell indexing is performed, which may take several minutes depending on the size of the loaded ENC database.

While the ENC database is being prepared, a warning will be displayed in the notification area:



2.2.1 USB-dongle and License (Install, Update)

The License file contains essential information about the ECS/ECDIS product and any additional available options.

The ECS/ECDIS software developer issues a license specifically for a selected USB-dongle. This means that each "license-dongle" pair is unique. Ensure that you obtain both the License file and USB-dongle directly from the ECS/ECDIS manufacturer or the ECS/ECDIS software developer.

To install or update a License:

1. Save the License file to a prepared USB flash drive.
2. Insert the prepared USB flash drive with the License file into a free USB port on your computer.
3. Insert the USB-dongle into another free USB port on your computer.
4. Boot your device.

The system will automatically detect the License file and install or update it for your ECS/ECDIS.

For subsequent startups, there is no need to insert the USB drive with the License. The system stores the License file in memory.

Requirements:

- USB flash drive.
- FAT32 file system.
- The USB flash drive should be empty, with only the License file saved in the root folder.

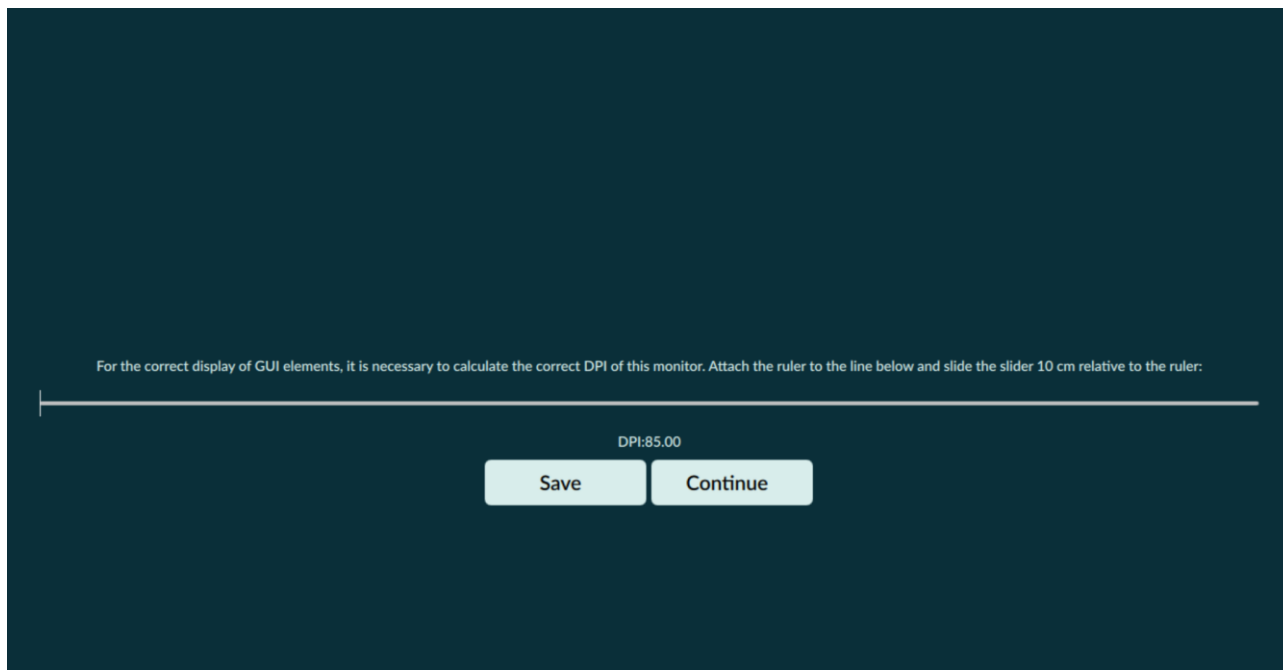
2.2.2 DPI settings

Upon the first startup, the system will prompt you to configure the DPI settings for your monitor.

NOTE

This is a crucial step because the correct DPI settings ensure the correct size of chart

objects on the Electronic Navigational Chart (ENC).



You can configure the DPI settings in two ways:

1. Automatic Method:

- Attach a ruler to the line displayed on the screen.
- Slide the on-screen 10cm line to match the ruler's 10cm mark.
- The system will automatically adjust and set the correct DPI settings.

2. Manual Method:

- Calculate the DPI manually by considering the screen resolution and display size (e.g., diagonal measurement).
- Alternatively, use an online DPI calculator, such as the one available here: [DPI Calculator](#).

After setting up the DPI, press the Save button, and then click Continue to proceed.

NOTE

You can also adjust the DPI settings later in the ECS/ECDIS menu settings.

Troubleshooting

In some cases, incorrect DPI settings may render the ECS/ECDIS Graphical Interface unusable.

To reset the DPI settings:

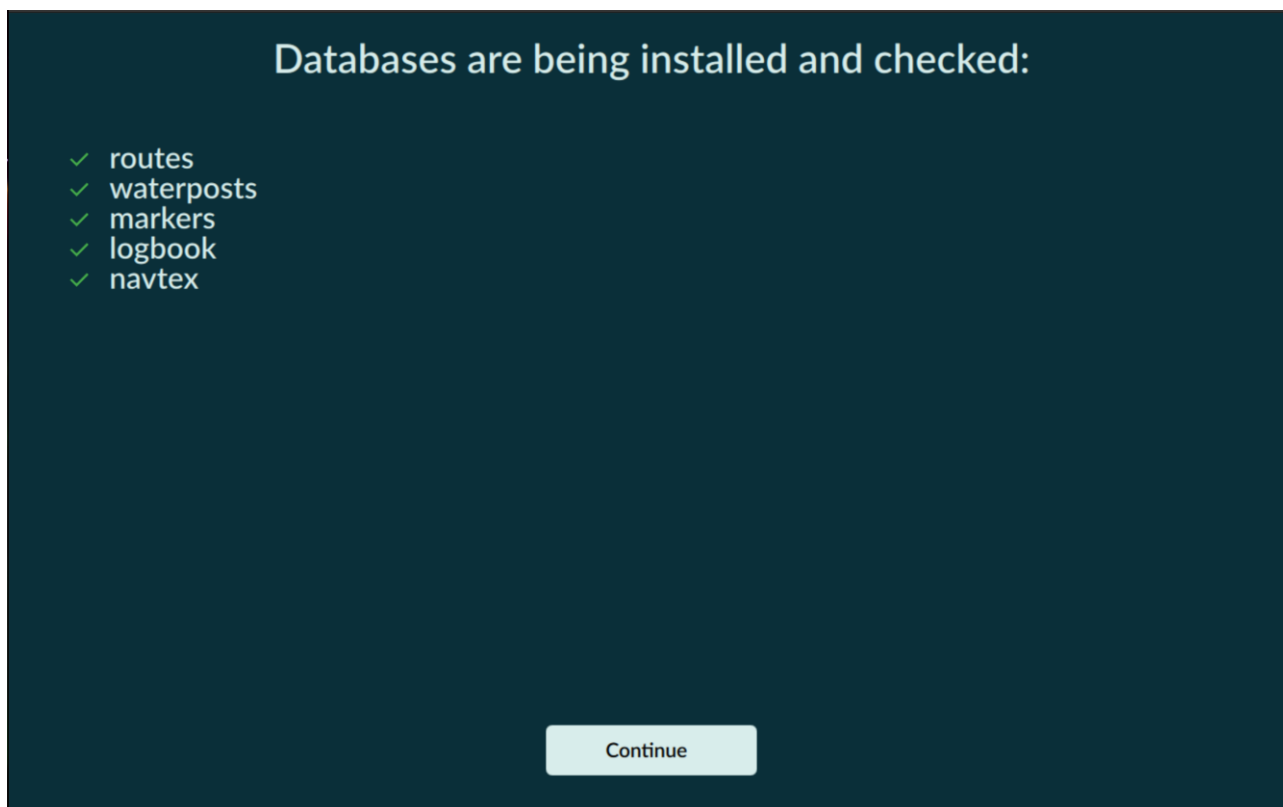
1. Press **Ctrl + Alt + G** on the main screen of the ECS/ECDIS application.

2.Reboot the system.

Upon startup, the system will prompt you to configure the DPI settings for your monitor as described above

2.2.3 Setup initial settings

While first boot system install and check databases, click Continue to proceed



Next, you will see the boot splash screen as the system checks the USB dongle and validates the license.



If the USB key and license are correct, the ECS/ECDIS application will start up successfully.

2.3 Identification key and licenses

ECDIS comes with a hardware system identification key (ID Key) and a license to use the application. Each time the application is started, it automatically checks for the key and license expiration date.

• NOTE

It is recommended to place the license files in the root directory of the USB drive. *.zip or *.tar.gz archives are supported.

It is recommended to use an empty USB drive.

For a **USB ID key**, the license file is installed separately from an external drive.



The license file must be written to a USB drive with FAT32 file system.

• NOTE

Prepare removable media (USB drive) for installing licenses and User Permit files in ECDIS.

Insert the USB drive with the recorded license file into the ECDIS USB port. The application will install the license corresponding to the installed ECDIS ID key and continue working.

User Permit installation is performed in the same way.

When the ID Key is removed from ECDIS, the ECDIS interface will be locked after 10 seconds. The message “Insert dongle!” will be displayed.



When you see this message it is recommended:

- check the availability of the ID key in the port;
- remove the ID key and reinstall it;
- if the ID key is not recognized within a minute then reboot ECDIS;
- if ECDIS still does not find the ID key it is recommended to contact the equipment supplier.

2.3.1 New license

An ECDIS license update (new license) is required when:

- failure of the identification key;
- purchasing additional options.

To install a license:

- a new license file should be saved to the USB-drive with **FAT32 file system**;
- install USB drive into the ECDIS USB port;

ECDIS will automatically detect the external storage medium with the license and perform the license installation (update).

2.3.2 Removable media

Removable media are used for: the installation of certificates, permits, licenses, chart sets, and updates; exchange the routes in RTZ format; and recording any available information from ECDIS to removable media.

• TIP

It is recommended that you dedicate a media to be used for this purpose only.

• **NOTE**

ECDIS supports removable media with a FAT32 file system.

Any purchased removable media must be formatted in FAT32 before use.

It is recommended to format media using specialized software. It is not recommended to format media with standard “default” services. We recommend formatting removable media using the Gparted application (<https://gparted.org>) as follows:

- delete an existing partition on removable media;
- create a new partition on removable media;
- format the created partition in FAT32;
- create a volume label for the partition (e.g., ECDIS [model]).

The following FAT32 file system limitations should be considered when selecting media:

- The maximum size of removable media that can be formatted under the Windows operating system is 32 GB;

The maximum size of a file that can be written to a FAT32-formatted removable medium must not be larger than 4 GB.

3. Basic Operational Procedures

3.1 Manipulators

The control devices such as: mouse, trackball and touchpad will be referred to as mouse.

• TIP

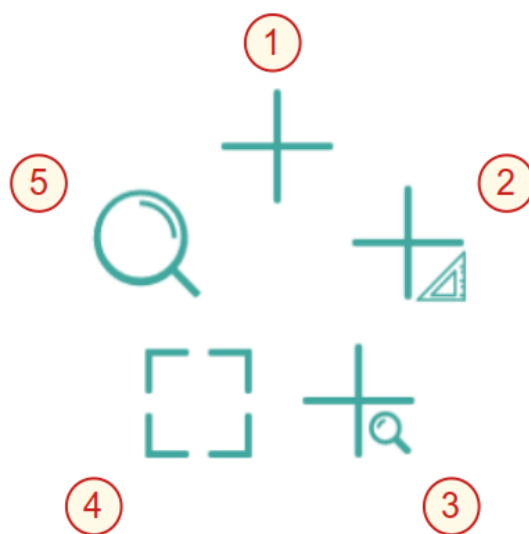
When using the touch screen, it is recommended to enable the **Touch Screen mode** in the **Interface tab**, which will increase the size of the ECDIS interface elements.

3.2 Tool selection

The tool corresponds to the cursor's current state. Switching tools can be done through a menu, accessed by:

Right-clicking with the mouse

Double-tapping on a touchscreen



1	Moving the Chart: Refer to section 3.3.
2	Scaling the Chart: See section 3.4. for details.
3	Information on Chart Objects: Refer to section 3.5.
4	Measurements (ERBL): See section 3.6 for details.
5	Lens Tool: Refer to section 3.7.

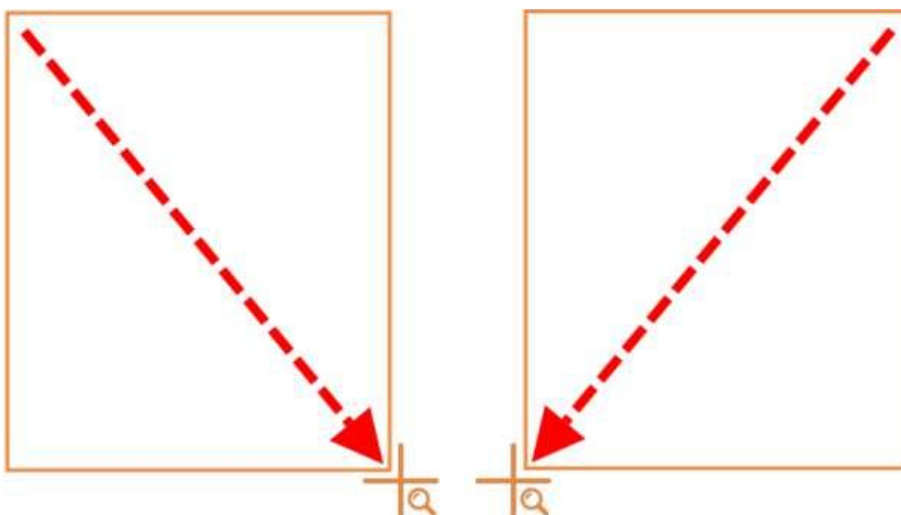
3.3 Moving the chart

To move the chart, activate the tool by selecting it from the tool selection menu. The active ECDIS cursor will change to . Once activated, you can drag the chart to the desired position.

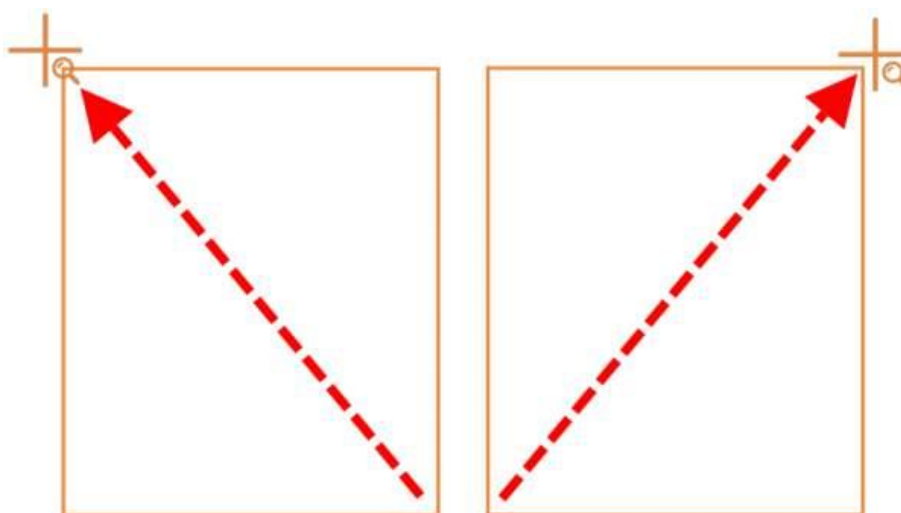
3.4 Chart scaling

To scale an arbitrary area on the chart, activate the tool by selecting it from the tool selection menu . The active ECDIS cursor will change to .

Enlarge: Drag the mouse (or finger on a touchscreen) southeast or southwest to define the zoom area (highlighted in orange). Release to fit it to the window.



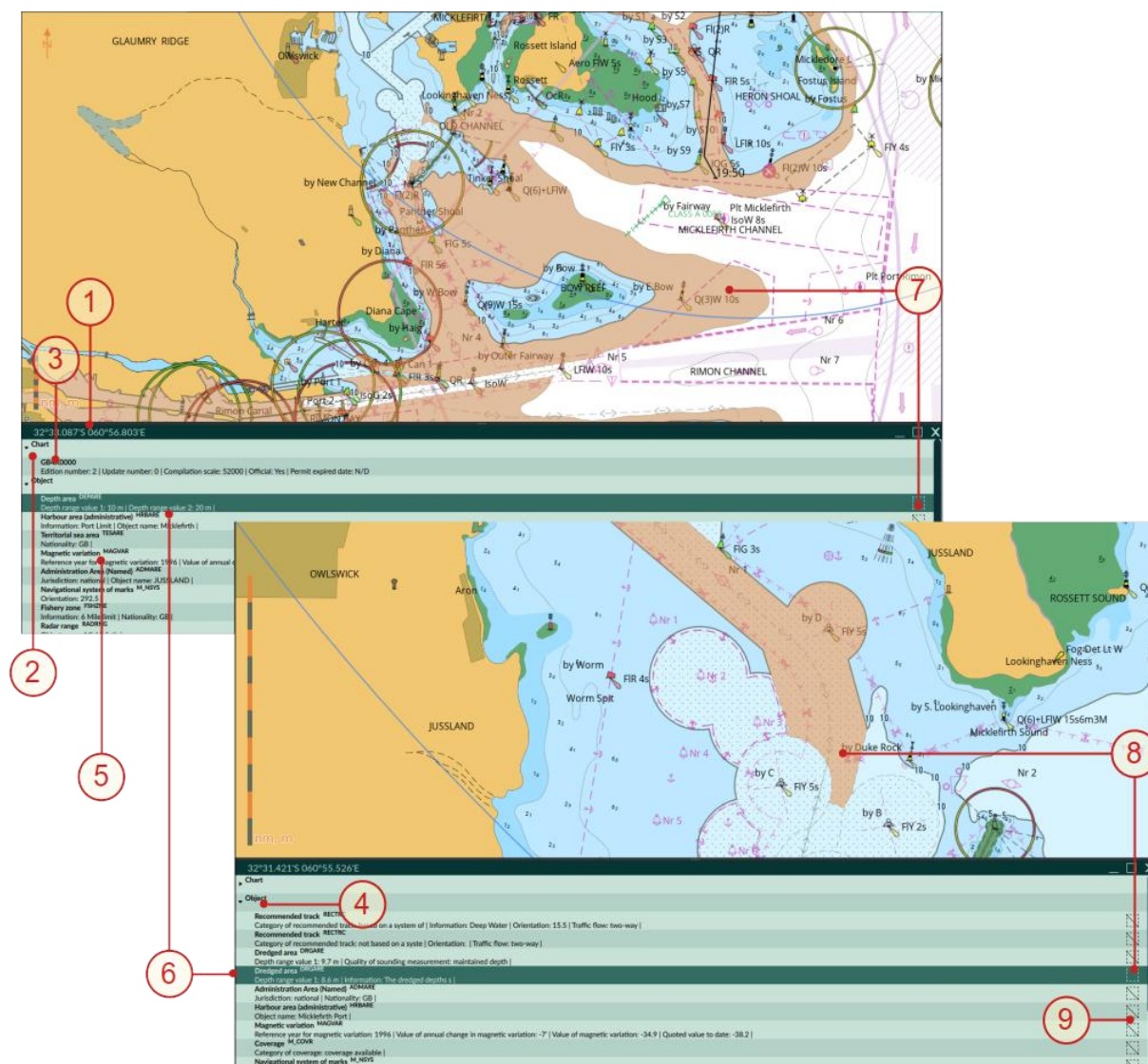
Reduce: Drag **northeast** or **northwest** to shrink the area.



3.5 Chart and object information

Activate this tool from the tool selection menu . The cursor will change to .

To view information, click (or tap) on a point of interest on the chart. Details will appear in a tree format in the lower window.



1	Query Point Coordinates: Displays the coordinates of the selected point.
2	Chart: Opens with a double-click (or double-tap) on the corresponding row.
3	ENC Cells: Lists ENC cells at the specified coordinates.
4	Object: Expands with a double-click (or double-tap) on the corresponding line.
5	Object List: Displays objects at the specified coordinates.
6	Display Selection: Highlights the selected object or ENC cell.

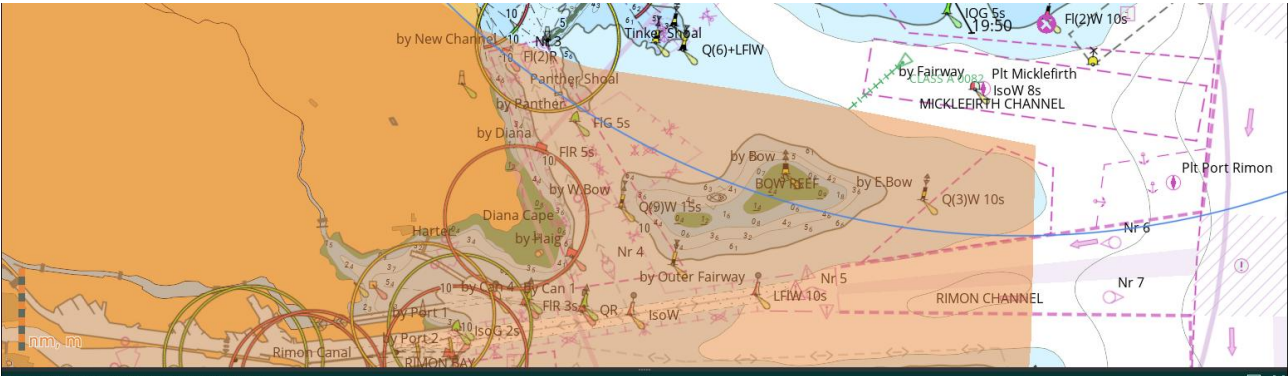
7		Highlight (Activated): Area objects are highlighted in the background.										
8		Highlight (Activated): Point objects are marked with a cross.										
9		Highlight (Deactivated): Object highlighting is turned off.										
Magnetic Declination (MAGVAR): Double-click (or double-tap) on the information line to open a detailed window.												
<table><tr><td>Magnetic variation</td><td>32°33.087'S 060°56.803'E</td></tr><tr><td>Reference year for magnetic variation</td><td>1996</td></tr><tr><td>Value of annual change in magnetic variation</td><td>-7"</td></tr><tr><td>Value of magnetic variation</td><td>-35</td></tr><tr><td>Quoted value to date</td><td>-38.3</td></tr></table>			Magnetic variation	32°33.087'S 060°56.803'E	Reference year for magnetic variation	1996	Value of annual change in magnetic variation	-7"	Value of magnetic variation	-35	Quoted value to date	-38.3
Magnetic variation	32°33.087'S 060°56.803'E											
Reference year for magnetic variation	1996											
Value of annual change in magnetic variation	-7"											
Value of magnetic variation	-35											
Quoted value to date	-38.3											

To view detailed information for a chart cell or object in the table, double-click (or double-tap) the table line of interest. A window will display the attributes and their values for the selected object or chart cell.

Buoy, lateral BOYLAT Buoy shape: pillar Category of lateral mark: port-hand lateral mark Colour: red Marks navigational - System of: IALA A Object name: Can 2	
LIGHTS (1) Light LIGHTS Category of light: Colour: red Light characteristic: quick-flashing Signal group: (1) Signal period:	
TOPMAR (1) Topmark TOPMAR Colour: red Topmark/daymark shape: cylinder (can)	
Buoy, lateral 32°35.810'S 060°55.895'E Buoy shape: pillar Category of lateral mark: port-hand lateral mark Colour: red Marks navigational - System of: IALA A Object name: Can 2	
Dredged area 32°36.047'S 060°54.987'E Depth range value 1: 20.8 m Information: (1995)	
GB4X0000 32°31.084'S 061°02.501'E Edition number: 2 Update number: 0 Compilation scale: 52000 Official: Yes Permit expired date: N/D	

3.5.1 Magnetic declination

If magnetic declination data is encoded in the ENC cell, it will appear in the information window.

	
Magnetic variation 32°33.087'S 060°56.803'E Reference year for magnetic variation: 1996 Value of annual change in magnetic variation: -7" Value of magnetic variation: -35 Quoted value to date: -38.3	

3.5.2 Tidal currents

If tidal current data is encoded in the ENC, it will be displayed in the information window.

Tidal Station: Lookinghaven			
Tidal Station Identifier: 00000			
	Hours	Direction of stream (degrees)	Rates at spring tide (knots)
Before	-6	174°	0.2kn
	-5	221°	0.7kn
	-4	276°	1.2kn
	-3	328°	1.1kn
	-2	342°	0.8kn
	-1	350°	0.5kn
HW	0	358°	0.2kn
After	+1	014°	0.3kn
	+2	061°	0.7kn
	+3	145°	0.9kn
	+4	168°	1.0kn
	+5	171°	0.7kn
	+6	174°	0.2kn

3.5.3 Graphic information

Chart objects may include additional graphical details, such as **navigation aids or object representations**. If external data is available, it will appear in the information window.

To view, double-click the entry to access extended details, then double-click on the image entry to open the graphic.

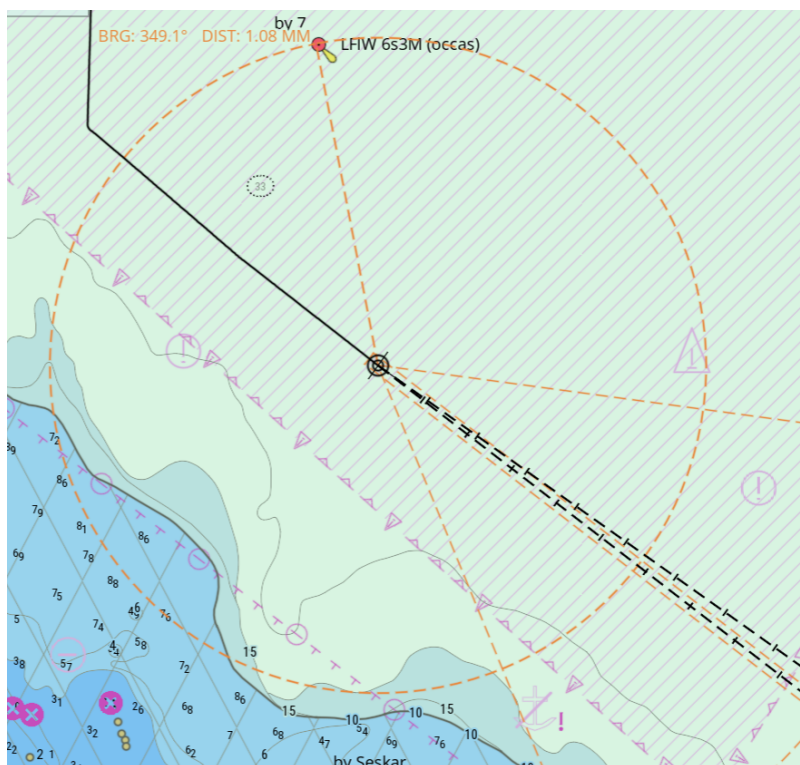
3.6 Bearing and distance measurement (ERBL)

Activate this tool from the selection menu by clicking the ERBL button . It allows you to measure directions and distances:

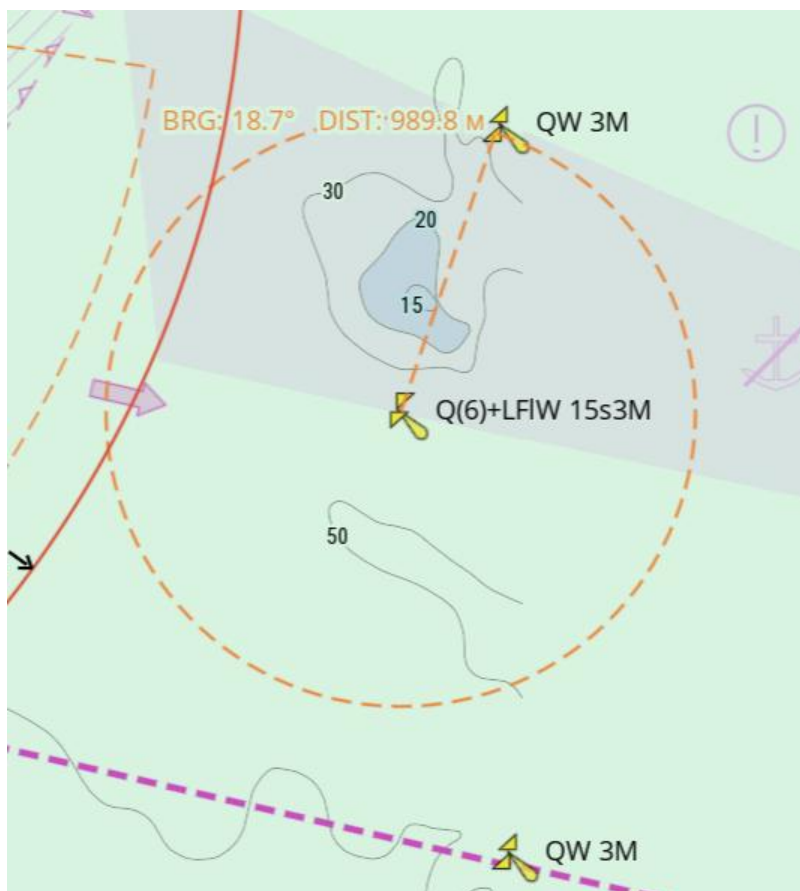
From the ship to any point on the chart

Between two arbitrary points

To measure the bearing and distance from the ship's current position, click (or tap) on the desired location on the chart.



To measure the bearing and distance between two points on the chart, click and hold the left mouse button on the first point, then drag the cursor to the second point.



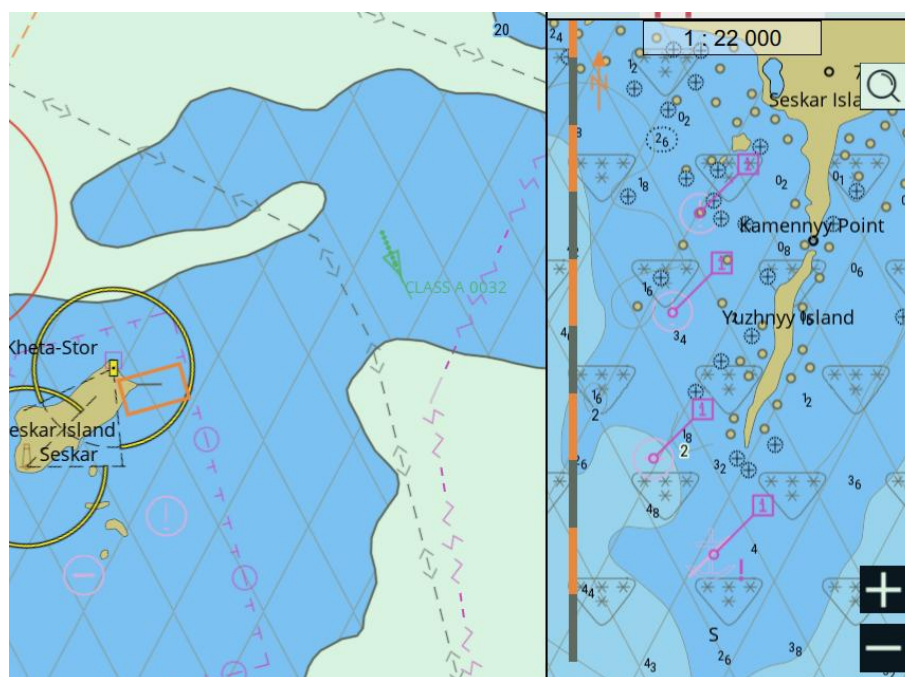
3.7 Lens

Activate the Lens Tool from the tool menu . It provides a zoomed-in view of the area around the cursor, shown in the Overview tab of the Multifunction window.

When the tool is active:

The cursor changes to .

A rectangular frame appears around the cursor, sized proportionally to the **Multifunction** window.



In the Multifunction window, the chart at the largest scale will display the area within the boundaries of the cursor rectangle.

Mouse: Moving the cursor also moves the rectangle, and the chart updates dynamically in the Overview window.

Touch Screen: Touching the area of interest moves the cursor and rectangle.

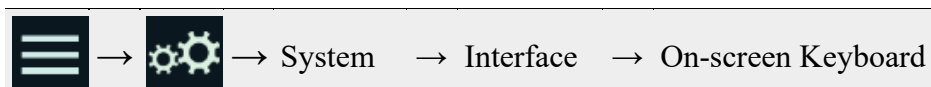
When the cursor is moved with the left mouse button held down (or by holding your finger on the touchscreen), the scale adjusts to **Best Scale** × 1.5.

3.8 On-screen keyboard

The on-screen keyboard is designed for use on devices that do not have a hardware keyboard.

By default, the on-screen keyboard is disabled.

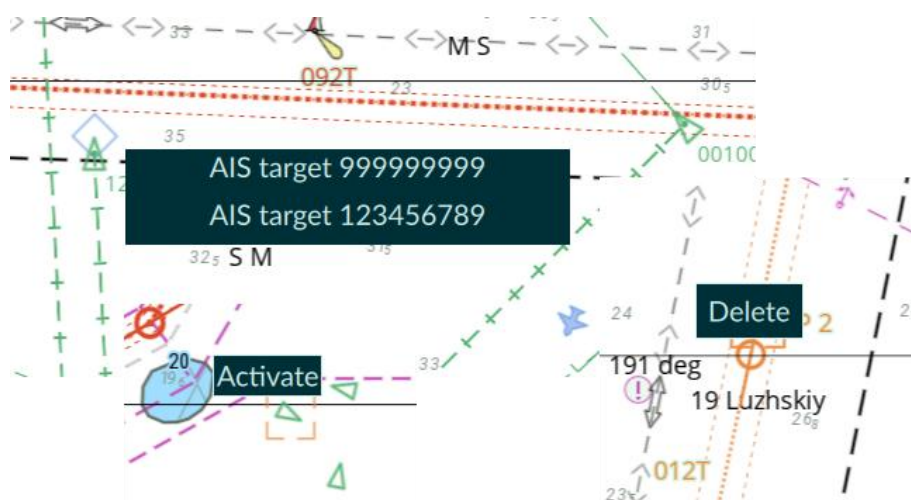
Enables/disables the on-screen keyboard:



1	Button with double input option: when pressed, a letter is entered, when held down, a number is entered.
2	Single input button.
3	Case change button, similar to CapsLock
4	Delete button, similar to Backspace.
5	Button to change the input language.
6	Space and current input language indication button

7	Enter button, similar to Enter
8	Close the keyboard.
9	Switching to numeric keypad
10	Number and Symbol Keyboard
11	Button to switch to keypad with additional characters
12	Keypad with additional characters

3.9 Context menu activation



Some elements of the interface or chart information may have a context menu with a list of actions. To call the context menu - right-click on the interface element.

For touch screen - tap and hold until the menu appears. When the menu appears, activate the selected item by left-clicking or single-tapping.

3.10 Text input

Use input fields to enter the text information:

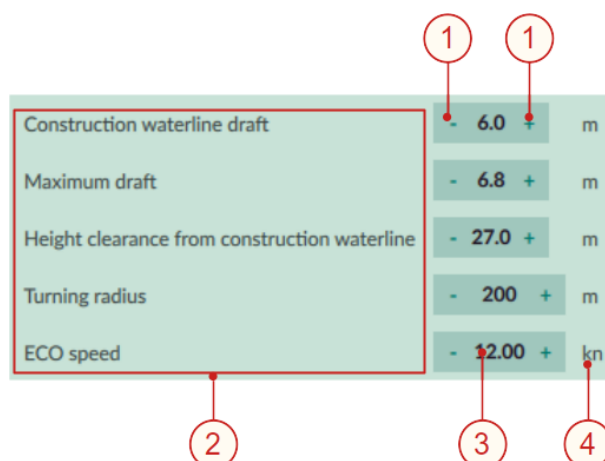
1	Parameter name
2	Input field
3	Cursor
4	Indication of invalid value

To input the text place the cursor in the input field. Enter the corresponding text. Confirm with the Enter button.

There is a input validation check in some fields. The field will be highlighted with a red frame if an incorrect value is entered.

3.11 Entering numeric values

A special input field is used to enter numeric values in the application interface.



1	Value change buttons
2	Parameter name
3	Input field
4	Measurement unit (if available).

Place the cursor in the parameter value input field. Enter parameter value. Confirm with the Enter

button .

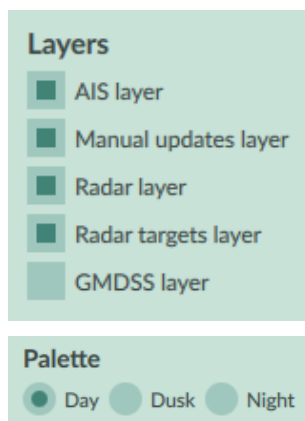
You can change the value by pressing the  /  buttons or by rotating the manipulator wheel with the cursor above the input field.

• **TIP**

When  button on the keyboard is pressed or the right mouse button is held down, the wheel rotation changes the fractional part of the numerical value, when it is released - the integer part.

3.12 Check box usage

Two types of switches are provided in the ECDIS interface:

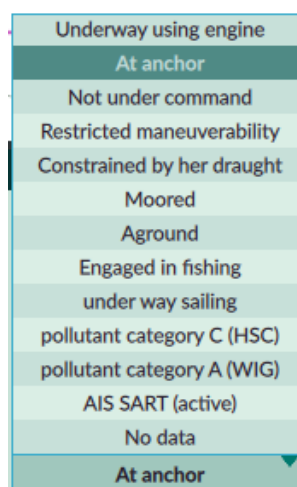


- Check box. Any combination of settings is allowed.
- Radio button. Allows selection of only one parameter.

3.13 Drop-down lists

Calling the list, click the left mouse button (single tap) on the input field. From the list of values, select the required item and click the left mouse button (single tap).

Some drop-down lists provide for manual entry of values. In this case, the input is performed using the keyboard, similar to the input in the text field.



3.14 Tables

1	Horizontal scroll bar
2	Table header
3	Table sorting by column
4	Vertical scroll bar

Horizontal or vertical scrolling of the table is performed by dragging the sliders (1, 2). When using a mouse, vertical scrolling can be done by rotating the wheel. When using the touch screen, horizontal and vertical scrolling is performed with a finger anywhere on the table.

To change the column order, press the left mouse button (touch and hold) on the column header, drag to the desired position **Horizontal or vertical scrolling** of the table is performed by dragging the sliders (1, 2). When using a mouse, vertical scrolling can be done by rotating the wheel. When using the touch screen, horizontal and vertical scrolling is performed with a finger anywhere on the table.

To change the column order, press the left mouse button (touch and hold) on the column header, drag to the desired position, and release.

Changing the column width is done in the same way, but you need to move the separator between the headers (vertical line).

Selecting a group of records when editing the tables

2

Create WPDelete WP

Route planning:route120724

	Nº	LAT	LOn	CIRCULATION (m)	XTD PORT (m)	XTD STB (m)	SPEED kn	LEG GEOME	LEG DIST NM	LEG BEARING (°)	CURRENT		WP NAME	STAY TIME
	1	32°20.397 'S	061°03.502 'E	200	300	300	12.00	RL	1.78	149.0	↑			-- --d --m
	2	32°21.943 'S	061°04.595 'E	200	300	300	12.00	RL	7.83	173.2	↑			000 00d 00m
	3	32°29.744 'S	061°05.688 'E	200	300	300	12.00	RL	0.87	203.5	↑			000 00d 00m
	4	32°30.542 'S	061°05.279 'E	200	300	300	12.00	RL	1.00	180.0	↑			000 00d 00m
	5	32°31.545 'S	061°05.279 'E	200	300	300	12.00	RL	0.97	151.8	↑			000 00d 00m
	6	32°32.407 'S	061°05.825 'E	200	300	300	12.00	RL	2.45	188.3	↑			000 00d 00m
	7	32°34.886 'S	061°05.400 'E	200	300	300	12.00	RL	5.17	263.6	↑			000 00d 00m
	8	32°35.453 'S	060°59.389 'E	200	46	46	12.00	RL	2.06	261.4	↑			000 00d 00m
	9	32°35.768 'S	060°56.930 'E	200	56	56	12.00	RL	0.56	302.7	↑			000 00d 00m
	10	32°35.466 'S	060°56.374 'E	200	46	46	12.00	RL	1.53	335.9	↑			000 00d 00m

DISTANCE: 29.51 NM

Select(7)Check route

SaveCancel

1

1	Select — the button to activate the selection mode with indication of the number of selected records
2	Selected records

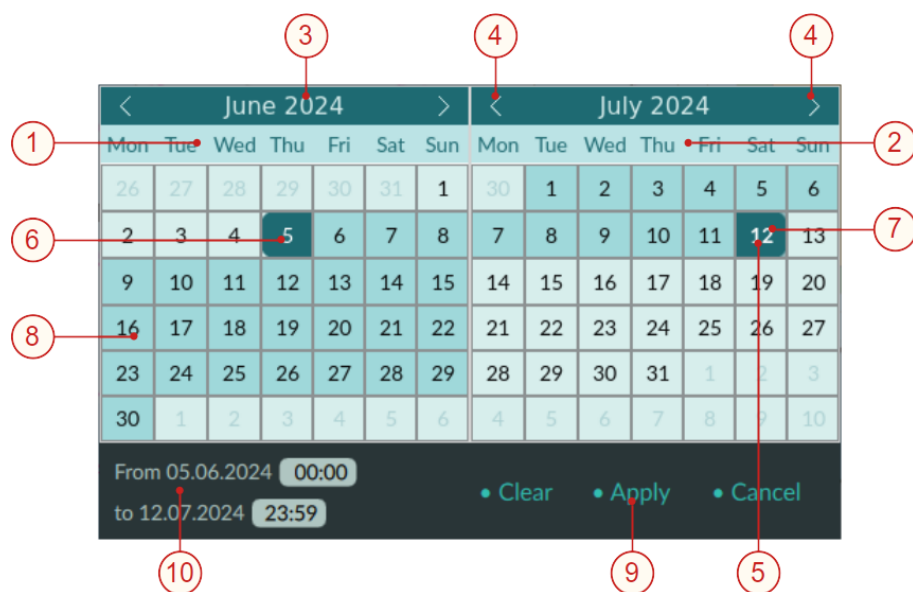
To edit a record in the table, click with the left mouse button (single touch) on the selected field. If the field is editable, the cursor will be placed in it, and the whole row of the record will be selected. To edit using the keyboard (on-screen keyboard), similar to entering in a text field (see above).

To activate **the selection mode**, press the **Select (1)** button, select the initial record with the left mouse button, and select the final record in the same way. All records in the selected range will be selected, and the button indicator (1) will change its value.

For **group editing**, click the left mouse button (single touch) on the field of the last selected row and perform editing. The changes will be applied to all selected rows.

To delete rows, click the **Delete WP** button, and the selected records will be deleted.

3.15 Selecting a date or date range



1	Left panel
2	Right panel
3	Indicator of the selected month in the panel
4	Month selection
5	Current date
6	Range start date
7	Range end date
8	Selected range
9	Control buttons
10	Fields for setting the time of the start and end dates of the range.

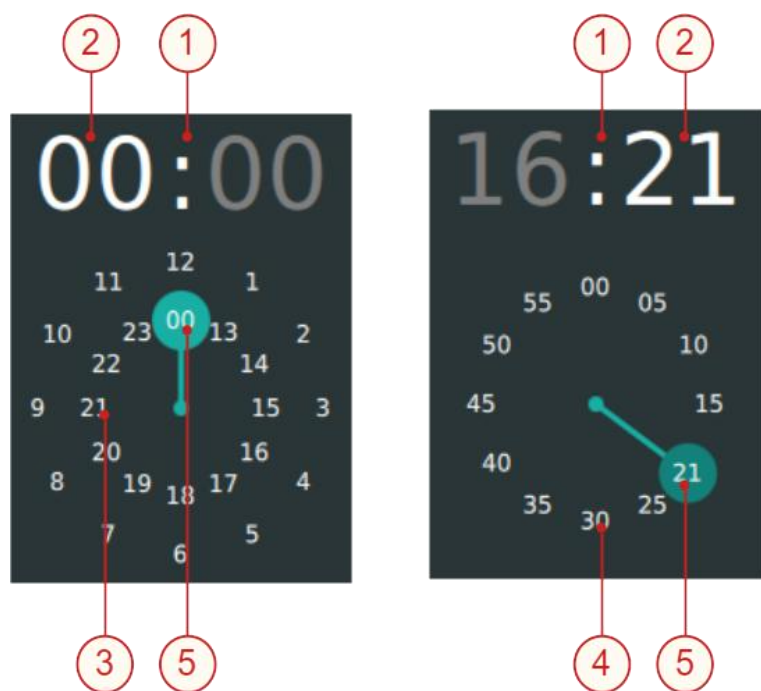
To **select a date**, select the month by double-clicking the left mouse button (double-tap for touch screen) on the date. The date will be highlighted with a background with rounded corners.

To **select a date range**, in the left pane select the start date of the range, and in the right pane select the end date of the range. The selected range will be highlighted.

Confirm the range selection with the **Apply** button.

The **Clear** button resets the selection.

3.16 Setting the time



1	Current time value (default)
2	Time indicator (hh:Mm)
3	Hour scale
4	Minute scale
5	Value selection cursor indicator.

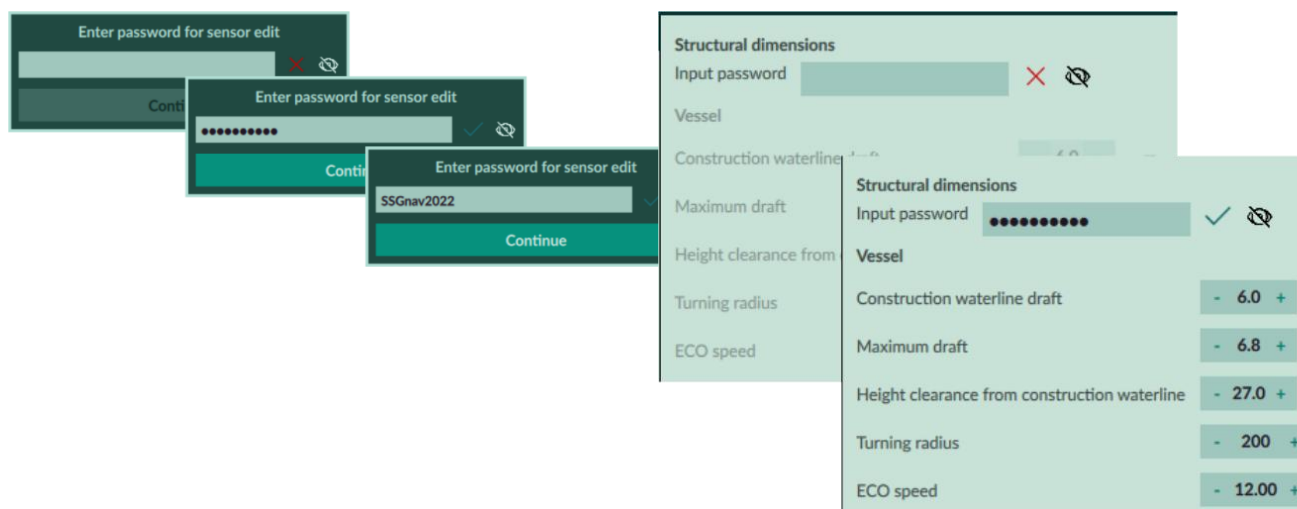
To set the **time**:

Select the input mode (hours/minutes) by left-clicking (single-touch) on the indicator (2).

Set the cursor indicator (5) to the appropriate scale value. To move the cursor indicator, press the left mouse button on it (touch and hold), move it to the desired value, and release it.

The sequence of entering hours or minutes is irrelevant; the input modes can be switched in any order.

3.17 Entering passwords



To see the password being entered, click  next to the input field.

If the password is successfully entered  will be displayed to the right of the input field; otherwise .

• NOTE

The default password used in the system is **Nsr#66733733**.

After you start operating ECDIS, be sure to change the password using the System Information.

3.18 Hot keys

Hot keys	Action	reference
	POB	Person over board
	Ship position	Center chart to ship position

Hot keys		Action	reference
		Standard Display	Standard display layout ON
		Acknowledgement	Alert's acknowledgement
		Event	Record event with text description / Screenshot
		Day	Day palette
		Dusk	Dusk palette
		Night	Night palette
		Overlay	Radar overlay ON/OFF
		IN	Scale IN
		OUT	Scale Out
		Main Menu	Main menu
		Orientation	Change Chart orientation
		Gain	Radar gain tuning ON. Use keys +/-

Hot keys		Action	reference
		Clutter	Radar clutter (rain) suppression ON. Use keys +/-
		Sea	Radar clutter (sea) suppression ON. Use keys +/-
		FRR	Fixed range rings ON/OFF
		Targets Info	Show table of targets
		ARPA ON/OFF	ARPA on/off
		Range Up	Radar image distance scale enhancing
		Range Down	Radar image distance scale decreasing
			User Interface default settings (factory default)
		Language Switch	Switch the input language (ENG/CHN)
		Fix Scale	ENC scale fix on/off. Disabling the automatic load of charts at different scale levels when the scale of the primary ECDIS window is changed.

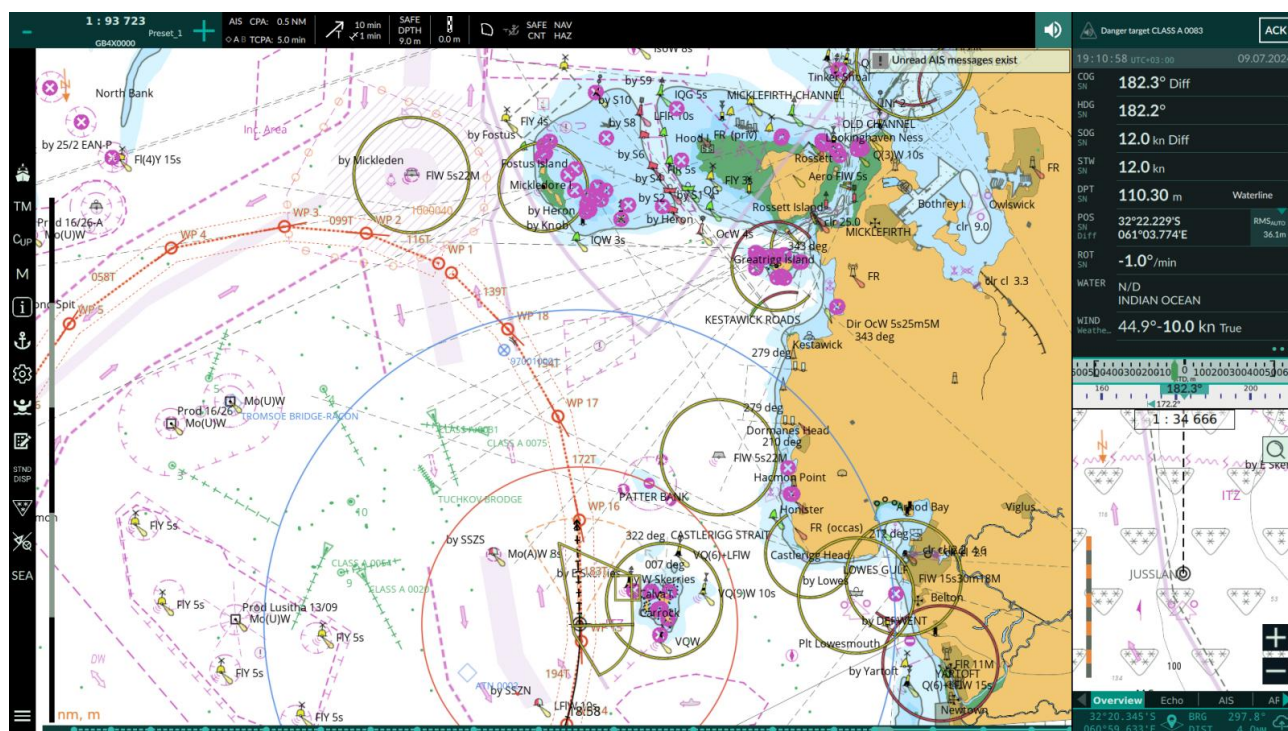
4. User interface

• NOTE

The graphical user interface, pictograms and text are designed to be readable by a single user from a distance of 1 meter.

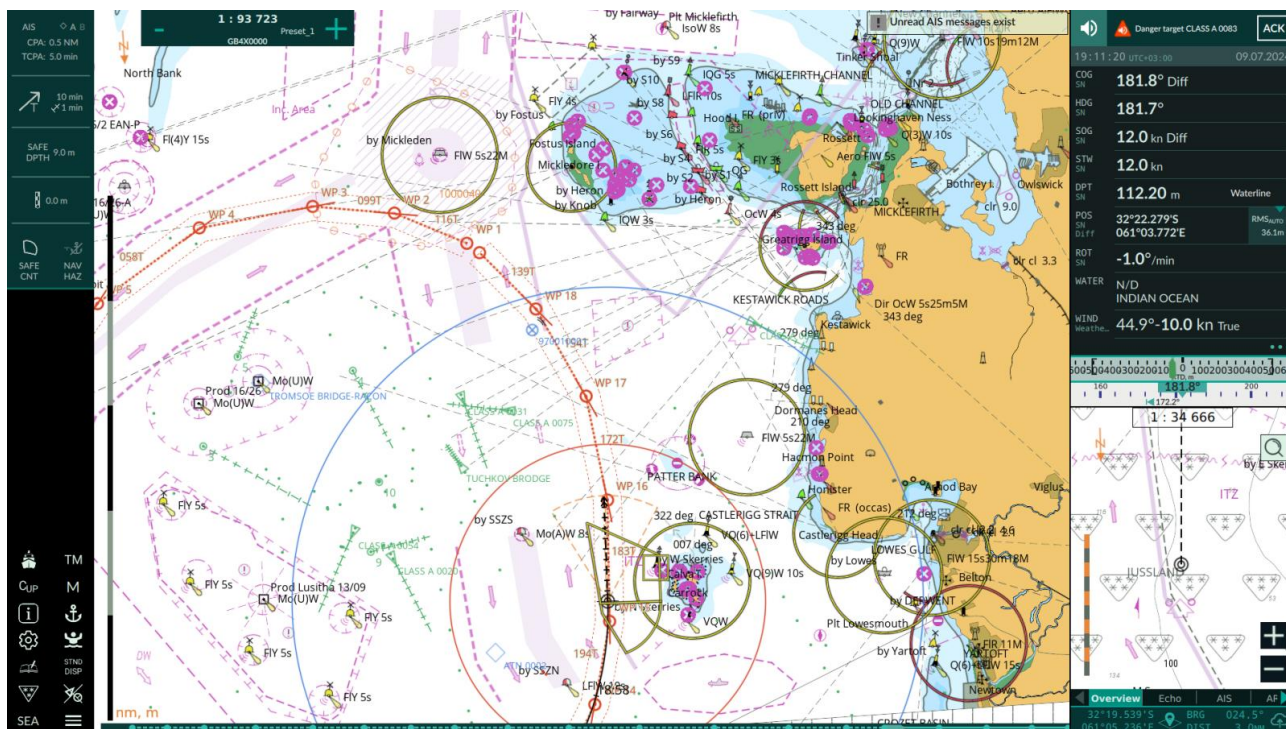
4.1 Main screen elements

After starting ECDIS, the display shows the main application window, which is divided into two parts. The right part of the screen contains a set of information indicators, whose composition depends on the current operation mode. Left part: chart window, single action function buttons, current chart scale indicator, alarms and warnings, permanent indication zone.



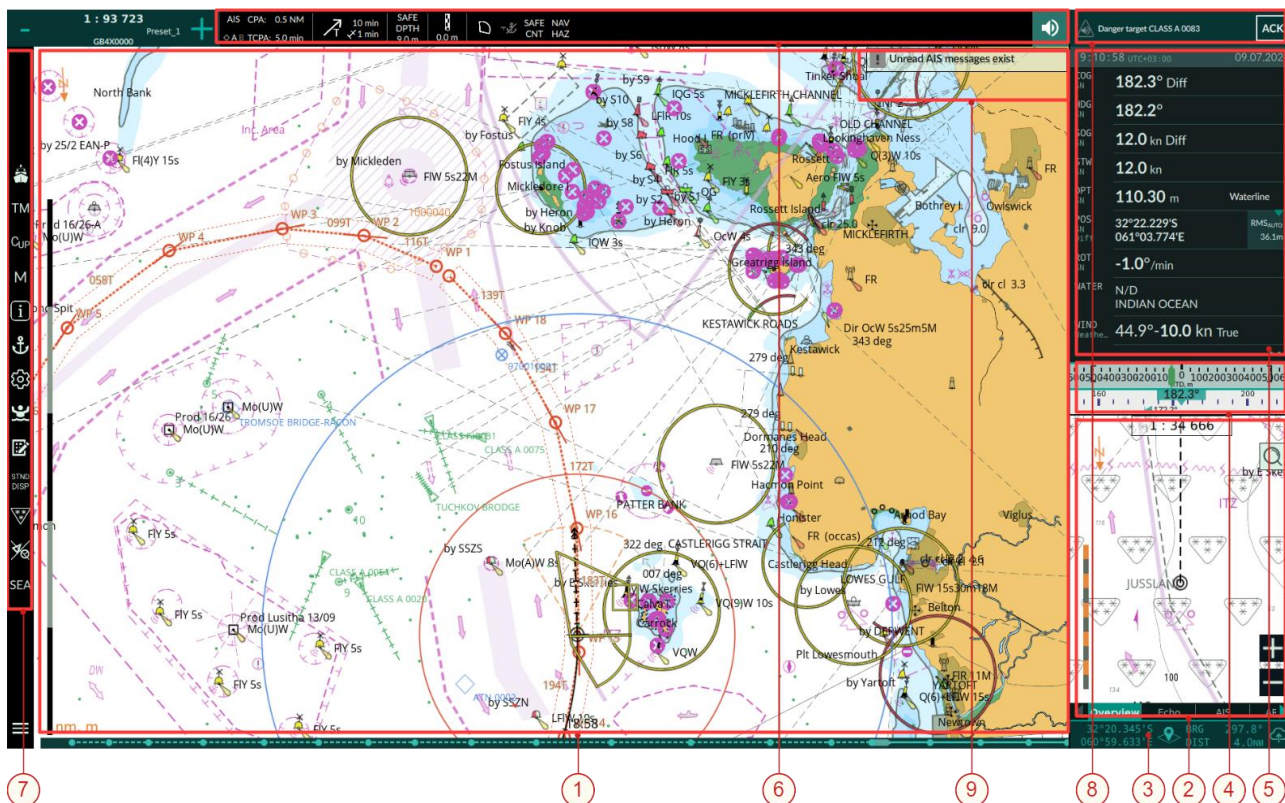
GUI configuration for 4:3 and 5:4 aspect ratio screens.

Depending on the aspect ratio of the ECDIS screen, there are two options for the layout of the single action button group and the permanent indication zone.



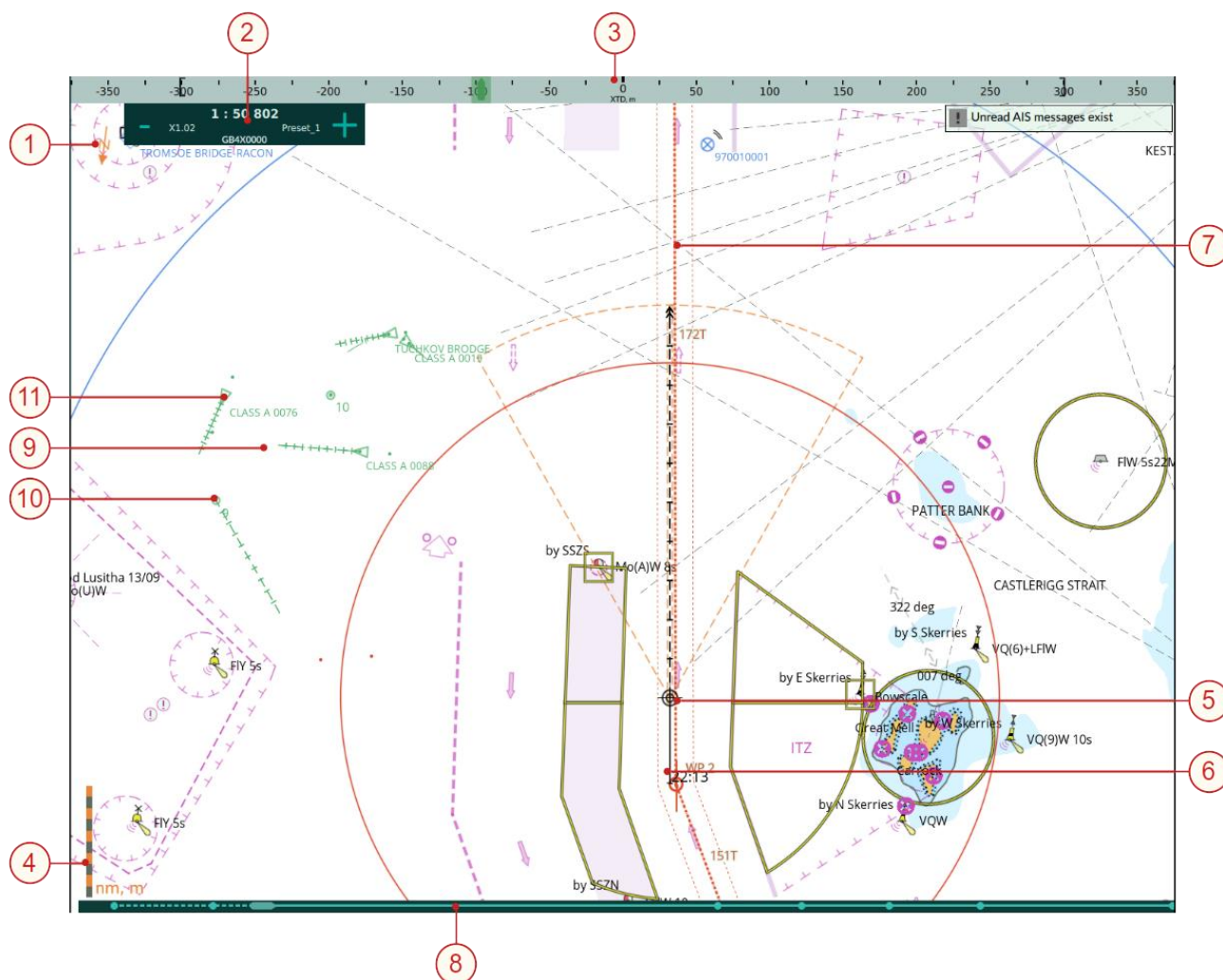
GUI configuration for 16:9 and 16:10 aspect ratio screens.

Switching between the GUI options:



1	Main window of the ECDIS chart
2	Multifunction window.
3	Cursor coordinates.
4	Out-of-scale indicators
5	Navigation panel
6	Permanent display area
7	Single Action Buttons
8	Alerts area
9	Notification area

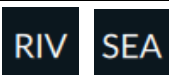
4.2 Main window



1	North array
2	Presentation scale. Left click opens the list of standard scales and Best scale control
3	XTD indicator
4	Scale bar
5	Own ship symbol
6	Passed track
7	Route
8	Voyage time diagram
9	ENC
10	Radar target
11	AIS target

4.3 Single action controls

Control	Action	reference
	Chart centered to ship position	
	True mode/Relative mode	
	Orientation	
	Master/ Backup	
	Info symbol ON/OFF	
	Anchor watch	
	Quick settings	
	Person over board	

	Event record
	Standard display layout ON
	Accuracy symbol ON/OFF
	Targets suppression
	
	Main menu

4.4 Main menu

Open the ECDIS main menu - press  . The main menu contains functions of simple operation:

Control	Function	reference
	Main menu	
	Search and rescue (SAR)	
	List of Alerts	
	Log Book	
	Routes	
	Chart management	
	Manual position fixing	



Radar Overlay



User chart



Markers



Targets Table



Navtex

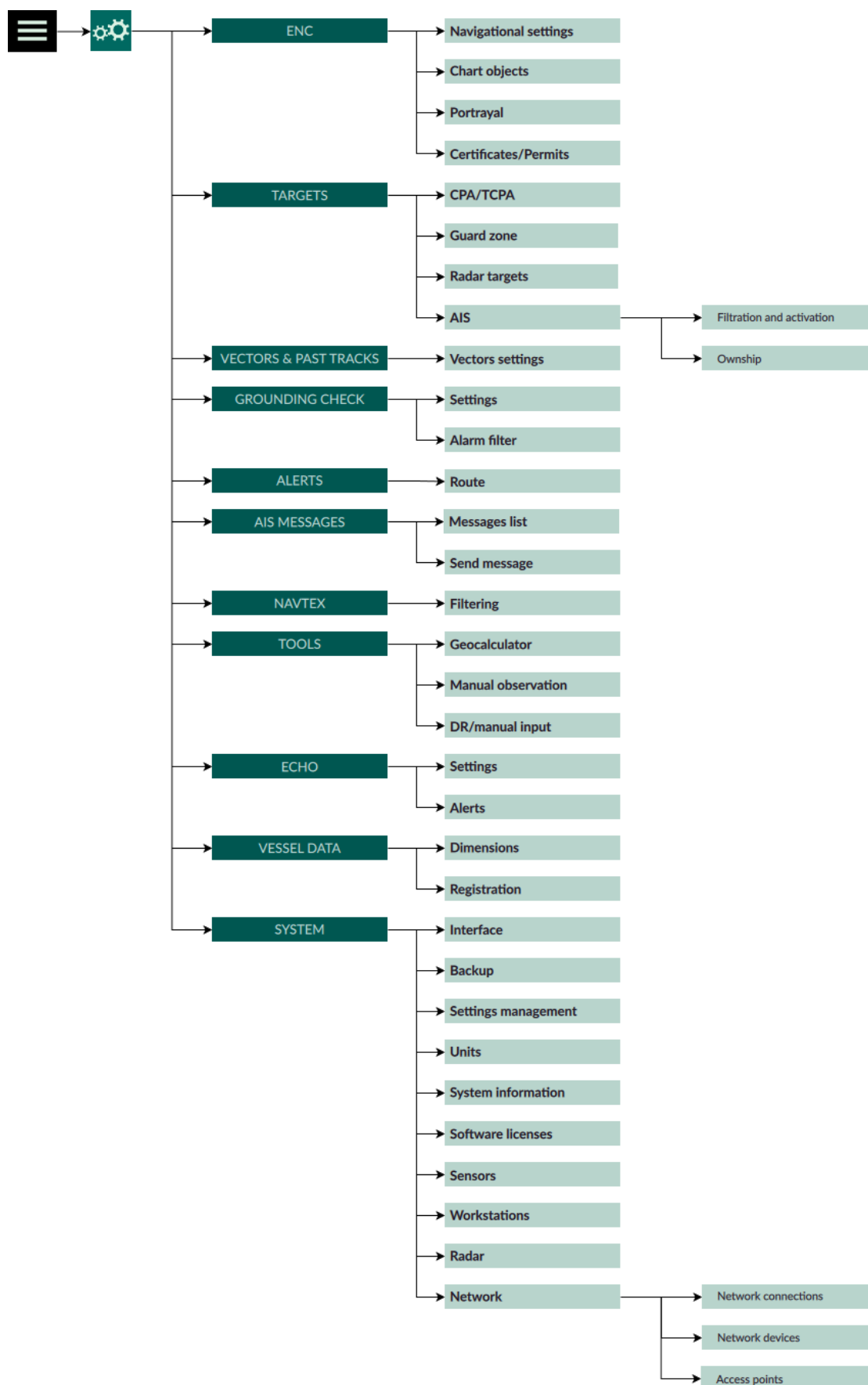


Settings

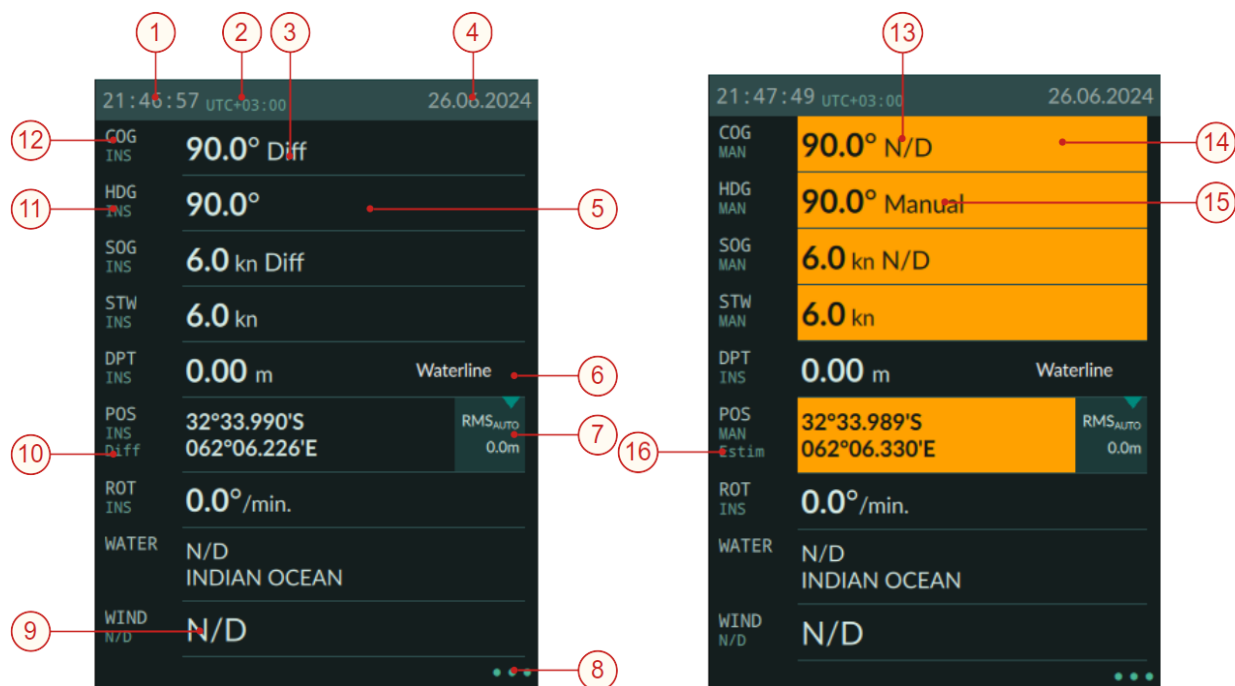


ECDIS OFF

4.5 Settings menu chart



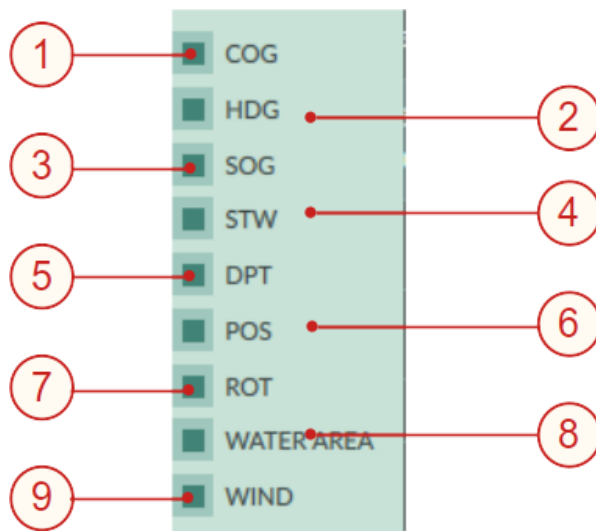
4.6 Navigational data panel



1	Local time
2	Time zone
3	Mode of sensor.
4	Local date
5	NAV data
6	Depth reference level
7	Radial coordinats error
8	Control of Nav.Panel settings
9	No data indication
10	Sensor Mode
11	Sensor Name
12	Name of navigation parameter
13	No data indication on a parameter's generation mode
14	Color coding of navigational parameter status
15	Manual input of navigational parameter
16	DR/EP indication

4.6.1 Panel's content adjustment

Press  to open the list of available navigational parameters.



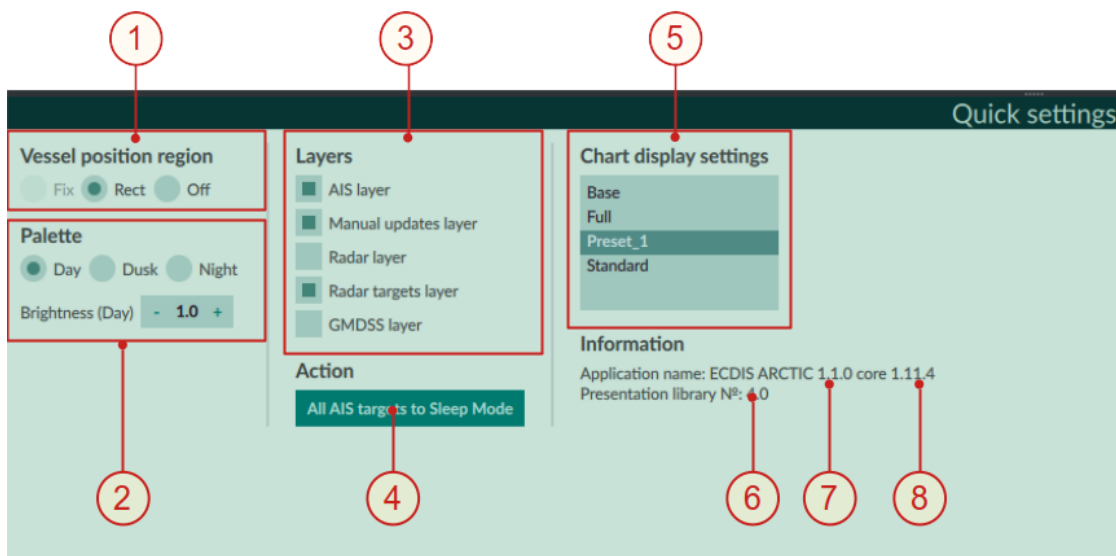
1	COG - Course over ground
2	HDG - Heading
3	SOG - Speed over ground
4	STW- Speed through the water
5	DPT - Depth
6	POS - Position
7	ROT - Rate of turn
8	WATER AREA - Name of water basin
9	WIND - Wind

Keep the left mouse button pressed and drag the parameter field UP or Down to adjust the parameter order in the navigation panel.

4.7 Quick Settings



Use **Quick Settings** to access the chart display settings, placement of the ship symbol within the chart window, palette selection, and additional layer management.



1	Vessel position region setting – depends on Relative/True Motion mode
2	Palette — switching between Day/Night/Dusk and Brightness for each of these palettes. Palette settings are synchronized with the User Interface settings
3	Layers – use layer’s selectors to activate corresponding information layer
4	All AIS targets to Sleep Mode — all AIS targets except of dangerous targets and the targets within the auto-activation zone will be set to Sleep Mode
5	Chart Display Settings — selection of predefined set of chart display settings. This selector is synchronized with check list of Chart Objects setting
6	S-52 Presentation Library Version
7	ECDIS SW version
8	ECDIS SW core version

• **NOTE**

Adjusting the brightness and contrast of the ECDIS screen can make it difficult to read information, especially when using night and twilight palettes.

4.8 Multitask window

Multitask window serves to display one of the following supplementary displays:

- Overview chart or Lens  (Best Scale chart)  under the ship;

- Lens Cursor;
- Echosounder diagram
- ARPA targets details
- AIS targets details
- Route sketch

The **Lens Cursor** is intended to view the best scale chart under the cursor positions and in its surroundings, regardless of the main window settings. It is switched on by the navigator when selecting

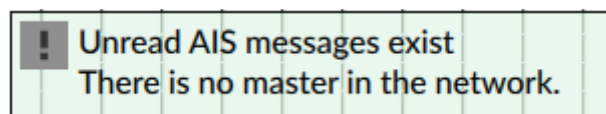
the cursor mode  (see **Instruments**). It is switched off by changing the cursor mode.

4.9 Cursor data widget



1	Coordinates of the cursor position.
2	 Activate GO TO dialog to input coordinates to chart center
3	Bearing and distance from ship to cursor
4	Network connection indicator

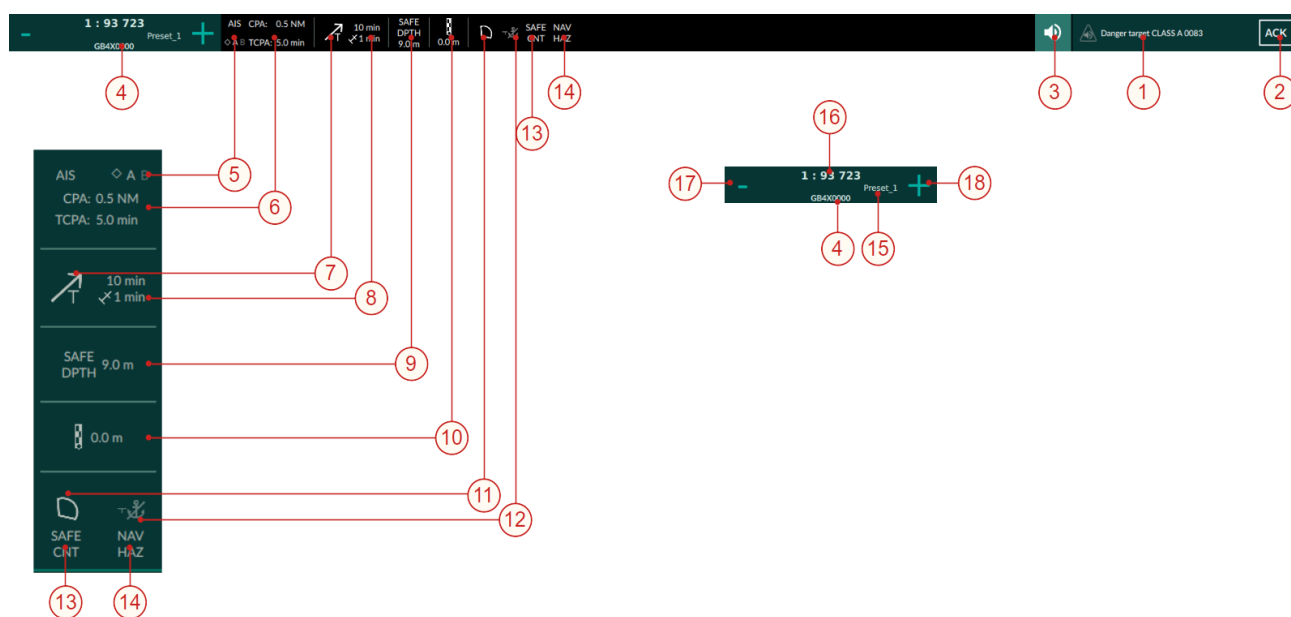
4.10 Alerts area



4.11 Permanent indication area

The permanent indication area shows the ECDIS status:

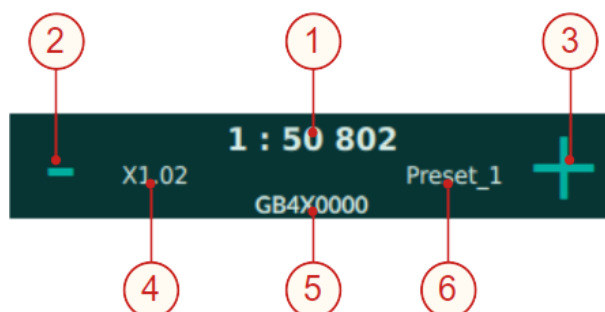
- AIS (ON/OFF, filter settings);
- Sound status;
- Tide level;
- CPA/TCPA criteria;
- Settings indication.



1	Alerts area
2	Acknowledgement button (also  )
3	Sound ON -  , Sound OFF - 
4	ENC name under ship symbol
5	AIS filter indication
6	CPA/TCPA criteria
7	Targets vectors mode: T – true / R – relative. Press to change mode.
8	Vectors presentation: length, time marks. Press to open Vectors settings
9	Safety Depth
10	Tide relatively of chart vertical datum. Press to open tide settings.
11	Filter status indicator of highlighting dangerous objects within the Safety Zone. Switching OFF the highlighting of dangers doesn't affect the monitoring of all objects within the Safety Zone and generation of alerts.
12	Filter status indicator of highlighting areas within the Safety Zone: White — no filter applied, Grey – at least one category of the areas for which special conditions exist excluded from highlighting. Press the button to open filter settings. Switching OFF the highlighting of detected areas doesn't affect monitoring of all areas within

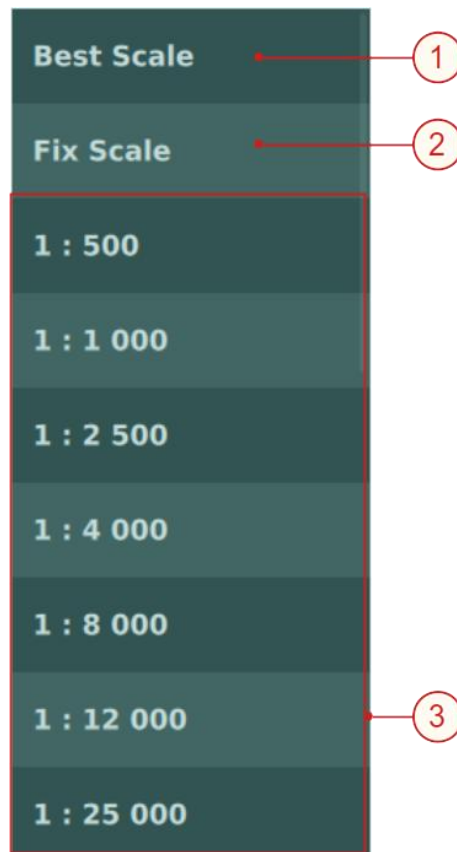
	Safety Zone and generation of alerts.
13	Filter status indicator of highlighting Safety Contour within the Safety Zone: White — no filter applied, Grey – Safety Contour excluded from highlighting. Press the button to open filter settings. Switching OFF the highlighting of Safety Contour doesn't affect the monitoring of Safety Contour within Safety Zone and generation of alerts.
14	Filter status indicator of exclusion from ground check the selected categories of chart objects. White — no filter applied, Grey – at least one category of chart objects excluded from ground check. Press the button to open filter settings.
15	Name of chart display setting
16	Chart presentation scale in main window.
17	Chart presentation scale down. Other method  .
18	Chart presentation scale up. Other method  .

4.11.1 Scale indicator



1	Current ENC scale value set in the Main Window;
2	ENC zoom out button. It is duplicated by HW button  .
3	ENC zoom in button. It is duplicated by HW button  .
4	ENC scale coefficient from the ENC compilation scale;
5	Name of the current ENC cell displayed in the main window;
6	Selected chart load preset name.

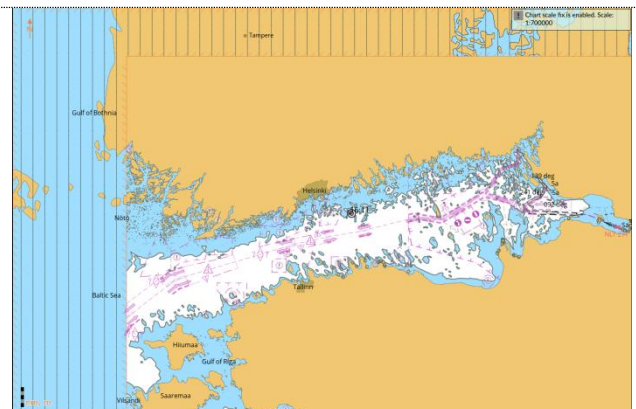
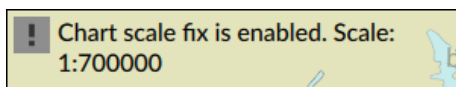
Press the current ENC scale value (1) to compile the ENC of the required scale level.



1 Best Scale — the larger scale chart is selected to display under the vessel's position. The large scale chart cell will be loaded and displayed;

2 Fix Scale — fixes the displayed cell scale. When ENC scale is changed in the main window, it will be displayed permanently with the fixed scale.

When the fix scale function is enabled, a notification will be displayed in the notification area:



Function enabling is duplicated by the hot keys:

Alt

F

3 The list of ENC cell scale levels available under the vessel's position.

4.11.2 Chart viewing date

If a Chart viewing date other than the current date is specified by the navigator, or if the current date is not within the selected date range for chart viewing (of objects with a specified validity period), the Display time conditional message will be displayed in the window.

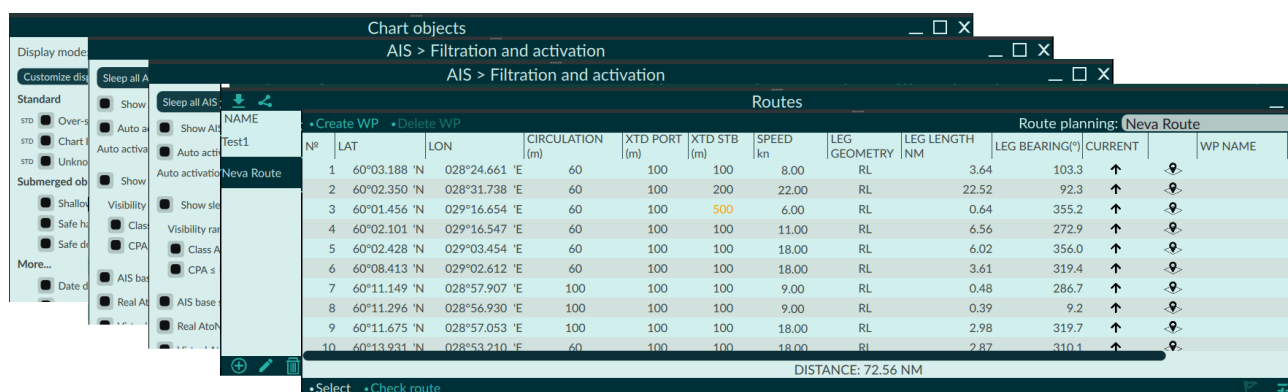
In addition, the permanent indication area can display:

Non-official indication if a non-official ENC is displayed;

If cells that have been set with SSE25 or SSE27 warnings are used, a corresponding message will appear (3.14);

Message about chart overscaling (Overscaled x...) or the presence of a larger scale ENC under the ship symbol.

4.12 Bottom temporary panels

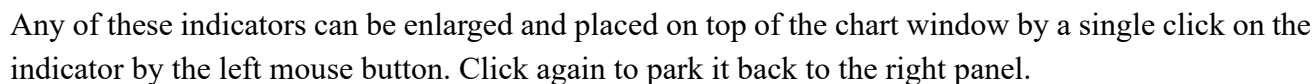


The panels are intended for displaying the interface of settings, editors, indicators, additional information at the navigator's choice.

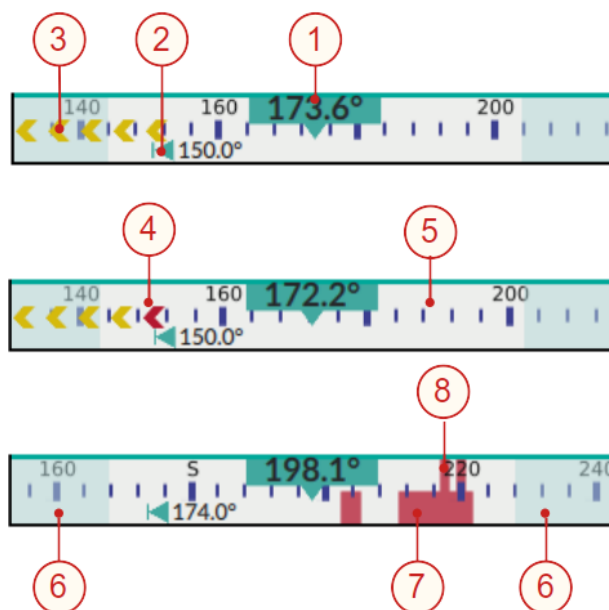
4.13 Scale independent indicators

These two indicators are designed to enhance the display of essential information generated by ECDIS, particularly during navigation in confined waters. In such situations, it may be necessary to zoom out the chart to provide an extended look-ahead while simultaneously keeping the ship accurately on course, with an indication of potentially dangerous courses readily available.

- Danger course indicator;
- XTD indicator.



Danger course indicator is permanently ON. Possible suppression of highlighting detected dangerous chart objects doesn't affect it.



1	Current COG
2	Next course (if a route is active)
3	Port / starboard pointer to next course turn. Activated 1 min before the turn (if a route is active).
4	Turn command indicator (running line). Activated on crossing of WOL
5	COG sector of ground check (white) (0)
6	COG sectors out of ground check (gray)

7	Indication of danger area
8	Indication of isolated spot hazards

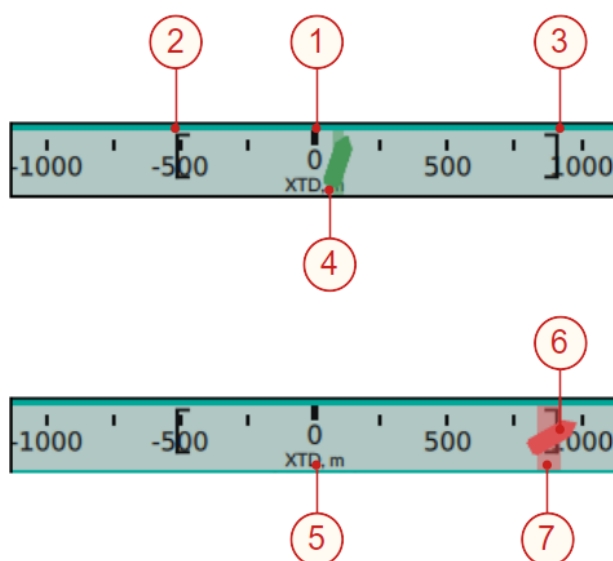


Association of navigational hazards on ENC and out-of-scale indicator

4.15 XTD Indicator

XTD indicator is displayed when a route is active.

XTD indicator shows both the position of the lane taken by the ship relative to the planned route and the XTD limits, and the ship's symbol array rotated relative to the route leg direction according to the ship's heading.



1	Route leg
2	XTD PORT
3	XTD STB
4	Projection of the ship's orientation to the route leg. Green – the ship's maneuvering lane is within XTD limits
5	XTD scale graduated in meters
6	Projection of the ship's orientation to the route leg. Red – XTD limit exceeded
7	The maneuvering lane (the lane taken by the ship moving with the current drift taken into account also the position uncertainty). Green – the lane is within XTD limits, Red – XTD limit exceeded

• **NOTE**

The calculation of the maneuvering lane is only performed if the ship's heading data is available. In the absence of a heading sensor, the ship symbol is always displayed vertically.

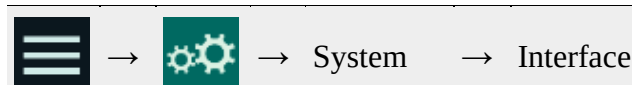
5. System Setting

Navigation

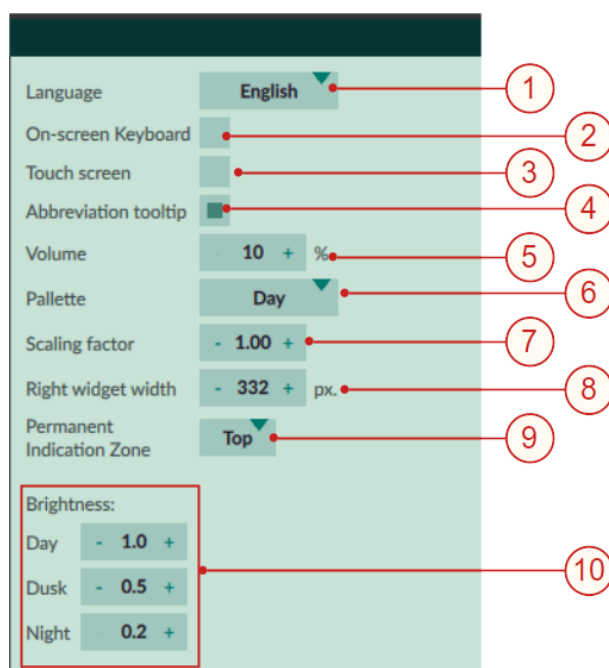


5.1 User Interface settings

Navigation



The User Interface settings allow the navigator to configure the colour palette, brightness, screen layout, and input preferences.



1	Language: Select the ECDIS interface language. Default language: English .
2	On screen Keyboard: Enables a virtual keyboard that opens automatically when text or numeric input is required. Recommended for use without a hardware keyboard.
3	Touch screen: Enlarges interface components for easier operation on devices with small screens.

4	Abbreviation tooltip: Displays tooltips for icons and abbreviations
5	Volume: Sets the system speaker or buzzer volume level
6	Palette: Configures the ECDIS interface colour palette. Synchronized with the Quick Settings Palette option. Night Palette: Automatically enables depth highlighting in Portrayal Settings to improve the visibility of shallow waters and dangerous depth. Day/Dusk Palette: Depth highlighting remains enabled unless turned off manually
7	Scaling factor: Adjusts the screen scale.
8	Right widget: Modifies the width of the right-side widget.
9	Brightness: Configures brightness settings for each interface palette. Requires individual adjustment based on the monitor in use. Note: Adjusting brightness or contrast may reduce ENC visibility, especially when using the night palette

• **NOTE**

If you set incorrect values when configuring the interface and the information cannot be displayed:

1. Press **Ctrl + Alt + G**.
2. Restart ECDIS.

This will reset the graphical interface settings to default values.

5.2 Settings Management

To provide individual customization, ECDIS can save system settings as individual sets.

By default, individual sets are not created in the system, so when you open this panel, some of the controls are locked.

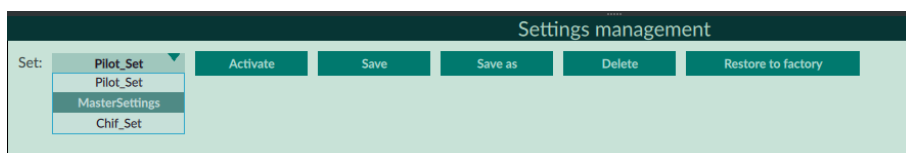
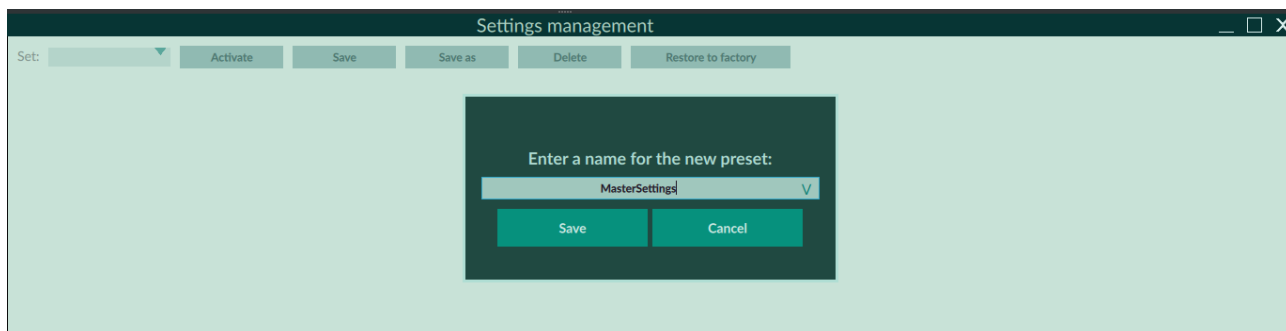


ECDIS allows saving system settings as customized sets for easier personalization. By default, no individual sets are created, so some controls in this panel are initially locked.

- Creating a Customized Settings Set
- Configure ECDIS with the desired settings.
- Open the Settings Management window.

- Click **Save As** and enter a name for the custom settings.
- Press **Save**.
- A message, "**Saved**", will appear at the bottom of the window.

The new set will now be available in the **Set** drop-down list.



Modifying a Customized Set:

Make changes to the ECDIS settings.

Navigate to:



A message, "**Saved**", will appear at the bottom of the window.

Deleting a Customized Set

Navigate to:

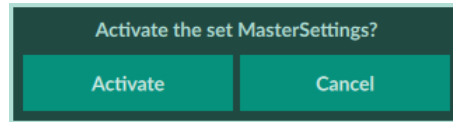


A message, "**Deleted**", will appear at the bottom of the window.

Applying a Previously Created Settings Set:

Navigate to:

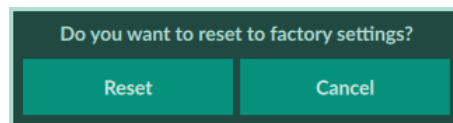
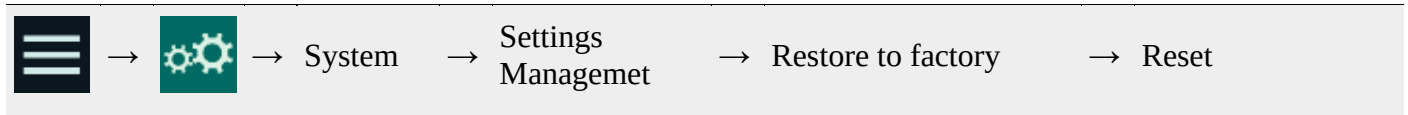




A message, "**Preset activated successfully**", will appear at the bottom of the window

Restoring Factory Defaults:

Navigate to:

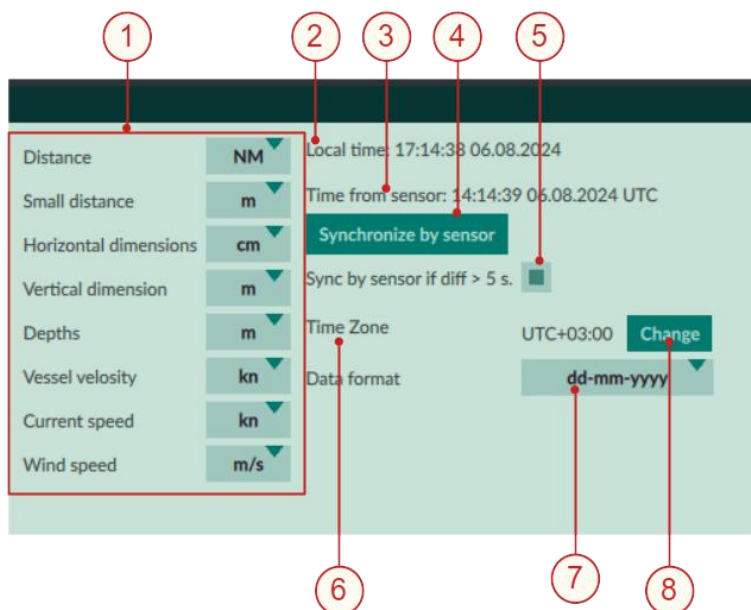


The settings will return to factory defaults.

5.3 Units



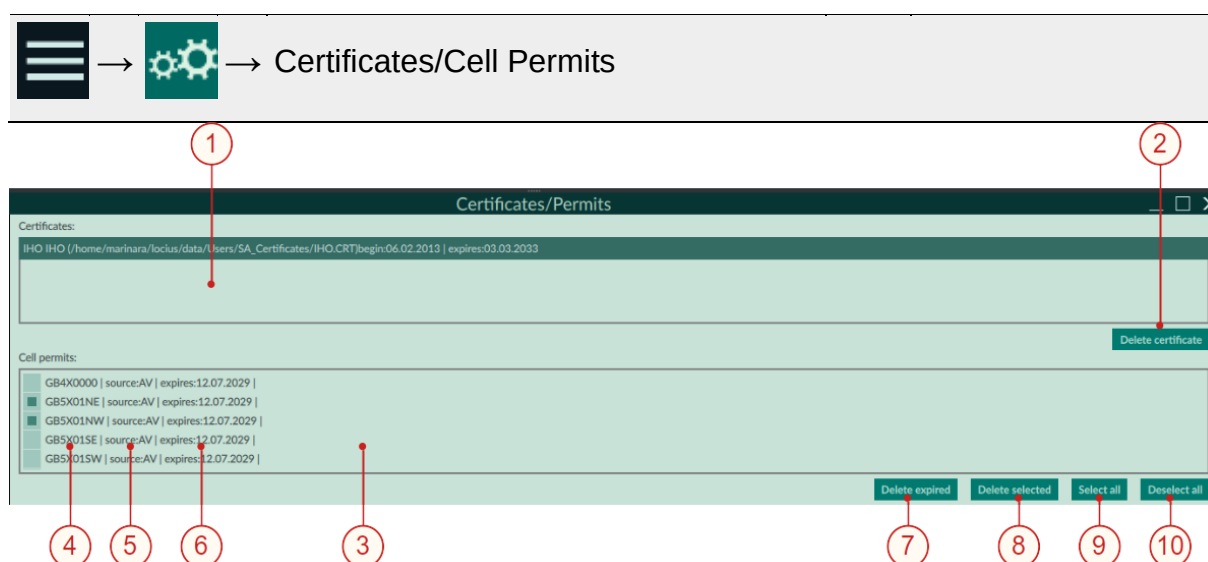
The **Units** section allows the navigator to configure measurement units, input/output formats, and time settings.

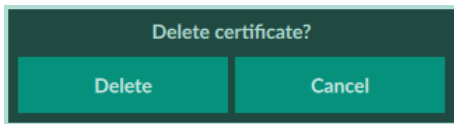


- | | |
|----------|--|
| 1 | Measurement units: Configure units for distance and speed (e.g., nautical miles, kilometers, knots) |
|----------|--|

2	Local time: Set ECDIS to display local (zone) time
3	Time from sensor: Time is obtained from the primary positioning sensor or the ship's time system (always in UTC).
4	Synchronize by sensor: Force synchronization of ECDIS time with signals from positioning sensors
5	Automatic Synchronization: Enable or disable automatic synchronization of ECDIS time using ZDA messages when the time difference exceeds 5 seconds
6	Time zone: Configure the current time zone for the vessel
7	Date format: Choose the format for displaying dates in the ECDIS interface.
8	Change Time Zone: Select and adjust the time zone as needed

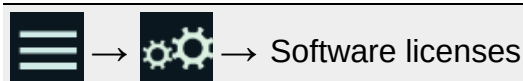
5.4 Certificates/Licenses



1	Certificates table: Displays a list of certificates installed in ECDIS
2	Delete Certificate: Deletes the selected certificates. 
3	Cell Permits List: Deletes the selected certificates
4	ENC Name
5	Data server ID (ENC provider's ID)

6	Expiration date
7	Delete Expired Permits: Automatically removes expired cell permits. Delete expired permits? Delete Cancel
8	Delete Selected Permits: Deletes the permits selected by the navigator. Delete selected permits? Delete Cancel
9	Select All: Selects all permits in the table
10	Deselect: Cancels the current selection.

5.5 Software licenses



The **Software Licenses** section provides access to the texts of various license agreements, including:

- End-User License Agreement (EULA).
- Licenses for Libraries and Fonts Used.

Licenses such as **LGPL**, **MIT**, and **BSD** are presented in their original language. Translation into a national language is not permitted under the terms of these licenses



5.6 System password

Certain interface elements (e.g., input fields and setup sections) are password-protected to ensure security.

Change password

Current password

Nsr123

✓

👁️

New password

NAVsg2024

✓

👁️

Confirm new password

••••••••

✓

👁️

Save password

Password requirements:

- latin alphabet;
- from 6 to 15 characters;
- contains numbers;
- contains uppercase and lowercase letters.

Default password is indicated in the documentation.

ATTENTION: You can't reset password! Save it, print it and store it in a safe place.

The current password can be changed in the **System Settings** section.

• NOTE

The default system password is **Nsr#66733733**.

Important: After ECDIS is installed on a vessel, the password must be changed in compliance with **IEC 61162-460** requirements.

Steps to Change the Password:

- Enter the Current Password.
- Enter the new password in the New Password field.
- Re-enter the new password in the Confirm New Password field.
- Click Save Password to apply the changes.

Password Requirements:

Do Not Use:

Names (e.g., personal, ship, company, product).

Dictionary words or any meaningful terms.

Must Contain:

Random characters.

A combination of characters that has no identifiable meaning.

5.7 Network settings

If you have a bridge network setup (e.g., Master-Backup configuration) and/or if your NMEA sensors and other devices (e.g., VDR) are connected via Ethernet, ensure that your network connection settings are properly configured.

1. Navigate to Menu -> Network -> Network connection/devices to access the network settings.

2. Enter the password to access the settings. Default password: **Nsr#66733733**.

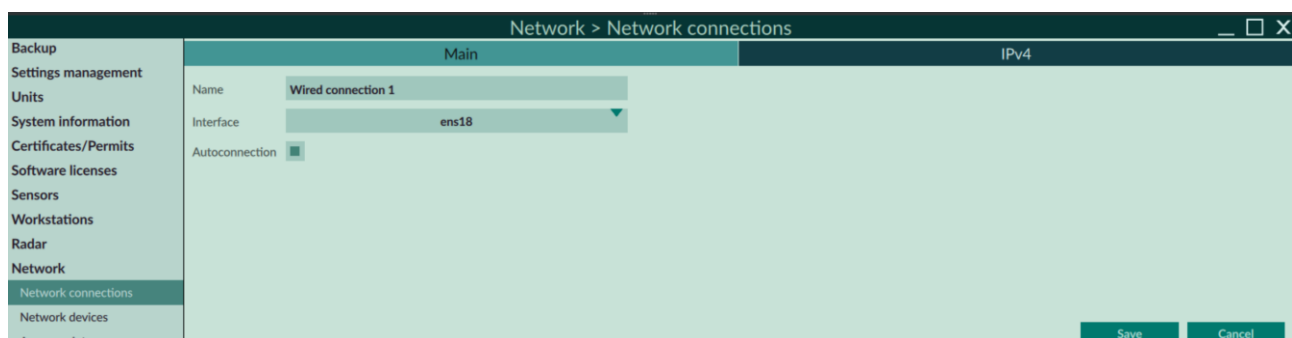
5.7.1 DHCP

If your network configuration includes a DHCP server (e.g., a router or 450/460 Gateway), the ECDIS will automatically connect to the network. You can verify the network interface name, IP address, Gateway, and DNS settings in the **Network devices** menu. This menu displays all accessible network interfaces on your computer



5.7.2 Manual Network Settings

If your network configuration requires manual settings, you can manually configure the IP address, Gateway, and DNS through the **Network connections** menu.



These settings follow the standard procedure for network configuration.

• NOTE

Make sure that the firewall is properly set up. Otherwise, there may be issues with network communication.

6. Own Ship Setting

• NOTE

Settings for ECDIS interfacing with other equipment should be made by the service engineer during system commissioning/maintenance or by a trained crew member. All other settings are normally made by the navigator.

6.1 Vessel registration data

The Registration section is intended for entering the vessel's information, which can be transmitted to a connected AIS transponder.

1	Call Sign — ship's call sign
2	Name — ship's name
3	MMSI (Maritime Mobile Service Identity) — a nine-digit individual number assigned to the vessel by the Maritime Mobile Service.
4	IMO (International Maritime Organization No) — a unique seven-digit identifier of the vessel assigned when the vessel was laid down.
5	Persons on Board — number of persons on board the vessel
6	Nav. Status — the current vessel navigational status selected from the drop-down list. Available values are set by the ITU-1379 Standards.

Underway using engine
At anchor
Not under command
Restricted maneuverability
Constrained by her draught
Moored
Aground
Engaged in fishing
under way sailing
pollutant category C (HSC)
pollutant category A (WIG)
AIS SART (active)
No data
At anchor

- 7 **Vessel Type** - vessel type and type of cargo carried selected from the drop-down list. Available values are set by the ITU-1379 Standards.

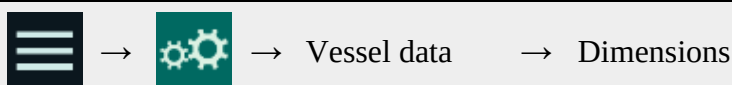
Not available
Wing in ground (WIG), all ships of this type
Wing in ground (WIG), Hazardous category A
Wing in ground (WIG), Hazardous category B
Wing in ground (WIG), Hazardous category C
Wing in ground (WIG), Hazardous category D
Fishing
Towing
Towing: length exceeds 200m or breadth exceeds 25m
Dredging or underwater ops
Diving ops
Military ops
Sailing
Pleasure Craft
High speed craft (HSC), all ships of this type
High speed craft (HSC), Hazardous category A
High speed craft (HSC), Hazardous category B
High speed craft (HSC), Hazardous category C
High speed craft (HSC), Hazardous category D
High speed craft (HSC), No additional information
Pilot Vessel
Search and Rescue vessel
Tug
Port Tender
Anti-pollution equipment
Law Enforcement
Spare - Local Vessel
Spare - Local Vessel
Medical Transport
Noncombatant ship according to RR Resolution No. 18
Passenger, all ships of this type
Passenger, Hazardous category A
Passenger, Hazardous category B
Passenger, Hazardous category C
Passenger, Hazardous category D
Passenger, No additional information
Cargo, all ships of this type
Cargo, Hazardous category A
Cargo, Hazardous category B
Cargo, Hazardous category C
Cargo, Hazardous category D
Cargo, No additional information
Tanker, all ships of this type
Tanker, Hazardous category A
Tanker, Hazardous category B
Tanker, Hazardous category C
Tanker, Hazardous category D
Tanker, No additional information
Other Type, all ships of this type
Other Type, Hazardous category A
Other Type, Hazardous category B
Other Type, Hazardous category C
Other Type, Hazardous category D
Other Type, no additional information

• **NOTE**

All vessel registration data, when entered or changed in this section, are also available in the AIS 236 settings section and can be transferred to a connected AIS transponder.

6.2 Vessel dimensions

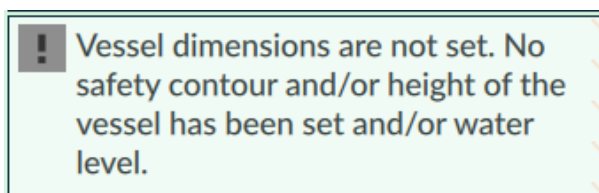
Navigation:



Correct setting of the vessel's dimensions is mandatory. ECDIS uses these parameters for calculation of Safety Depth, Vertical clearing, minimal Safety Zone, and selection of Safety Contour as described in paragraph 1.

The vessel's length and width can only be set as the corresponded distances from the Consistent Common Reference Point (CCRP) – usually this is the conning position on the bridge.

ECDIS checks the settings for length, width, draft, and air draft of the vessel as well as the under keel allowance at startup. If any of these settings are not set, the ECDIS will display the warning message:



Dimensions

Water level elevation above chart datum: m (1)

Maximum drift angle: ° (2)

Duration: min (3)

Calculated dangerous depth: 9.0 m

Safe vessel clearance: min (4)

Vertical clearance: 27.0 m (5)

Construction waterline: m (6)

Under keel allowance: m (7)

Barge dimensions

Structural dimensions

Input password: (11)

Vessel

Construction waterline draft: m (12)

Maximum current draft (static): m (13)

Height from construction waterline: m (14)

Turning radius: m (15)

ECO speed: kn (16)

Anchor

X: m (30)

Y: m

Dimensions, CCRP position

B: m A: m (17)

C: m (18)

D: m

Barge

Construction waterline draft: m (21)

Under keel allowance: m (22)

Structural dimensions

Input password: (23)

Vessel

Construction waterline draft: m

Maximum current draft (static): m

Height from construction waterline: m

Turning radius: m

ECO speed: kn

Barge

Construction waterline draft: m (24)

Maximum current draft (static): m

Height from construction waterline: m (25)

Anchor

X: m

Y: m

Dimensions, CCRP position

Barge position relatively to own ship: (27)

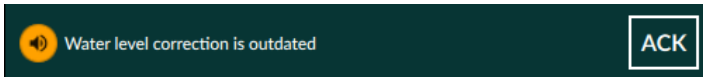
E: m (28)

F: m (29)

B: m A: m

C: m

D: m

1	Water level increment above chart vertical datum (Tide) — manual value entry.
2	Maximum drift angel — it is used in calculation of the minimum XTD. The default value is 40°.
3	Duration — the validity period of tide correction since the input.  If the correction is out of date and has not been updated by navigator within 5 minutes the

	notification status will be changed to warning and the correction will be reset to zero. 
4	time elapsed from the moment of input of tide correction
5	Calculated SAFETY DEPTH — automatically calculated value of Safety Depth based on vessel's draft, under keel allowance and tide correction
6	
7	DWL —DESIGN WATERLINE
8	Air Draft actual — calculated current air draft taken into account the tide correction
9	DWL — draft from the DESIGN WATERLINE of the vessel
10	Under keel allowance — water reserve under keel including all corrections for dynamic draft
11	password entry field: unlocks entry of design dimensions of ship, barge (19) and anchor clew position (30)
12	Entry field for DWL — draft from the DESIGN WATERLINE
13	Entry field for draft — current maximum static draft.
14	Entry field for Air draft from design waterline — height of the highest point of ship constructions or cargo from DWL
15	Entry field for Turning radius - Default value for route planning
16	ECO speed - speed of the vessel- Default value for route planning
17	A and B — Length increments to the bow and stern of the ship relatively to CCRP.
18	C and D — Width increments to the ship's sides relatively to CCRP.
19	Check box to add Barge dimensions
20	Schematics of barge and input parameters:
21	DWL of the barge
22	Entry field for draft - maximum static draft of the barge
23	Entry field for Under keel allowance for the barge
24	Entry field for DWL draft of the barge
25	Entry field for Maximum draft of the barge
26	Entry field for Vertical dimension from construction waterline — height of the highest barge structure or cargo from WL

27	Barge position in relation to the vessel
28	E — barge length
29	F — barge width
30	X and Y (Anchor) — coordinates of anchor clew relatively to CCRP

Vessel dimensions are entered by specifying the CCRP position. Changing the values in fields A, B, C, and D will cause the CCRP to be shifted to bow/stern or to port/starboard. The sum of values in fields A and B should be equal to the ship's length, and the sum of values in fields C and D should be equal to the width of the ship.

The values in the **Turning Radius** and **ECO speed** fields are used as default parameter values for route planning (see **Routes** section).

When forming a barge-tugboat train, the train is considered a single vessel with combined dimensions. Towing alongside, the barge on the port side.

Dimensions, CCRP position

Barge position relatively to own ship **Left**

E: - 50.0 + m

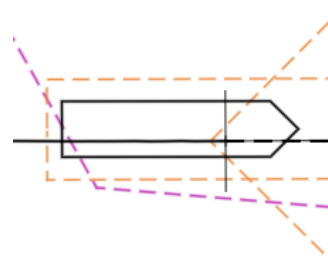
F: - 10.0 + m

B: - 67.4 + m A: - 30.0 + m

CCRCP

C: - 6.5 + m

D: - 6.5 + m



Towing alongside, the barge on starboard side.

Dimensions, CCRP position

Barge position relatively to own ship **Right**

B: - 67.4 + m A: - 30.0 + m

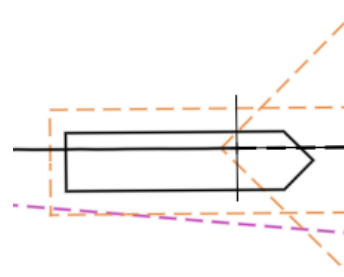
CCRCP

C: - 6.5 + m

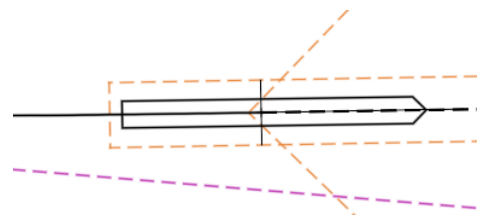
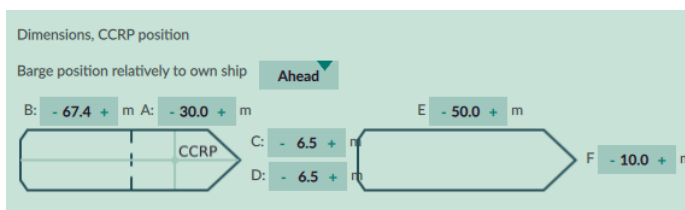
D: - 6.5 + m

E: - 50.0 + m

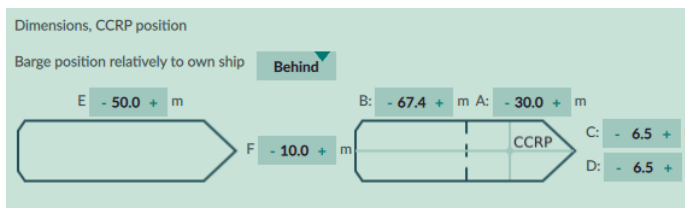
F: - 10.0 + m



Notch-towing, barge positioned ahead of the vessel on a rigid hitch.



Towing astern on a rigid hitch or tow rope. When towing with tow rope, the length of the tow rope should be added to the length of the barge. **The current towing model does not take into account the free movement of the barge.** The composition is considered the rigid hull of the vessel.



• **NOTE**

The Safety Depth for a barge-tow train will be calculated using the greatest value of draft and the under keel allowance; Safety Contour will be selected accordingly.

• **NOTE**

Changes of vessel dimensions, including the formation of a barge-towing train, as well as the changes of vessel / barge draft or under keel allowance, will reset the status of the routes to “Not checked”. It is necessary to perform a safety check of the route before activation.

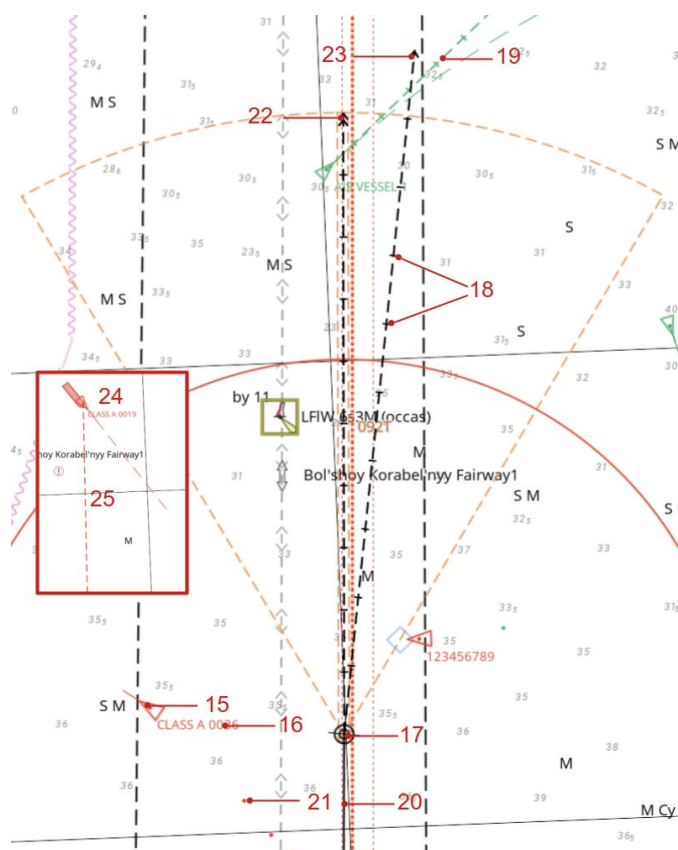
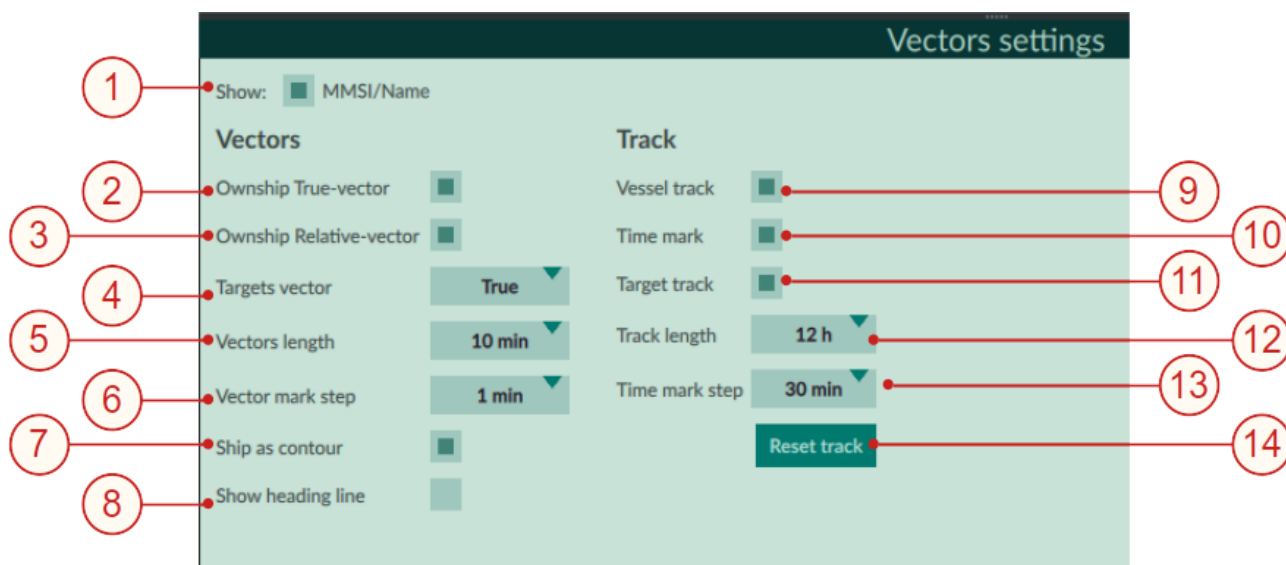
6.3 Vector settings

The display of symbols, vectors and tracks of the own ship and the AIS targets is configured in the **Vector settings** section.

Navigation:



→ Vectors Settings



1	MMSI / Name - display on the chart the name or MMSI number of AIS targets depending on the data being transmitted (16).
2	Ownship True-vector - includes display of Own ship vectors (22), AIS targets (19), Radar targets
3	Ownship STW-vector - enables display of the Course/Speed log vector.
4	Targets vector - select the type of target vector - absolute or relative.

5	Vectors length - motion forecast time in minutes. Vector length, expressed in chart scale, is equal to the distance that the vessel or target will travel at the current speed for the set time
6	Vector mark step - time marks on vessel vectors (18), vectors of AIS-targets (19) and radar targets
7	Ship as contour - display of the own ship symbol and AIS targets symbol as a contour in the chart scale, according to their dimensions in the chart scale (24). If the switch is off, the ship's symbol and AIS target symbols will be displayed as standard out-of-scale symbols (15, 17). In the absence of heading data, the ship outline display is not available, and the switch is disabled. This setting does not apply to radar targets.
8	Show heading line - enables display of the heading line on the chart
9	Vessel track – ON/OFF display on the chart the passed track of ship (20). The length of the track to be set in the Track length field (12)
10	Time mark – ON/OFF display of time marks on the own ship passed track with the interval specified in Time mark step (13)
11	Target track – ON/OFF display of passed tracks of AIS targets (21) and Radar targets with the step set in the Time mark step field (13)
12	Track length – Show tracks of the own ship and AIS/radar targets for the selected time
13	Time mark step - time mark interval on the own ship's passed track
14	Reset track - reset the tracks of the own ship and targets
15	AIS target, out-of-scale symbol
16	Show AIS target name. MMSI will be displayed if the connected AIS transponder does not transmit the name of the target vessel.
17	out-of-scale symbol of own ship
18	time marks on the own ship vector with the step specified in Vector mark step (6)
19	AIS target vector
20	Own ship passed track (7)
21	AIS-target passed track (9)
22	Own ship COG vector
23	STW vector
24	AIS target contour (8) in chart scale
25	The relative vector of the target.

7. ENC Management

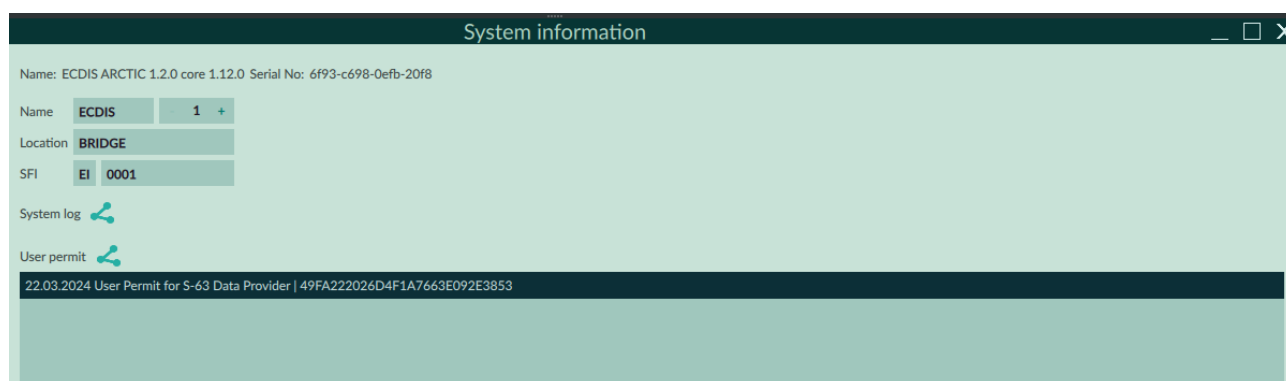
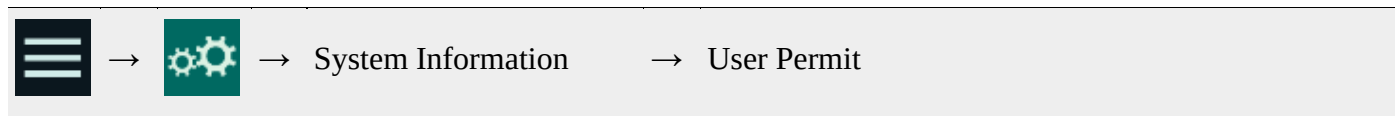
ECDIS accepts both encrypted and unencrypted ENC exchange datasets with the structure that meets the IHO S-63 standard.

• NOTE

It is impossible to import exchange data sets without the CATALOG.031 file

To order Official ENC from chart providers, the so-called **USER PERMIT** – a unique identifier of your ECDIS - is required.

User Permit is located at:



Export the **USER PERMIT** as a text file to a USB memory stick and send it to your chart provider via e-mail.

User Permit export:



An encrypted ENC dataset contains: ENC base cells, updates, Scheme Administrator (SA) Digital Certificate, CATALOG.031 file, and **Cell Permits**. The encrypted data set may be compressed in a *.zip or *.tar.gz archive and come to you on various media such as DVD etc.

Save the data to a USB drive to load ENCs into ECDIS.

• **NOTE**

It is possible to install certificates, permits, and charts from **zip** and **tar.gz** archives written on a USB drive. The recommended file system for a USB stick is FAT32.

Note that installing a large ENC exchange set (e.g., a world chart database) and also the update sets for such a collection can take a considerable amount of time.

• **NOTE**

Always use a dedicated memory stick for loading of ENC and updates into ECDIS to avoid unnecessary time consumption caused by scanning of heterogeneous data not related to ENC exchange dataset.

7.1 ENC management functions

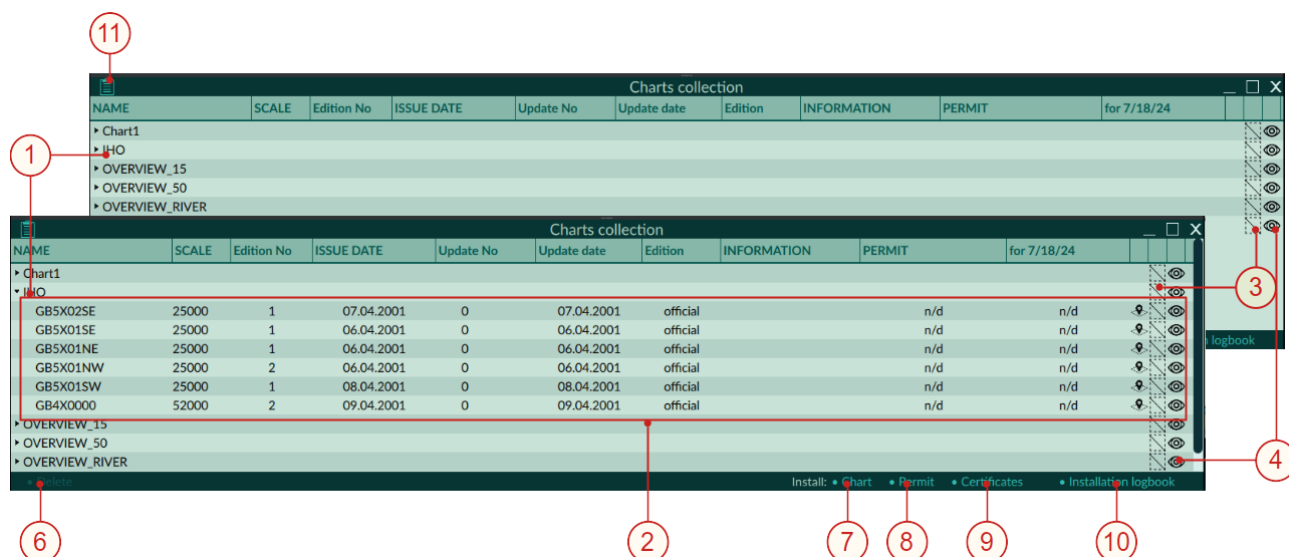
Navigation:



ECDIS provides the following ENC management functions:

- view information about ENC sets;
- installing and removing schema administrator root certificates;
- installing and removing cell permits;
- installing and deleting ENC sets;
- updates installation;
- view a report on installation and removal of ENCs, updates, certificates, and cell permits;
- generate an ENC status report.

All actions with ENCs, certificates, permits, and updates are recorded in the Installation Log.



1	Named data set
2	List of ENC cells
3	ON/OFF data set boundaries or cell frames
4	ON/OFF show ENC
5	Centering to selected ENC
6	Delete — deletes the selected cell set. It is not possible to delete individual cells of a set separately.
7	Chart opens the ENC installation window
8	Permit opens the Enc Permit Installation window
9	Certificates opens the Install Certificates window
10	Installation Logbook opens the Installation log window.
11	Reports opens the Chart Collection Report window.

To install ENC:

- Make sure that the valid IHO.CRT Schema Administrator (SA) Certificate is installed. SA Certificate is usually supplied along with the ENC or can be downloaded from <https://iho.int/en/enc-data-protection>.
- Install ENC Cell Permits obtained from the chart provider.
- Install ENC obtained from the chart provider who issued the Cell Permits.

• NOTE

If the local bridge network includes several NES 3000 ECDIS stations, chart management operations such as installing or deleting SA certificates, ENC cell permits,

installing ENC cells or update files, deleting ENC sets, as well as ENC manual updating should be performed on the ECDIS with “Master” rights.

The System database (SENC) encrypted for this network will be synchronized between the Master ECDIS and other ECDIS stations in the local network.

Should the Master ECDIS fail, Master rights are transferred to another ECDIS in the local network.

7.1.1 Installing/deleting Schema Administrator certificates

Install a USB drive with chart datasets into the ECDIS USB port

Navigate to



Install certificate	
IHO: /media/sdc1/IHO.CRT	
Start:06.02.2013 16:58, End:03.03.2033 15:58, IHO, installed, not expired	
IHO: /media/sdc1/Amur/3/Amur/IHO.CRT	
Start:06.02.2013 16:58, End:03.03.2033 15:58, IHO, installed, not expired	

Successful installation will be followed by notification “Certificate Installed Successfully” and recording in the Installation Log. The Certificate status will change to «Installed».

Return to the Data Set and click Back.

SA Certificate can come alone or included in a dataset zip archive.

• TIP

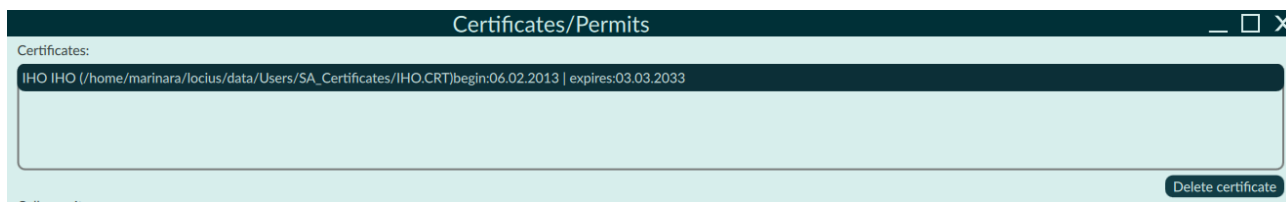
The list of installed certificates is available in the **Certificates/Permits** tab.

• NOTE

It is not possible to install SA certificates from second-level zip archives. In such cases, first unzip the attached files and install SA certificate as described above.

Removing certificates:





A notification will be displayed at the bottom of the panel and an entry will be made into the **Installation Log**.

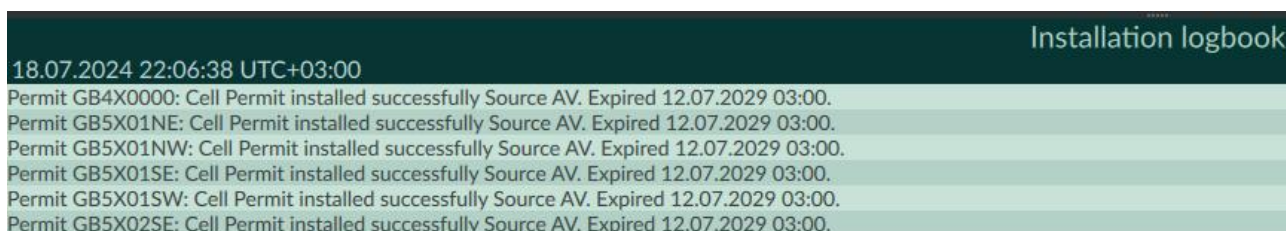
7.1.2 Installing/deleting Cell Permits

Install a USB drive with chart datasets into the ECDIS USB port.

Navigate to:



Once installation completed a notification will be displayed at the bottom of the panel and corresponding entry will be made into the **Installation Log**.



If errors occur, the logbook will indicate errors in accordance with IHO S-63 (see 5.7). The navigator is invited to act according to the manufacturer's recommendations.

To return to **Data Set** window, click **Back**.

• NOTE

ECDIS can install Cell Permit packaged in a zip archive alone or within a dataset zip archive.

Installation from second-level zip archives is not possible. In such a case, unpack Cell Permits before installation.

• TIP

Note that repeated installation of already installed Cell Permits can cause slowdowns in the ENC installation process and further the inability to decrypt the cells.

Avoid repeated Cell Permits installation for example, when loading updates to installed base cells.

Should the “SSE 21” error occur during installation, it is recommended to uninstall (delete) the permits and ENC, reinstall the ENC permits, and repeat the ENC cell installation.

Removing ENC permits:



1	List of installed ENC permits, specifying dataserver ID and permit expiration date
2	Delete Selected - to delete selected cell permits
3	Delete expired - to delete expired permits
4	Select all - to select all permits from the list
5	Deselect all - deselects all selected cells

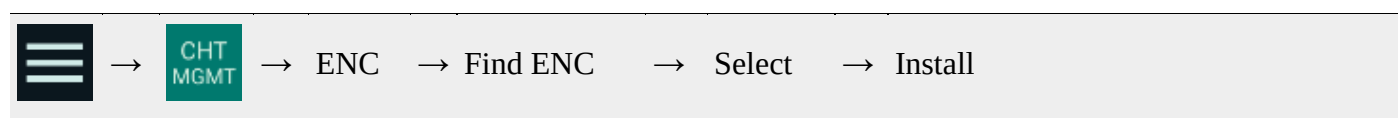
A notification will be displayed at the bottom of the panel confirming that the permits are deleted.

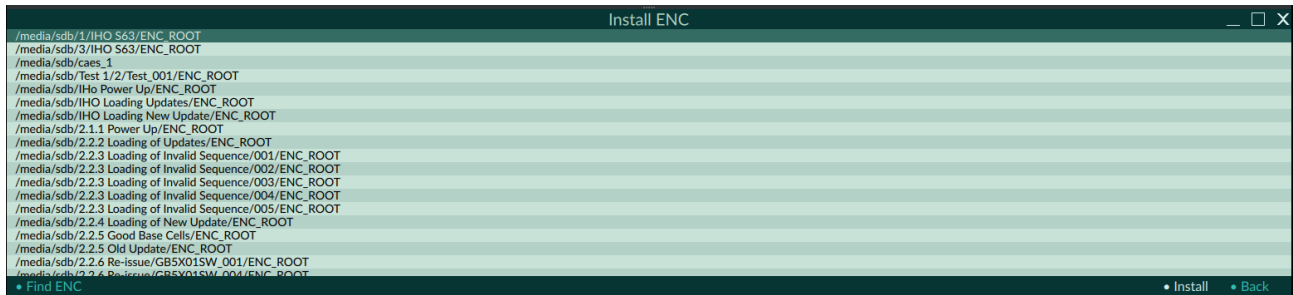
7.1.3 Installing/deleting ENC

To install ENC:

Install a USB-drive with chart dataset into the ECDIS USB port.

Navigate to:

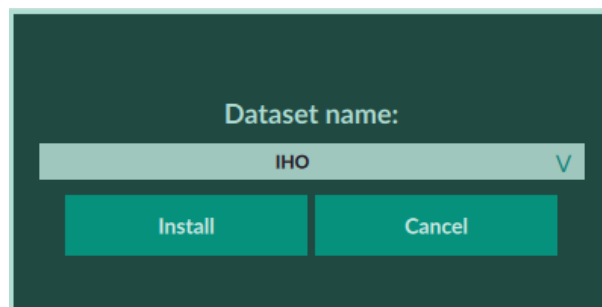




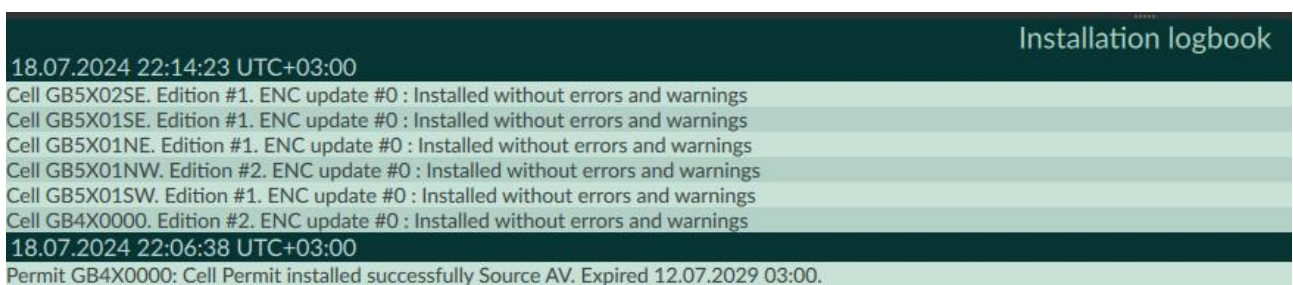
Select from the drop-down list or enter the name of the chart data set you want to install the chart(s) in. Click Install.

• **NOTE**

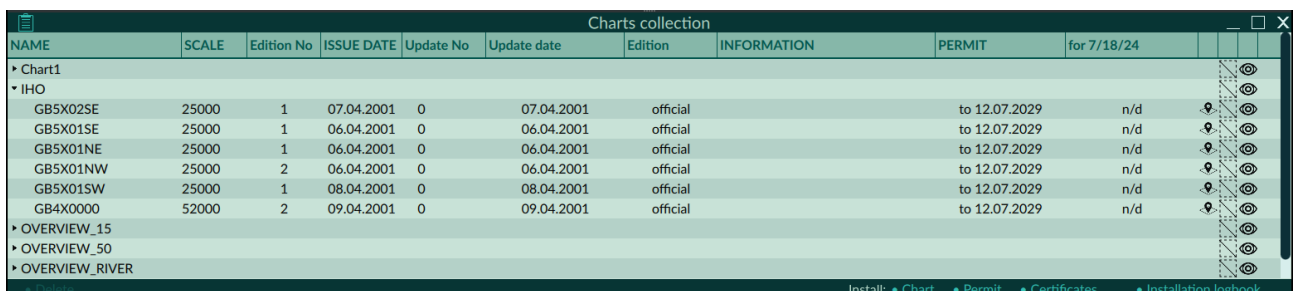
USE ONLY LATIN LETTERS AND/OR FIGURES WITHOUT SPACES TO NAME THE NEW CHART DATA SET.



The installation result will be displayed with a corresponding notification at the bottom of the window and recorded in **Installation Log**.



To return to **Data Set** panel, click **Back** twice.



A new collection will appear in the Data Set window. To view the ENC list - double-click on the data

set row.

• **NOTE**

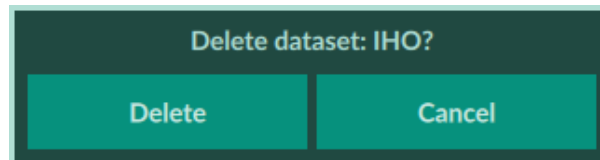
ECDIS can install ENC's packaged in a zip archive.

It is not possible to install ENC's from second-level zip archives. Unpack dataset before installation.

Removing ENC data sets:



1. Confirm the action in the dialog by clicking **Delete**:



The result of the deletion will be displayed with a corresponding notification at the bottom of the window and recorded in **Installation Log**.

NAME		SCALE
Chart1		
OVERVIEW_15		
OVERVIEW_50		
OVERVIEW_RIVER		
caes		

• **NOTE**

Individual cells can not be deleted.

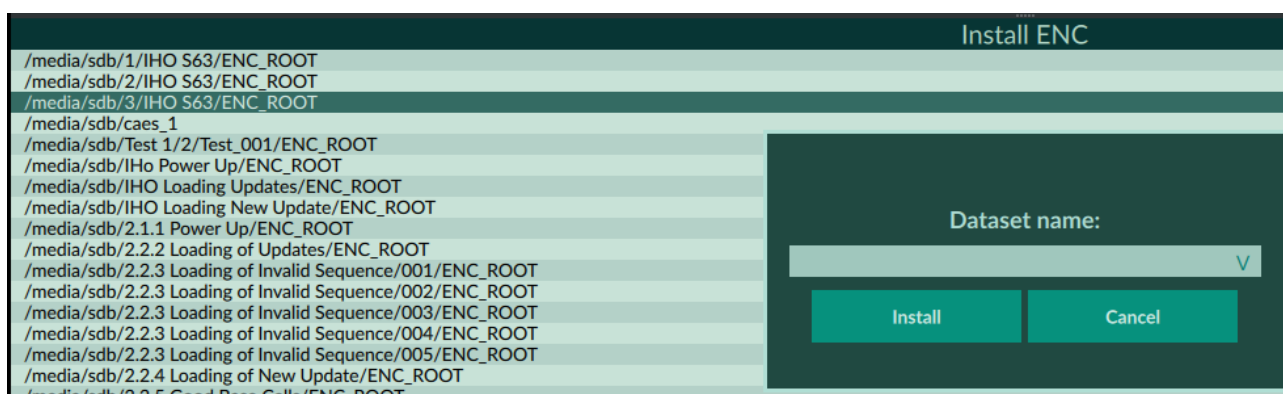
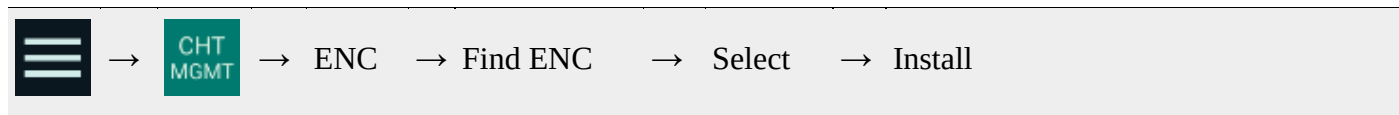
7.2 ENC cell updates

7.2.1 Installing updates

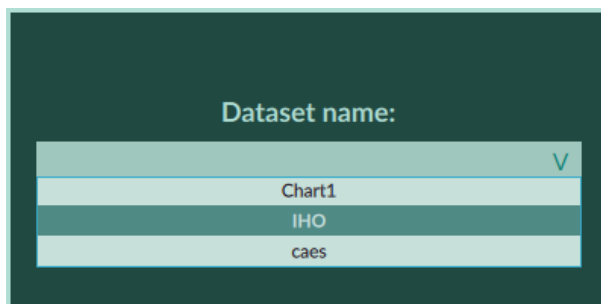
The procedure for installing ENC updates in ECDIS is similar to the procedure for **installing charts**.

Install a USB-drive with the dataset into the ECDIS USB port.

Navigate to:



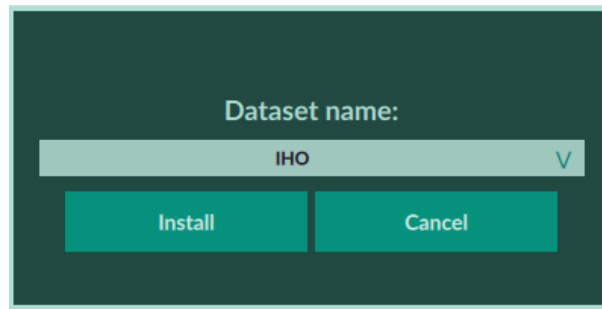
Select from the drop-down list the dataset name the updates are to be installed to.



• NOTE

Updates can only be installed to the dataset they are released for.

Click Install.



The result of the installation will be displayed in the lower part of the window and recorded in the **Installation Log**

7.2.2 To view updates

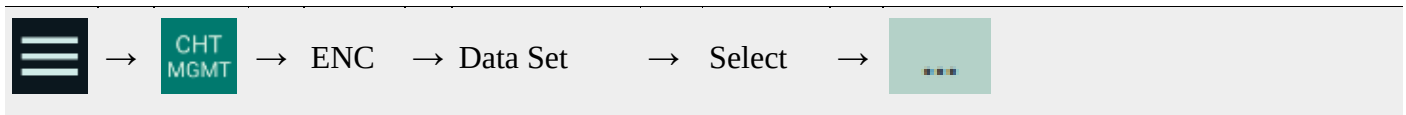
ECDIS keeps a log of installed and applied ENC updates. Updates can be viewed via **Data Set**.

For cells that have an update, a button in the form of a multi-dot [...] will be displayed. The chart set collection pane for the cell also shows the number of the last update applied (**Update No**) and **Update Date** - the date the last update was installed.

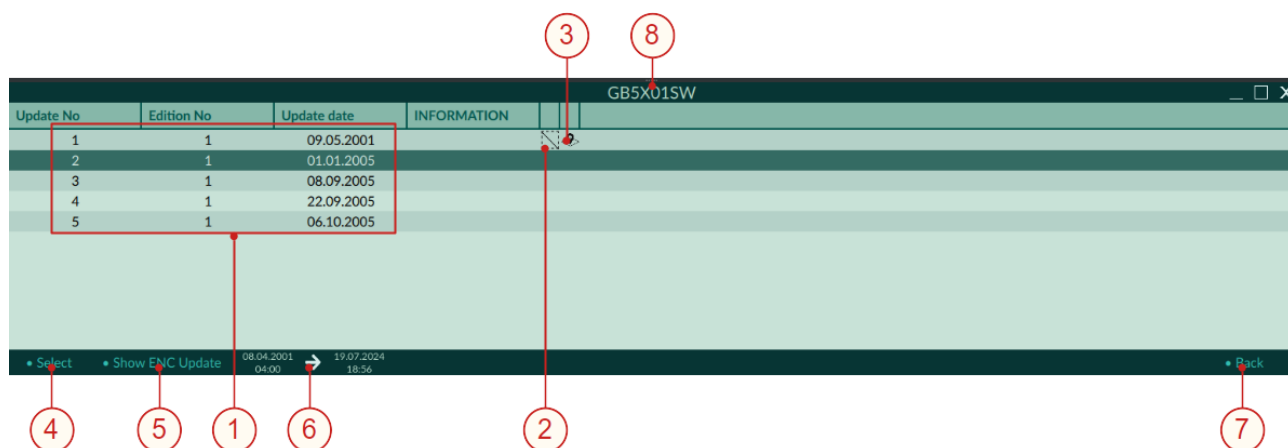
NAME	SCALE	Edition No	ISSUE DATE	Update No	Update date	Edition	INFORMATION
GB5X02SE	25000	1	07.04.2001	0	07.04.2001	official	
GB5X01SE	25000	1	06.04.2001	0	06.04.2001	official	
GB5X01NE	25000	1	06.04.2001	0	06.04.2001	official	
GB5X01NW	25000	2	06.04.2001	0	06.04.2001	official	
GB5X01SW	25000	1	08.04.2001	5	06.10.2005	official	
GB4X0000	52000	2	09.04.2001	0	09.04.2001	official	

1	Number of the last update applied (Update No)
2	Cell updates view button
3	Date of the last update (Update Date)

To view cell changes, navigate to:



Opens the table of the selected cell's update list.

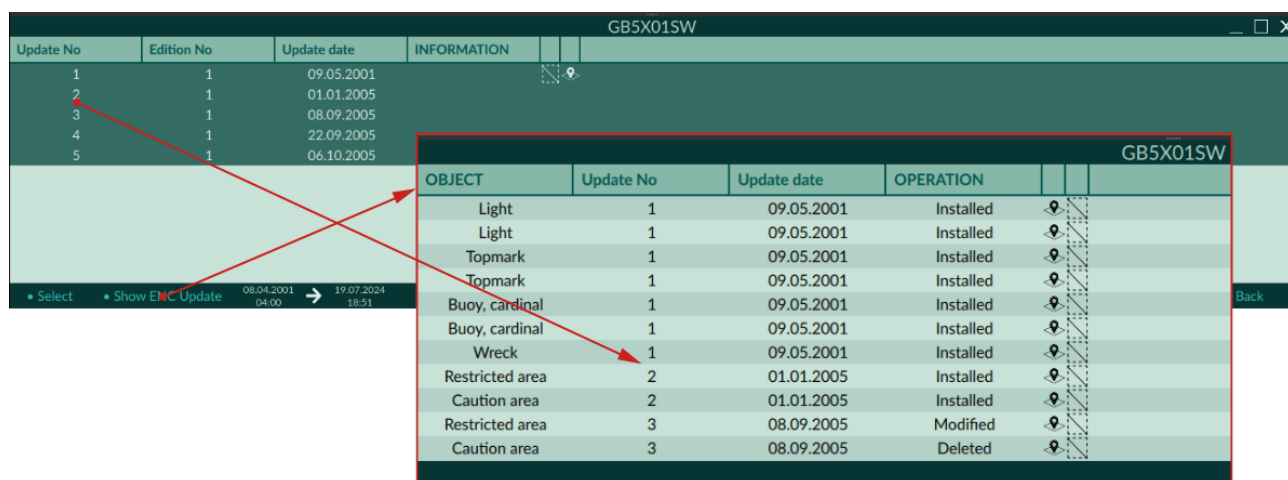


1	List of applied updates with update number and date of update release
2	ON/OFF cell backlighting
3	Centering the screen on the cell
4	Select - enables multiple selections of updates to view
5	Show ENC updates - opens a table detailing the changes for the selected update(s).
6	An indicator of the selected update release period for viewing. The default setting is the range from the cell release date to the current date. Press to select the viewing period in the calendar
7	Back - return to Data Set
8	Cell Name.

Detailed updates view:

Set the viewing range to filter the list of updates.

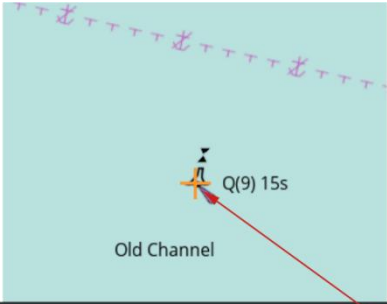
Select an update or several updates in the list and click **Show ENC updates**.



The list of changes for selected update(s) will be opened with the following information: object name, serial number of the update set, update date, and name of the operation performed on the object.

Centering  : move to the object on ENC.

Highlighting  : highlighting of the object on the chart.



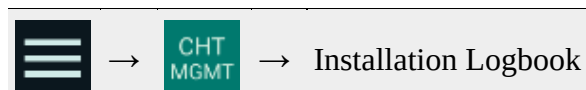
GB5X01SW				
OBJECT	Update No	Update date	OPERATION	
Light	1	09.05.2001	Installed	
Light	1	09.05.2001	Installed	
Topmark	1	09.05.2001	Installed	
Topmark	1	09.05.2001	Installed	
Buoy, cardinal	1	09.05.2001	Installed	
Buoy, cardinal	1	09.05.2001	Installed	
Wreck	1	09.05.2001	Installed	

To return to Data Set, click Back.

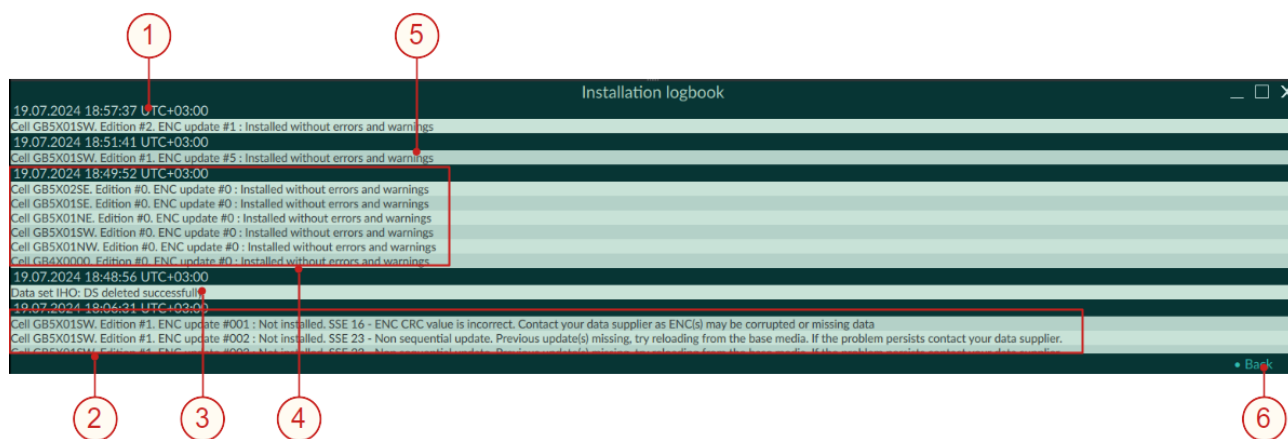
7.3 Installation Logbook

The results of working with the ENC collection: installation and/or removal of certificates, ENC, and ENC permits are recorded in the **Installation Logbook**. The logbook stores the records for the last 2 weeks.

Viewing the logbook:



The window that appears will contain the records grouped by date.

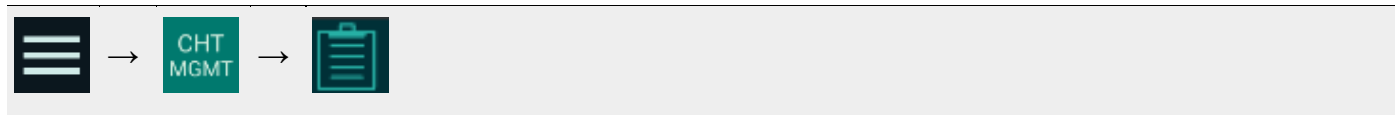


1	Date/Time UTC of the operation performed
2	Record of installing updates to the “IHO” cell set with SSE errors (5.7)
3	Record of deleting a cell set
4	Record of successful installation of a cell set
5	Record of successful installation of updates to a cell set.
6	Back : return to the chart Collection.

7.4 ENC Status Report

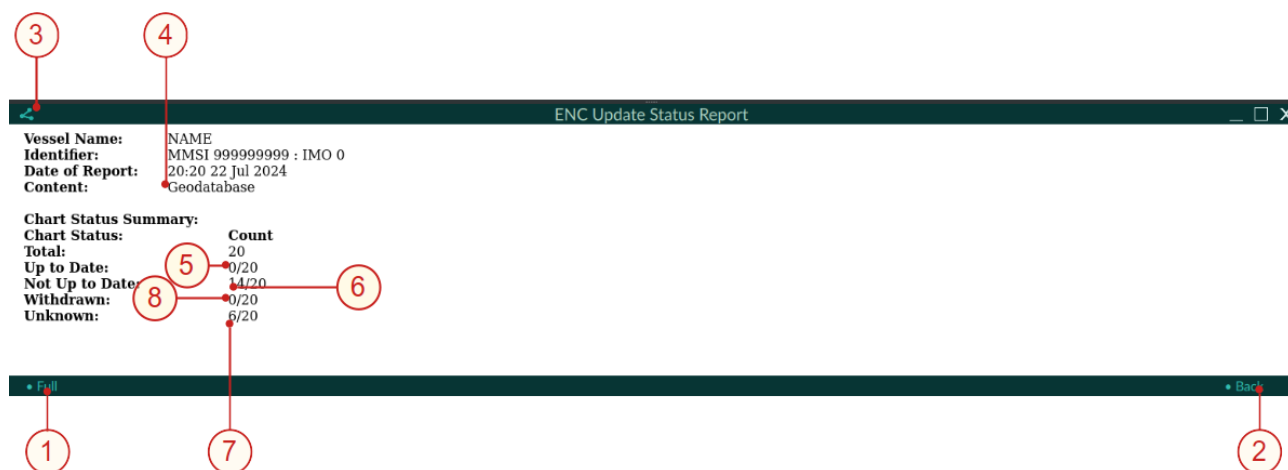
ECDIS generates ENC Status Report upon request. The report can be exported to an external storage media.

To view the report:



7.4.1 Short Report

By default, a **short** report is generated.



1	Report type selection button: Full or Short
2	Back, return to Chart Collection
3	Collection status report export to external media in *.pdf
4	Report content: Geodatabase (ENC cell collection installed in ECIDS, excluding preset ENC's). The ENC cell report by route is described in 7.2.
5	Number of updated cells
6	Number of not updated cells
7	Number of excluded cells
8	Number of cells that have not been updated for more than 3 weeks.

7.4.2 Full Report

To view Full report:



ENC Update Status Report

Vessel Name: NAME
Identifier: MMSI 999999999 : IMO 0
Date of Report: 20:21 22 Jul 2024
Content: Geodatabase

Chart Status Summary:
Chart Status: Count
Total: 20
Up to Date: 0/20
Not Up to Date: 14/20
Withdrawn: 0/20
Unknown: 6/20

ENC Name: IHO
ENC Update Reference Date: 19 07 2024

Data Server: 63 63

Cell Name	Edition	Update	Issue Date	Application date	Last update issue date	Expiry Date	Status	Source
GB4X0000	2	0	09-04-2001	Unknown	Unknown	N/D	Unknown	Official
GB5X01NE	1	0	06-04-2001	Unknown	Unknown	N/D	Unknown	Official
GB5X01NW	2	0	06-04-2001	Unknown	Unknown	N/D	Unknown	Official
GB5X01SE	1	0	06-04-2001	Unknown	Unknown	N/D	Unknown	Official
GB5X01SW	1	0	08-04-2001	Unknown	Unknown	N/D	Unknown	Official
GB5X02SE	1	0	07-04-2001	Unknown	Unknown	N/D	Unknown	Official

Manual update:

Call name	Object	Operation	Date
GB4X0000	Buoys	Added	20:28 22-07-2024

Short Back

1	ENC cell set name. The sets in the report are arranged sequentially.
2	Date of the last ENC update applied.
3	Information on manual updates to the ENC collection.

• **NOTE**

Generating a full report on the entire chart collection can take considerable time and depends on the size of the ENC collection.

• **TIP**

The **Last update issue date** field of the report specifies the date of the last update. **Issue Date** is specified in the table column of the same name.

ENC is considered up-to-date if the last ENC update does not exceed 4 weeks.

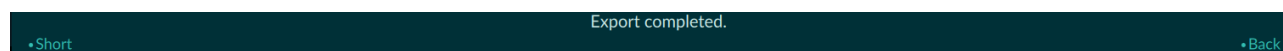
To return to short report click **Short**.

7.4.3 Report Export

Export the ENC status report:



A message will be displayed when the export is successfully completed:



To return to **Data set** click **Back**.

You can validate the export by viewing the contents of the file `senc_report_datetime_format.pdf` (datetime: export time and date, format: short or full) from a USB drive on any computer.

7.5 ENC Status Report

Navigation:



7.5.1 Portrayal

• NOTE

In order to automatically take into account, the tide correction over (below) the chart vertical datum, the SAFETY CONTOUR and SAFETY DEPTH values should NOT be entered manually.

The ECDIS calculates automatically the value of dangerous depth Z_{dg} using the values of maximum static draft of the vessel H_{st} , under keel allowance d_H , and correction for tide over the level to which the depths on the chart d_Z are given.

$$Z_{dgr} = H_{st} + d_H - d_Z,$$

The value of d_Z is positive if the current water level is greater than the chart vertical datum and negative if the current water level is less than the chart vertical datum.

A Safety Contour is selected from the depth contours encoded in ENC with the deeper value closest to the Safety Depth.

Warnings and alarms are always generated using the ENC data of the largest scale at the ship's position (or during a route safety check), regardless of the scale of the chart displayed.

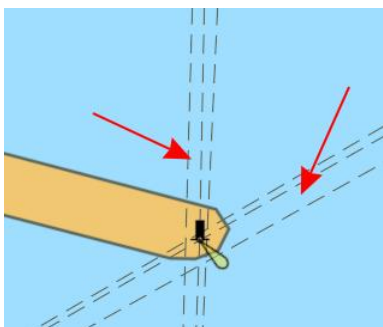
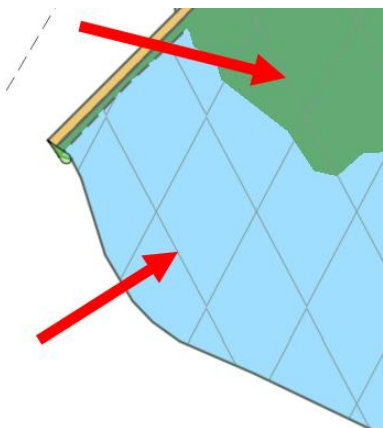
• **NOTE**

The term “Safety Depth” refers exclusively to the depths displayed on the electronic chart and referenced to its Vertical Datum. The “Safety Depth” value is used by ECDIS to automatically select a “Safety Contour” for a vessel with given dimensions and to generate appropriate warnings.

The actual depths measured by the echo sounder in specific sailing conditions can differ from the spot soundings contained in the electronic chart.

This section is used to customize the visual representation of the ENC:

1	Safety contour and Safety Depth values are calculated from ship’s draft and under keel allowance settings, and current tide value.
2	Portrayal style of symbols: S52 or INT1 . Boundaries (6) and Chart symbol style (7) are available for S52. S52 S52 INT1
3	Color mode determines the color gradation of the depth areas on the chart. Options: 2 shades and 4 shades . When using the 4 color option , Shallow contour (4) and Deep contour (5) become available for manual setting, Four shades Four shades Two shades
4	Shallow contour sets the depth value to a lower Safety Contour . Shallow contour is used only to determine the fill color of depth areas designated as shallow when color scheme 4 shades (3) is selected.
5	Deep contour sets a depth value greater than Safety Contour . Deep contour is only used to define the fill color of depth areas when color scheme 4 shades is selected.

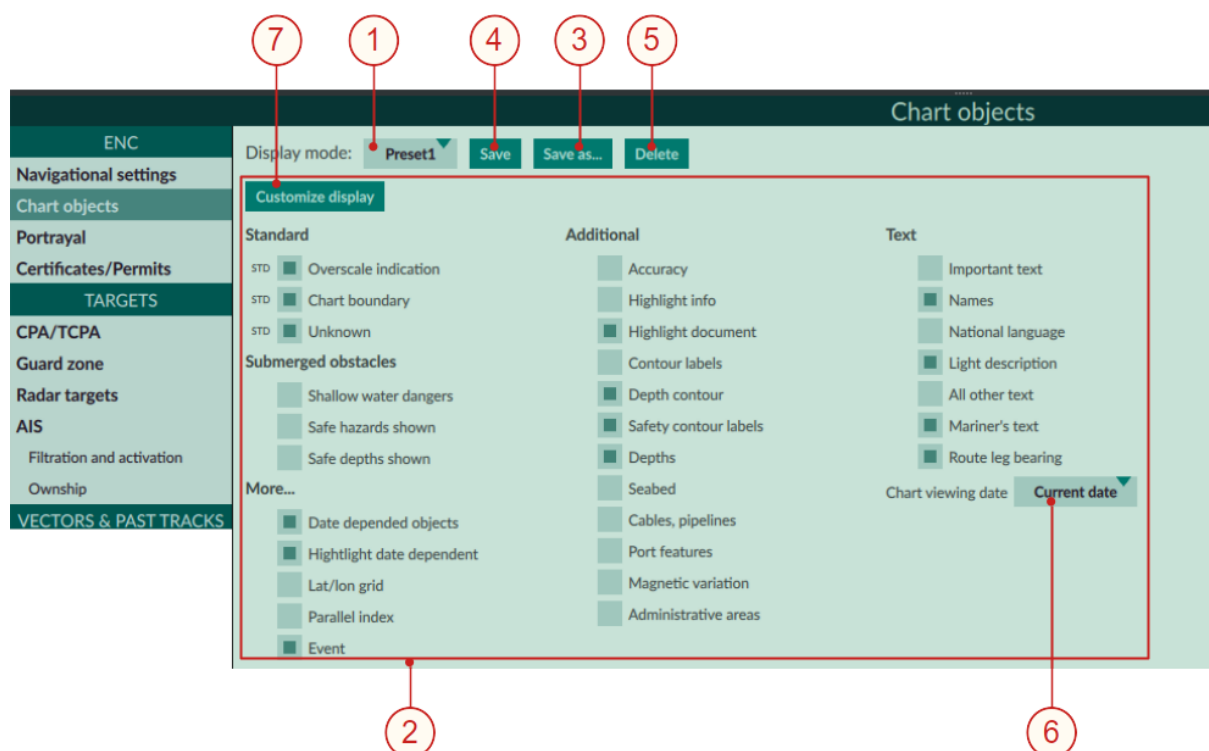
6	Boundaries selects whether the boundaries of the areas are Symbolized or Simple. Available only for S52 presentation (2).
7	Chart symbol style - selection of chart symbol display style: Symbolized or Simplified. Available only for S52 presentation (2).
8	The danger symbol enables the display of the Danger symbol for all point objects lying within the Safety Depths area that are dangerous for the ship with the set parameters and accounting for current tide correction. 
9	Scale min applies automatic generalization of ENC objects when the chart display scale is reduced.
10	Full light lines enable the display of light sectors 
11	The shallow pattern enables hatching of the shallow depth area. 

7.5.2 Chart Objects

Navigation:

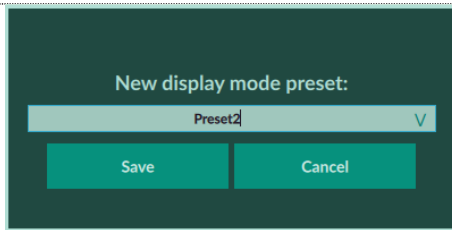


The general principle to be followed when choosing the chart display settings is to minimize information noise while simultaneously displaying all significant cartographic information on the screen necessary for solving the current navigation tasks.

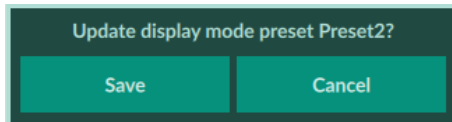


- 1 List box **Display Mode** — select one of the **chart display mode** sets. By default, ECDIS has three sets: **Base**, **Standard** and **Full**. These sets cannot be changed or deleted. ECDIS provides the ability to create Custom Display Mode Sets based on the existing sets.
- 2 Customizing the display of chart objects:
Overscale indicator - ENC rescaling indication
Chart boundary - ENC boundaries ON/OFF.
Unknown - unknown object symbol ON/OFF
Shallow water dangers - hazards located in shallow water display ON/OFF.
Safe hazards shown - display ON/OFF of objects that are deeper than the Safety Contour but pose a hazard for submerged instruments. Only applies to terrain and infrastructure objects.
Safe depth shown - safe depths ON/OFF.
Date depended objects - display ON/OFF of objects with a set validity time. Setting a view day/time different from the current day/time, ECDIS displays the message “display time is

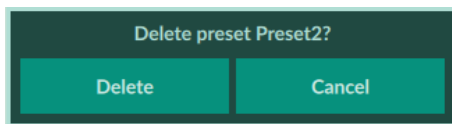
	conditional”, but all navigation tasks and data logging are performed in real time. Highlight date depended – time-depended objects highlighting ON/OFF. Lat/Lon grid - coordinate grid ON/OFF. Parallel index - parallel index lines ON/OFF. Event mark - the operational marks created by the navigator display ON/OFF. Accuracy - the hydrographic survey accuracy symbols display ON/OFF. Highlight info - info symbol indicating the presence of information attributes of cartographic objects display ON/OFF. Highlight document - the symbols for attached text documents display ON/OFF . Contour labels - depth contour captions display ON/OFF. Depth contour – depth contours display ON/OFF. It does not disable Safety Contour. Safety contour labels - Safety Depth contour captions ON/OFF. Depth - all depths display ON/OFF. Seabed - ground type display ON/OFF. Cables, pipelines - submarine cables and submarine pipelines display ON/OFF. Port features - port service symbols display ON/OFF. Magnetic variation - magnetic variation display ON/OFF. Administrative areas - administrative areas display ON/OFF. Important text - texts related to the safety of navigation display ON/OFF. Names - geographical and administrative object names ON/OFF. National language - captions, geographical and administrative names in the national language as encoded in ENC display ON/OFF. The names will be displayed in English if the ENC does not have the encoded names in the national language. Light description - the characteristics of lights and aids to navigation, including floating warning signs display ON/OFF. All other text - the additional captions display ON/OFF . Mariner’s text - the navigator's notes display ON/OFF. Route leg bearing - the leg directions for the active route display ON/OFF.
3	Save as... saves the current display settings as a user’s set. Creates multiple custom sets to provide the optimal Chart display mode for the current conditions. Quick switching between sets of Chart display mode is available in the Quick Settings.



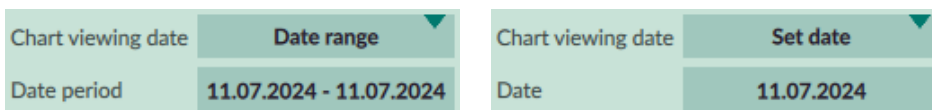
- 4 **Save** saves the changes in the selected user's set. The navigator can customize the selected User Set at any time.



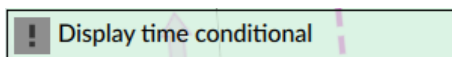
- 5 **Delete** deletes the selected user's set.



- 6 **Chart viewing date** - the temporary viewing objects that are valid for the specified date ON/OFF display. The default setting is Current Date. Arbitrary dates or date periods are available for selection.

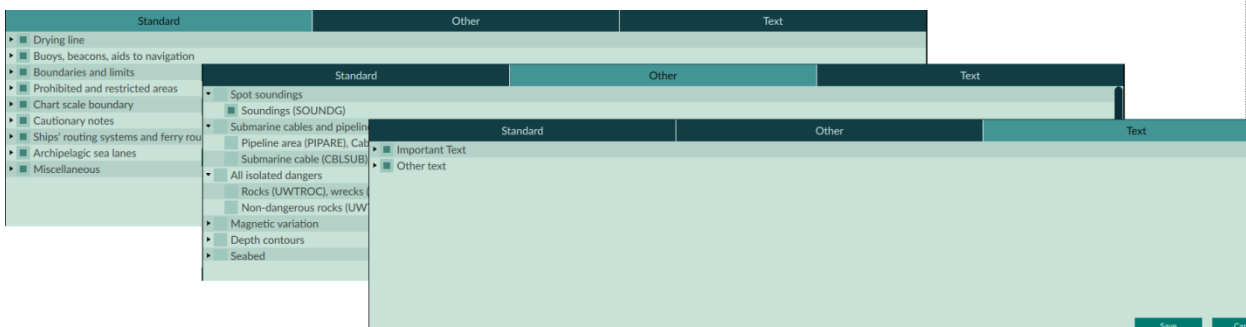


If a set date does not correspond to the current date or the set date period does not contain the current date, the message “**Display time Conditional**” will be displayed in the notification area.



- 7 **Customize display** opens a window for fine-tuning the display mode of chart objects. Group changes do not apply to the basic sets: Base, Standard and Full.

You can edit the selected set. When saving, a custom chart display mode set will be created or a previously created custom set will be overwritten.



7.5.3 Standard Display

Navigation:

STND
DISP

This is the Single action function required to turn the current ECDIS settings to the Standard Display ECDIS settings (12).

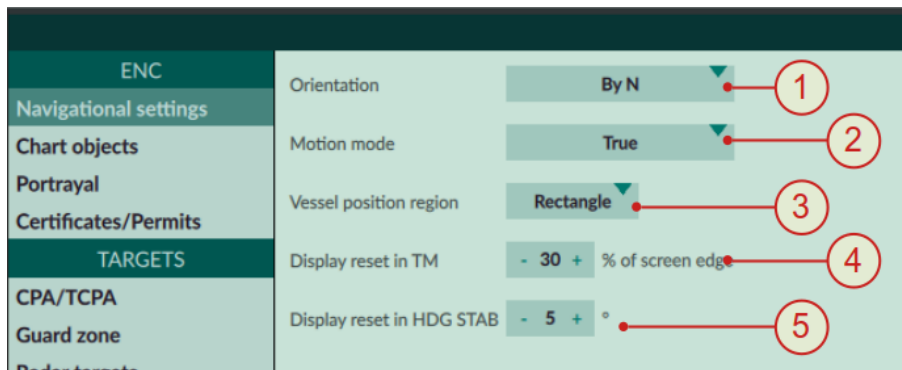
Activation of Standard Display does not affect the settings of ship dimensions, CCRP, antennas off sets. The temporary opened windows will be closed, and standard settings for vectors, orientation, etc. will be applied.

Pressing the button again - returns to the previous ECDIS state.

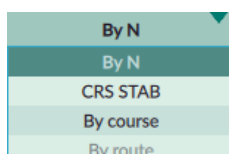
7.5.4 Navigational Settings

Navigation:

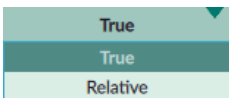
→ → Navigational Settings



- 1 **Chart Orientation** sets the chart orientation. An arrow indicating the direction to North is displayed in the upper left corner of the chart window. There are four chart orientation modes in ECDIS:



By N - the chart is oriented with the northern frame to the top of the screen - the conditional

	North. CRS STAB - chart orientation relative to the course line of stabilized or set direction (Course Up). The chart is oriented with the ship's course directed vertically on the screen. Subsequent course changes will cause the course line to deviate from the vertical of the screen, while the image remains stationary. The course line, when “yawing”, may deviate. The course line can be corrected by pressing the button again; the image will orient itself to the new course. If no heading data is available, ECDIS switches to COG orientation. The ECDIS settings allow automatic correction for deviation from the current course in the range of $\pm 45^\circ$ with an accuracy of 1°. By Course - chart oriented to the instantaneous course value (Heading Up). The initial direction is the vertical of the monitor, along which the ship's heading line is oriented (Heading - HDG). The image is oriented relative to the heading line. When the course is changed, the image is rotated relatively to the fixed course line. In the absence of data from a heading sensor, ECDIS will orient the chart relatively to COG. By Route - the chart is oriented in the direction of the current route leg. This mode is only available when the route is activated.
2	Motion Mode — select absolute or relative motion mode. The choice of motion mode is independent of the chart orientation mode. Both modes are available at all scales at all chart orientations.  <i>Relative Motion</i> - in this mode, the chart is shifting in the direction opposite to the ship speed vector, the ship symbol is stationary. It is possible to change the position of the displayed chart area and the vessel's position on the ECDIS screen in the navigation settings. <i>True Motion</i> - the chart is stationary, the ship symbol is moving. It is possible to enable the ship symbol reset in the navigation settings. When the ship's symbol reaches the set value (10% to 75%) of the position relative to the edge of the screen, the ship symbol is automatically shifted in the direction opposite to the current ship's course.
3	Vessel Position Region - adjusts the location of the ship symbol on the screen.

	Rectangle Off Rectangle Fix. binding In Relative Mode: Fix Binding — sets the Ship Symbol at the selected location on the screen. Press Set Binding. The cursor will change its view to . Use the left mouse button (by tapping the screen) to set the chart to the position of the ship symbol. The ship symbol will be placed in the specified position. Off - fixed binding will be disabled. Ship position will be moved to the center of the screen. In True Mode: Rectangular - the chart is automatically updated when the ship symbol crosses the conditional boundary described by a rectangle inscribed within the screen boundaries with an indentation by a specified percentage from the edge. Off - no control of crossing the specified rectangle will be performed and the ship symbol may go beyond the screen boundaries.
4	Display Reset in TM sets the boundary value. The chart will be updated as a percentage of the chart window when ship symbol cross the set boundary.
5	Display Reset in HDG STAB sets the value of acceptable course deviation. The chart will be redrawn as that value is exceeded.

7.6 SSE messages

Errors and warnings that occur when working with charts, licenses, permits and certificates are recorded in the **Installation Logbook**. The meaning of SSEs, conditions of occurrence, and recommended actions are summarized in the table below.

Table 4: SSE messages and recommended actions

Message #	Description and recommended action
SSE 05	“SA Digital Certificate (X509) file is not available. A valid certificate can be obtained from the IHO website or your data supplier”
SSE 06	“The SA Signed Data Server Certificate is invalid. The SA may have issued a new public key or the ENC may originate from another service. A new SA public key can be obtained from the IHO website or from your data supplier”
SSE 08	SA Digital Certificate (X509) file incorrect format. A valid certificate can be obtained from the IHO website or your data supplier
SSE 09	ENC Signature is invalid
SSE 10	Permits not available for this Data Server. Contact your data supplier to obtain the correct permits.
SSE 11	Cell Permit not found. Load the permit file provided by the data supplier.
SSE 12	Cell [ENC Name] Permit format is incorrect. Contact your data supplier and obtain a new permit file.
SSE 13	Cell [ENC Name] Permit is invalid (checksum is incorrect) or the Cell Permit is for a different system. Contact your data supplier and obtain a new or valid permit file.
SSE 15	Subscription service has expired. Please contact your data supplier to renew the subscription licence
SSE 16	ENC [ENC Name] CRC value is incorrect. Contact your data supplier as ENC(s) may be corrupted or missing data
SSE 20	Subscription service will expire in less than 30 days. Please contact your data supplier to renew the subscription licencen service will expire in less than 30 days. Please contact your data supplier to renew the subscription licence
SSE 21	Decryption failed no valid cell permit found. Permits may be for another system or new permits may be required, please contact your supplier to obtain a new licence
SSE 22	SA Digital Certificate (X509) has expired. A new SA public key can be obtained from the IHO website or from your data supplier.
SSE 23	Non sequential update, previous update(s) missing try reloading from the base media. If the problem persists contact your data supplier.

Message #	Description and recommended action
SSE 24	[ENC Name] Signature format incorrect, contact your data supplier
SSE 25	Viewer – “The permit for ENC<cell name> has expired. This cell may be out of date and MUST NOT be used for Primary NAVIGATION”.
SSE 26	This ENC is not authenticated by the IHO acting as the Scheme Administrator
SSE 27	Viewer – “ENC<cell name> is not up to date. A New Edition, Re-issue or Update for this cell is missing and therefore MUST NOT be used for Primary NAVIGATION”.

8. Manual Update

The manual update feature is used to apply updates to ENC cells based on Notices to Mariners.

Manual update makes changes to the ENC cell.

Navigate to:



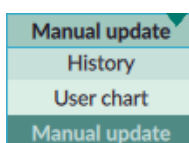
• NOTE

To view manual updates on the chart, enable the **Manual Updates Layer** in **Quick Settings** (see section 4.7)

Manual Update Options:

- **Add Objects:** Insert new objects into the ENC cell.
- **Modify Objects:** Make changes to existing objects.
- **Delete Objects:** Remove objects from the ENC cell.
- **History:** View a record of all manual updates.
- **User Chart:** Refer to section 9.1 for details.

Select an update option from the drop-down list:



8.1 Adding objects to the chart

Manual update		Manual update	
CELL	COMPILATION SCALE		
8M100015	1: 50000000		
8M100053	1: 15000000		
GB5X02SE	1: 25000		
GB5X01SE	1: 25000		
GB5X01NE	1: 25000		
GB5X01NW	1: 25000		
GB5X01SW	1: 25000		
GB4X0000	1: 52000		
• From ENC • Update		• Select	

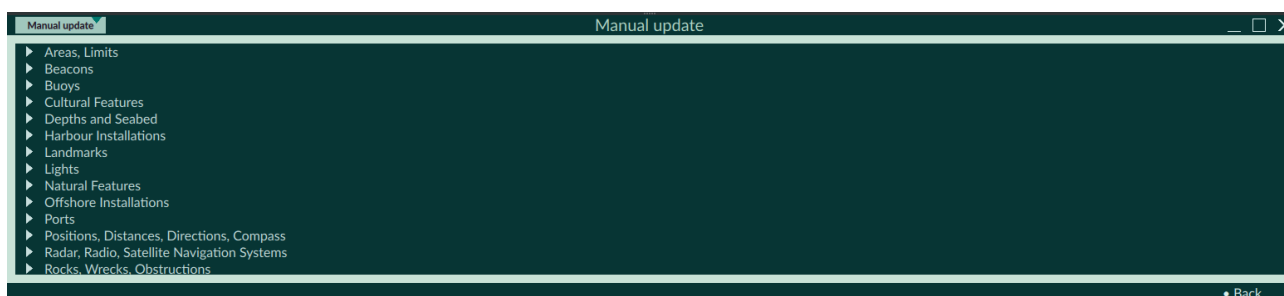
The table displays a list of ENC cells visible within the chart window. Moving the chart changes the

list of cells. To refresh the list after shifting the chart, click the **Update** button . The **Center** button centers the chart on the selected cell.

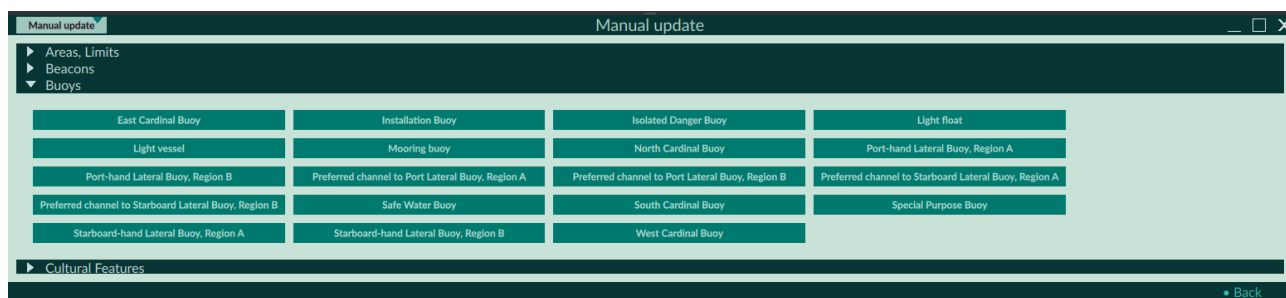
Steps to Add an Object:

Select a Cell: Highlight a cell in the table and click **Select**

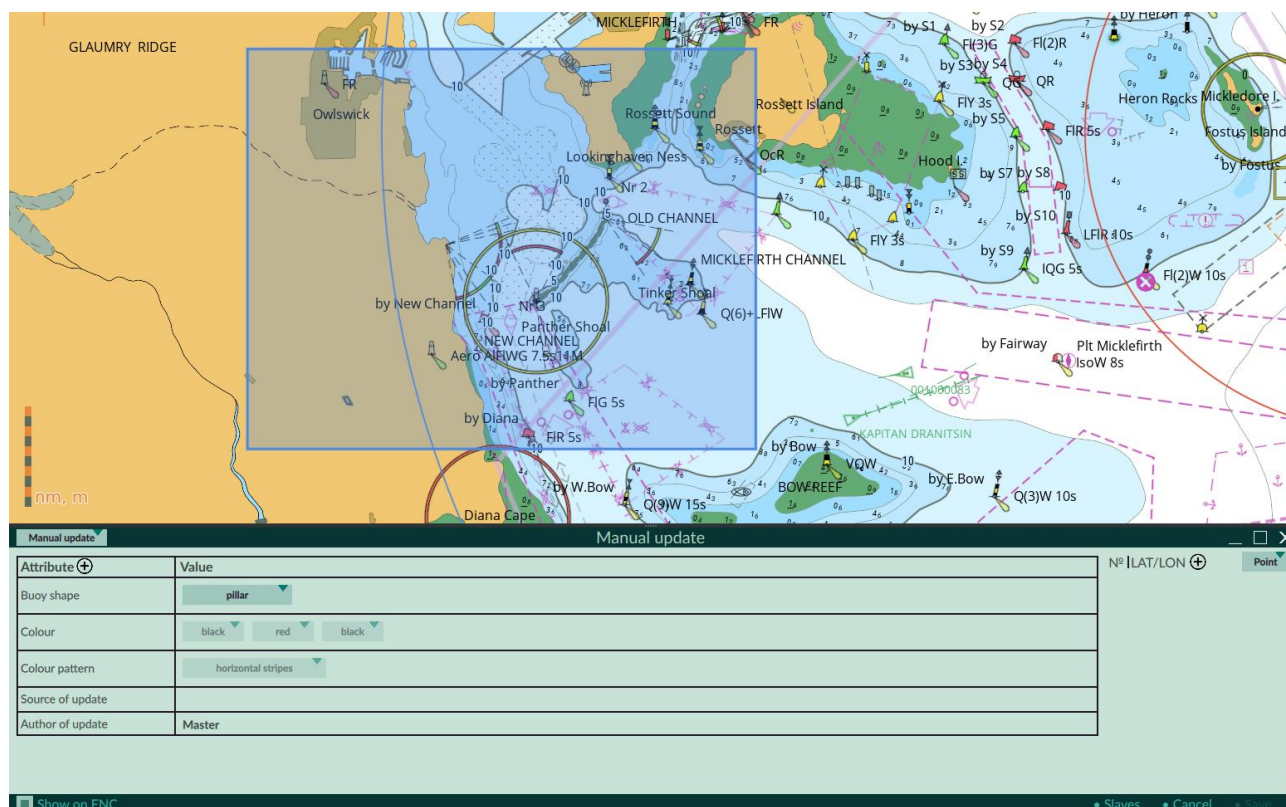
A list of chart objects available for adding will appear.



Choose Object Type: Expand the list of objects by selecting the desired type.



Select Object. The object's properties and attributes will open. The selected chart cell will be highlighted with a blue frame in the main ECDIS window.

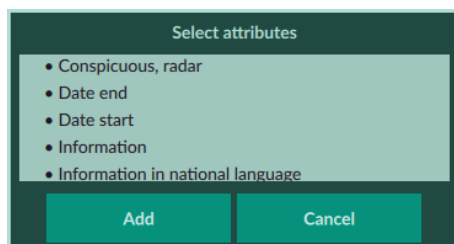


Choose the geometry of the object to be added

- **Point:** For point objects such as buoys, wells, lighthouses, etc
- **Area:** For adding areas like districts, land areas, or other enclosed regions.
- **Line:** For linear objects such as fairways, recommended routes, or boundary lines. Lines can be single or compound (broken)
- **Circle:** For circular objects, specifying the radius and center coordinates.



Add Attributes: The attribute list will display only the attributes relevant to the selected object.



Fill in Attributes: Complete the necessary attribute fields.

Manual update	
Colour	black red black
Colour pattern	horizontal stripes
Source of update	Notes to Mariners 2612 (20/07/24)
Author of update	Master
Date end	2024.08.02
Date start	2024.07.28
Scale minimum	- 1000.0 +
Scale maximum	- 75000.0 +
☒ Show on ENC	

Add child objects to the main object if required.

Select slaves	
- Fog signal - Petal Light - Topmark	
Add	Cancel

Manual update		
Nº	Slaves	Value
1	Petal Light	Colour white
2	Topmark	

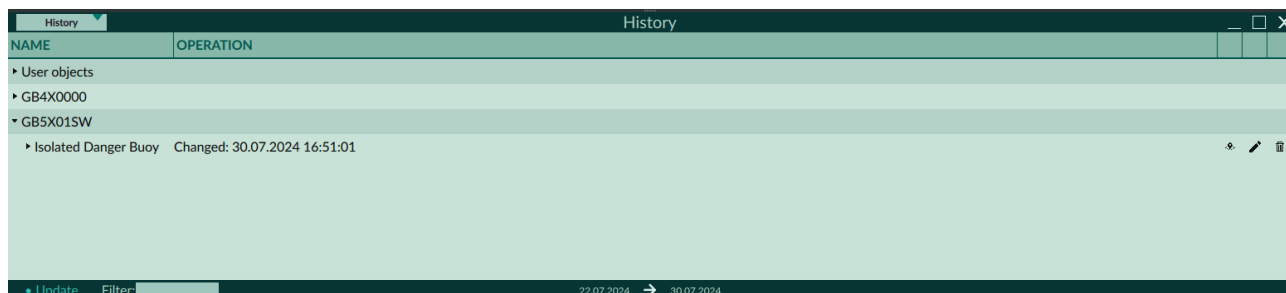
Manual update		
Nº	Slaves	Value
1	Petal Light	Topmark/daymark shape 2 spheres
2	Topmark	

Place the object on the chart using the cursor or by entering coordinates.



Nº LAT/LON	
1	32°32.951' S 060°56.672' E

Display on Chart: Toggles the visibility of the object on the chart.



The chart object (e.g., Isolated Danger Buoy) will appear on the chart. Any manual updates for the selected cell will be recorded in **History**. Changes to an existing update object are treated as new updates.

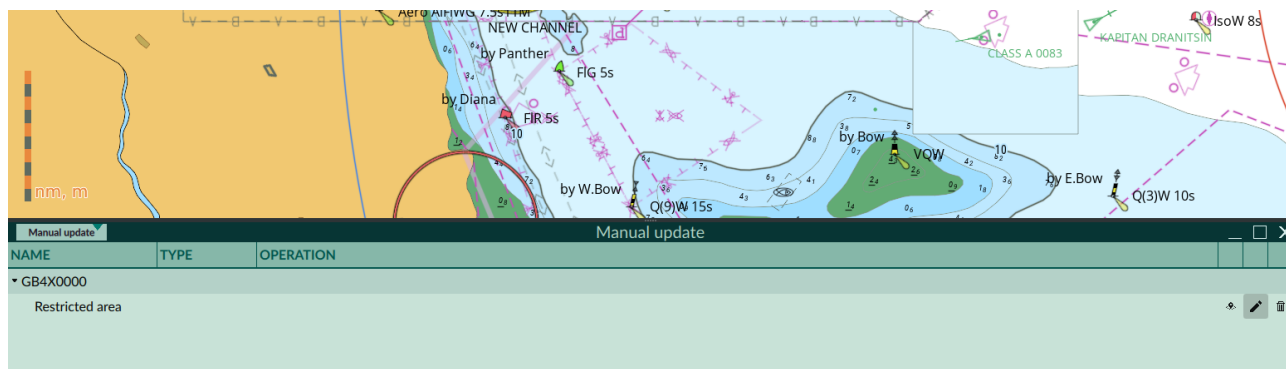
• **NOTE**

It is the navigator's responsibility to review received automatic updates and ensure they align with manual updates.

All manual updates are included in the **Chart Collection Report** (see section 7.4).

8.2 Object editing

Open Manual Update: Click Manual Update.



Click **Select on Chart** to choose an object directly from the chart or.

Select an object from the list and click **Edit**.



Manual update

Attribute	Value
Category of restricted area	degaussing range
Restriction	anchoring prohibited
	fishing prohibited

Attributes on the right:

Nº	Lat/Lon	Area
1	32°34.562' S 060°56.450' E	
2	32°34.510' S 060°56.417' E	
3	32°33.530' S 060°55.802' E	
4	32°33.523' S 060°55.798' E	
5	32°33.523' S 060°55.798' E	
6	32°33.416' S 060°55.991' E	
7	32°33.416' S 060°55.991' E	

Buttons: Show on ENC, Slaves, Cancel, Save

Edit Attributes: Update or add attributes as needed

History

Attribute	Value
Category of restricted area	degaussing range
Restriction	anchoring prohibited
	fishing prohibited
Author of update	Master
Source of update	Noes to Mariners 23/24216 24.07.2024

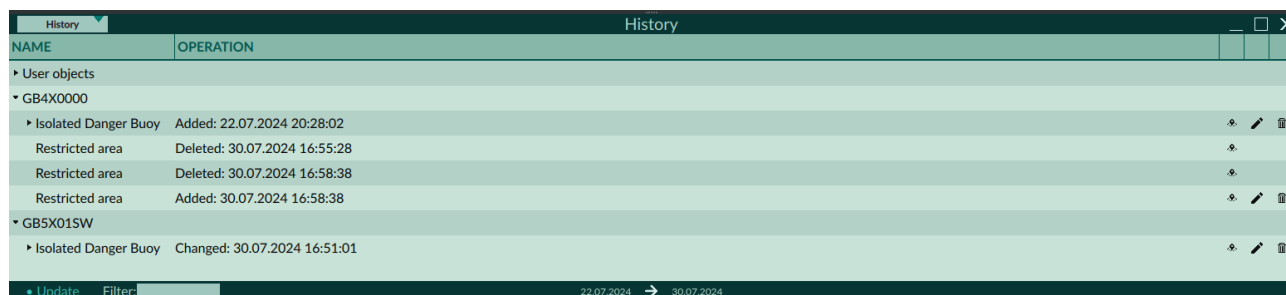
Buttons: Show on ENC, Slaves, Cancel, Save

Save Changes: Click **Save** to apply the updates.



8.3 History of changes

Open History: Click **History** to view past updates.



NAME	OPERATION			
User objects				
GB4X0000				
Isolated Danger Buoy	Added: 22.07.2024 20:28:02			
Restricted area	Deleted: 30.07.2024 16:55:28			
Restricted area	Deleted: 30.07.2024 16:58:38			
Restricted area	Added: 30.07.2024 16:58:38			
GB5X01SW				
Isolated Danger Buoy	Changed: 30.07.2024 16:51:01			

• Update Filter: 22.07.2024 → 30.07.2024

View Updates: The list displays cells where manual corrections have been applied;

Edit or Delete: Any manual update object in the list can be edited or removed;

Filter Updates: Use the **Filter** option for easier searching;

Select by Date: Use the calendar to filter updates by their application date;

Date Range: Cells updated within the selected date range will remain in the table.

9. Mariner's Objects

Navigation:



• NOTE

Mariner's Objects are user-defined chart objects that are not linked to ENC cells.

Mariner's Objects are user-created chart elements in ECDIS that allow navigators to add custom information to enhance navigation and situational awareness. These objects are not part of official ENC data and serve the following purposes:

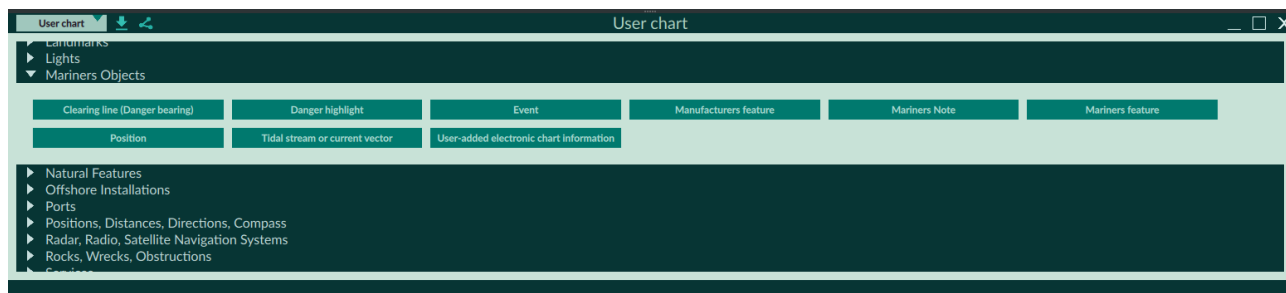
- Highlighting discrepancies between ENC data and real-world observations.
- Adding temporary marks, notes, or custom objects for operational convenience.
- Representing information from external sources like NAVTEX messages or Notices to Mariners not included in ENC updates.
- Customizing the chart to meet specific operational needs.

Mariner's Objects are stored in a separate layer, independent of ENC cells, and can be turned on or off in the chart display

• NOTE

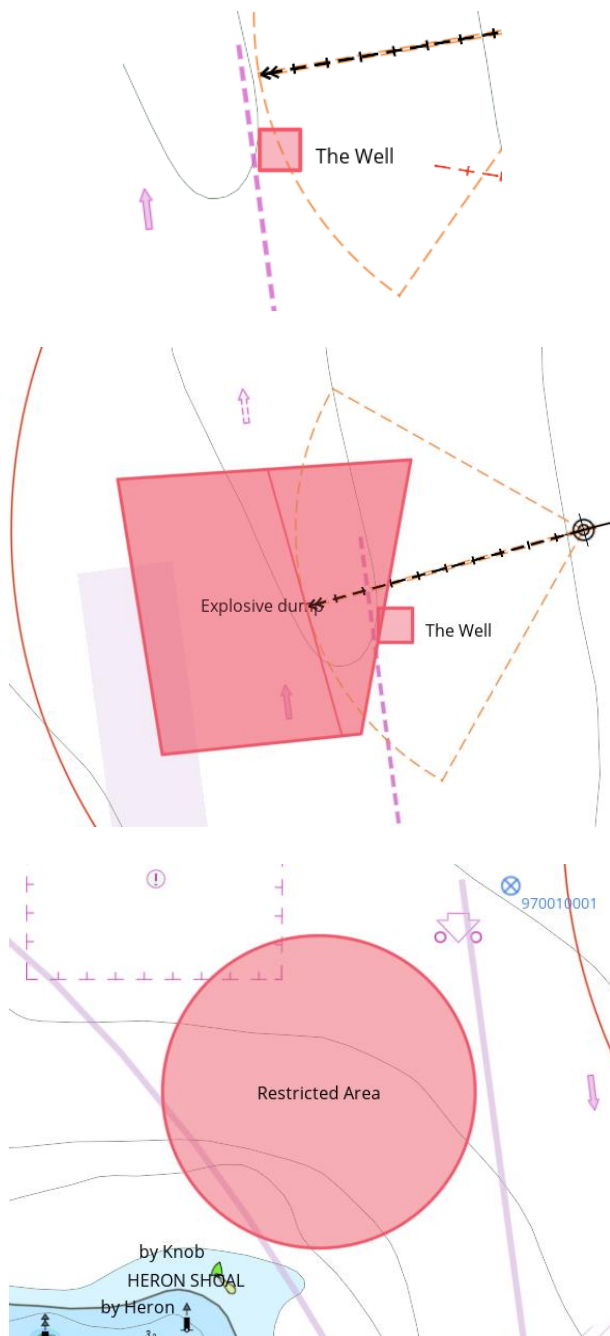
To display **Mariner's Objects** on the chart, enable the **Manual Updates Layer** in **Quick Settings** (see section 4.12)

ECDIS includes an extended list of Mariner's Objects, and the navigator can add additional chart objects to the User Chart. These objects are not part of the ENC cell but are considered part of the User Chart



9.1.2 Danger Highlight

Geometry: point, area, circle.



9.1.3 Event

Geometry: Point.

Don't cross ☒

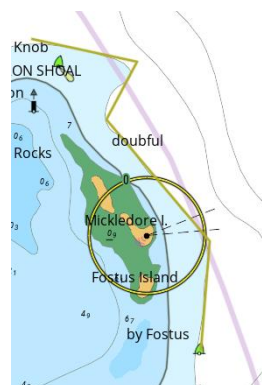
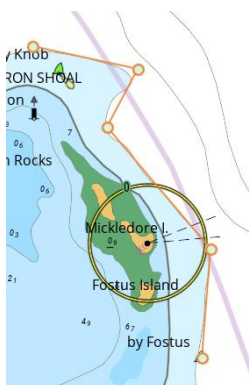
Attribute	Value
Source of update	capt. Phillips
Author of update	Master
Alert priority	emergency Alarm
Local time	2024.07.30
Users remark	Don't cross

N° | LAT/LON
 1 32°26.911' S
 061°00.899' E

9.1.4 Manufacturer's Feature

Objects created by the software developer.

Geometry : Point, line, area, circle



Attribute	Value
Category of mariners note	information
Source of update	capt. Phillips
Author of update	Master
Alert priority	undefined
Object name	strange contour
Users remark	doubful

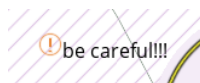
N° | LAT/LON
 1 32°29.375' S
 061°03.078' E
 2 32°29.517' S
 061°03.851' E
 3 32°29.877' S
 061°03.626' E
 4 32°30.637' S
 061°04.386' E
 5 32°31.313' S
 061°04.322' E

Show on ENC
Slaves Cancel Save



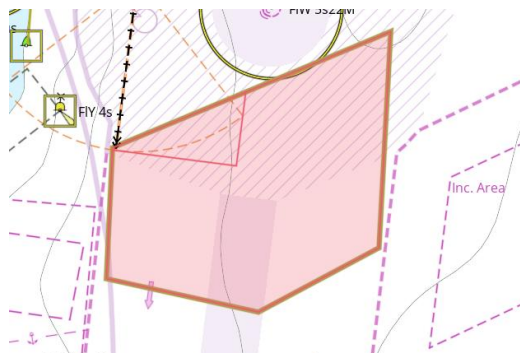
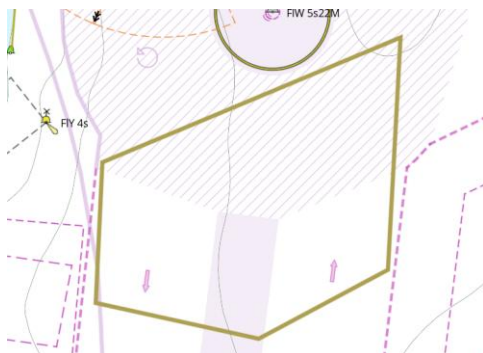
9.1.5 Mariner's Note

Geometry: Point.



9.1.6 Mariner's Feature

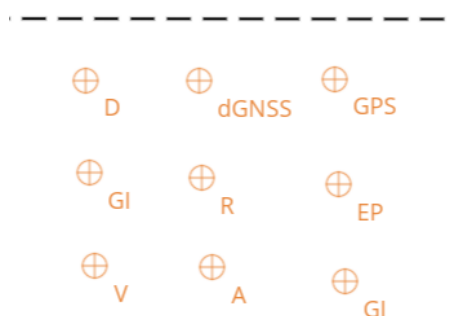
Geometry: Point, line, area, circle.



9.1.7 Position

Geometry: Point.

Decca
Differential Global Navigation Satellite
GPS
Global Navigation Satellite System
Glomass
Hi-Fix
Loran/Tchaika
MFDF
Microwave
Omega
RADAR
Radar transponder
Syledis
Transit/Tsikada
User defined
Visual/RADAR
astronomical
dDecca
dGPS
dGlomass
dLoran
dOmega
dead reckoning
estimated
visual
Decca



9.1.8 Tidal Stream or Current Vector

Geometry: Point.



9.1.9 User-Added Electronic Chart Information

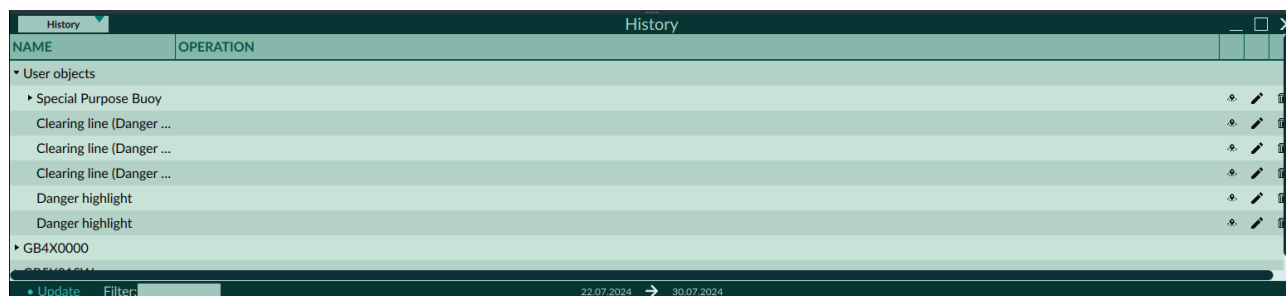
Geometry: Point, line, area, circle.



9.2 Creating User Object

1. **Select Object Type:** Choose the type of user object you want to create.
2. **Select Geometry:** Choose the object's geometry (e.g., point, line, area, circle).
3. **Fill Attributes:** Complete additional attributes for the object.
4. **Parent-Child Properties:** If the object includes successors, fill in their properties.
5. **Author and Source:** It is recommended to fill in the **Author** and **Source** fields.
6. **Chart the Object:** Place the object on the chart.
7. **Adjust Coordinates:** Manually correct the object's coordinates or node points, if necessary.
8. **Save Changes:** Save the object to apply all updates.

User objects are stored in the User Chart layer.



9.3 User Chart Import

Navigate to:



User Chart import is only possible for charts created on a similar ECDIS.

During import, the current ECDIS User Chart is merged with the imported User Chart.

NOTE

ECDIS does not check for matching or duplicate user objects during the import process.

9.4 User Chart Export

Navigate to:



Exporting a User Chart is only possible for charts created on a similar **ECDIS**.

9.5 Markers

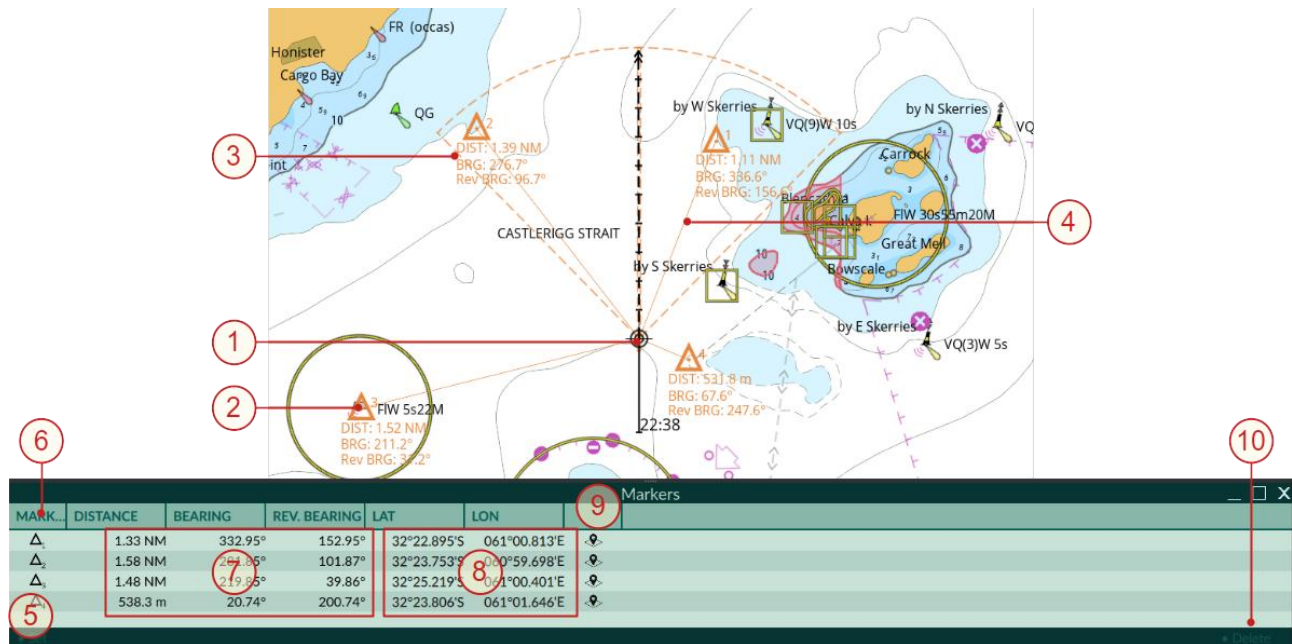
Markers can be placed anywhere at the navigator's discretion. Each marker is connected to the ship's position with a line, and the following are calculated for each marker:

- Distance (DIST)
- Bearing (BRG)
- Reverse Bearing (Rev BRG)

All calculations are updated to account for the ship's movement.

The maximum number of markers is 4.

Navigation:



1	Ship's Symbol: Represents the current position of the ship
2	Marker: Indicates a user-defined position on the chart.
3	Distance, Bearing, and Reverse Bearing Values: Displayed for each marker relative to the ship's position.
4	Bearing Line: Connects the marker to the ship's symbol
5	Set Marker: Adds a marker to the chart and the list. The marker's coordinates default to the center of the chart window.
6	Marker Symbol: Displayed in the table alongside each marker
7	Distance, Bearing, and Rev Bearing Values: Automatically calculated and displayed in the table. These values are not editable.
8	Marker Coordinates: Editable Latitude and Longitude fields for precise positioning
9	Recenter Chart: Aligns the chart center with the selected marker's coordinates.
10	Delete Marker: Removes the selected marker.

9.5.1 Setting Markers

Manual:

Click Set to add a marker.

Adjust its coordinates in the Latitude/Longitude field.

Press Enter to confirm.

Using a Mouse:

Click the left mouse button at the desired location on the chart.

Coordinates can be adjusted as described above.

Using a Touch Screen:

Tap on the desired location on the chart.

Coordinates can be adjusted as described above.

9.5.2 Marker Management

Saving Changes: After saving and closing the Markers window, the markers will remain on the chart with their positions fixed.

Moving Markers:

Open the Markers window.

Click and hold the left mouse button (or touch and hold with your finger) on a marker.

Drag it to the new location.

Deleting Markers:

Open the Markers window.

Select the marker to delete and click **Delete**.

9.6 Event

Action:



Ctrl

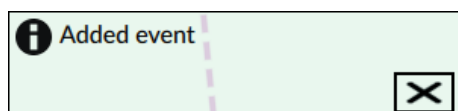
J

Event marks let the navigator add important markers on the chart.

Event marks are shown on a separate chart layer. To display this layer, enable it in the **Chart Objects** or **Quick Settings** sections.



Adding an operational mark triggers a message in the notification area.

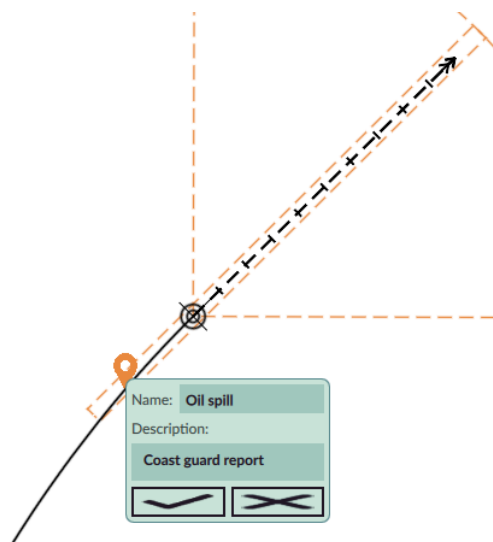


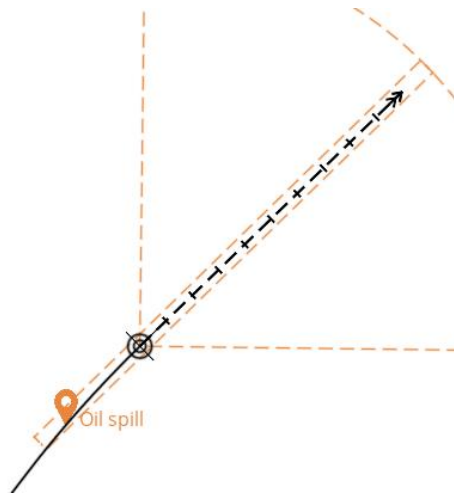
When an event is created, a **screenshot** of the current screen is automatically generated and linked to the mark.

Each event **is recorded in the Logbook** as a standard event entry (see section 16.5)

All events created by the navigator will appear along the **ship's trajectory**.

The navigator can name the event and add a description. To edit, select the event on the chart by clicking (or tapping) it.





To edit the name or description of an event, reopen the dialog box or make changes in the Logbook.

NOTE

Events cannot be deleted from the Logbook.

The **Events** chart displays only events created during the current ECDIS session. Events from previous sessions are available through the Logbook by selecting the appropriate date range. Symbols for events displayed via the Logbook will appear in red.

9.7 Go to

Navigation



Go to
X

Latitude:
☒ XXX°XX.XXX'
☐ XXX.XXXXX°

30°00.000' N

Longitude:
☐ XXX°XX'XX.XX"
☒ XXX°XX'XX.XX"

060°00.000' E

Go

Go to
X

Latitude:
☐ XXX°XX.XXX'
☒ XXX.XXXXX°

30°00'00.00" N

Longitude:
☒ XXX°XX'XX.XX"
☐ XXX°XX'XX.XX"

060°00'00.00" E

Go

Go to
X

Latitude:
☐ XXX°XX.XXX'
☒ XXX.XXXXX°

30.00000° N

Longitude:
☐ XXX°XX'XX.XX"
☒ XXX°XX'XX.XX"

060.00000° E

Go

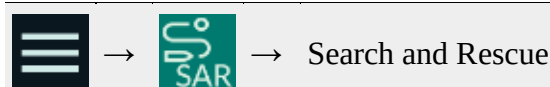
To center the chart using coordinates:

Choose one of the three coordinate input formats by selecting a radio button. Previously entered coordinates will be recalculated.

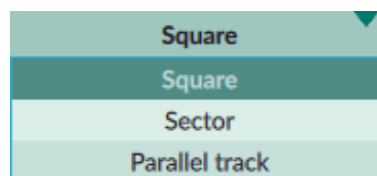
Enter the coordinates and press Go. The chart will center on the specified location.

9.8 SAR (Search and Rescue)

Navigate to:

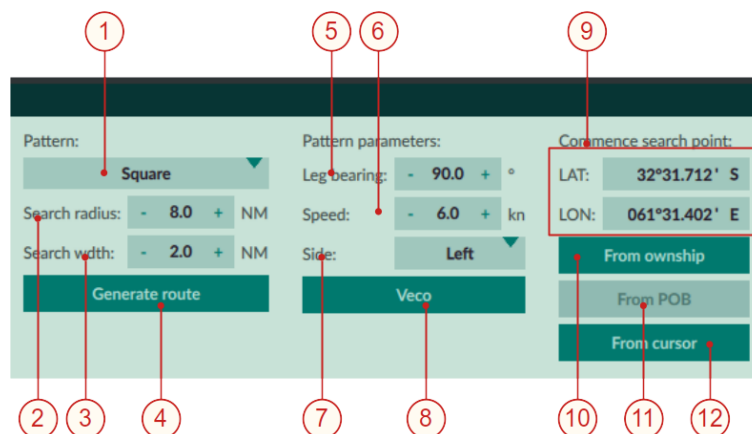


The SAR feature enables route planning for Search and Rescue operations. Routes can be calculated using three standard patterns: **Square**, **Sector**, and **Parallel Track**.



9.8.1 Square Search Pattern

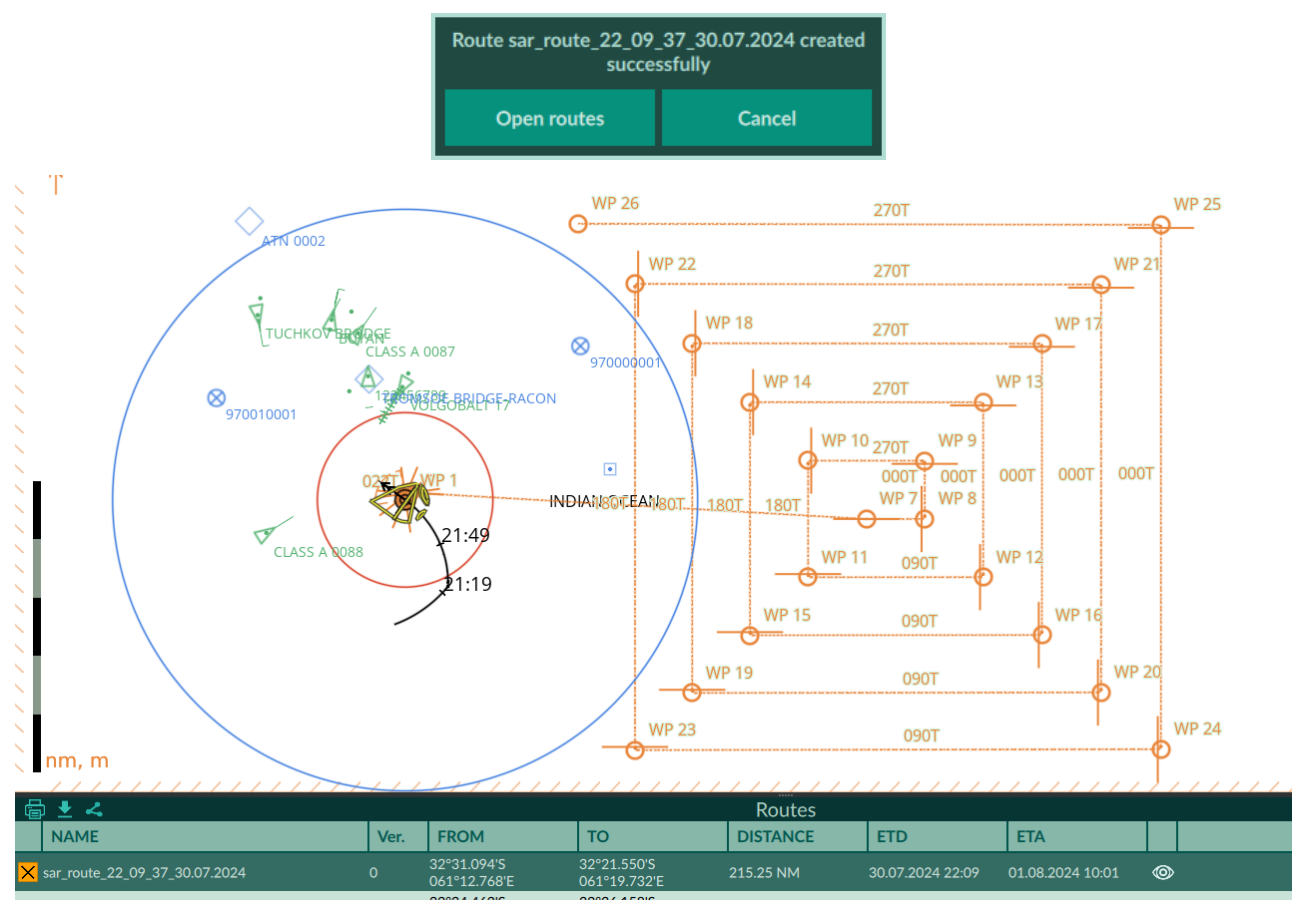
ECDIS calculates and constructs a SAR route based on the **Square** pattern using the following parameters.



1	Pattern: The standard search route template.
2	Search Radius: The area radius around which the search route is built
3	Search Width: The width of the search lane, determined by the ship's speed

4	Generate Route: Builds a search route based on the specified criteria and saves it in the route list.
5	Leg Bearing: Direction of the first leg of the search route.
6	Speed: Defines the search speed, which determines the search lane width.
7	Side: Selects the side (port or starboard) for turns.
8	V _{eco} - Sets the speed to the vessel's economic speed.
9	Starting Point Coordinates: Specifies the starting point of the search route. Options include:
10	Current Ship Position: Uses the ship's current coordinates
11	Man Overboard (POB) Coordinates: Uses the location of a Person Overboard event. Active only when POB mode is enabled.
12	Cursor Coordinates: Uses the cursor's position as the starting point

Once the route is generated, navigate to the **Route Collection** to review, modify, and activate the search route



SAR Route Details

The route includes:

A segment from the ship's current position to the starting point of the search area.

The search route itself.

The route is constructed in compliance with IAMSAR Vol. III guidelines.

The navigator must select search lane width and speed using IAMSAR nomograms to ensure optimal search performance.

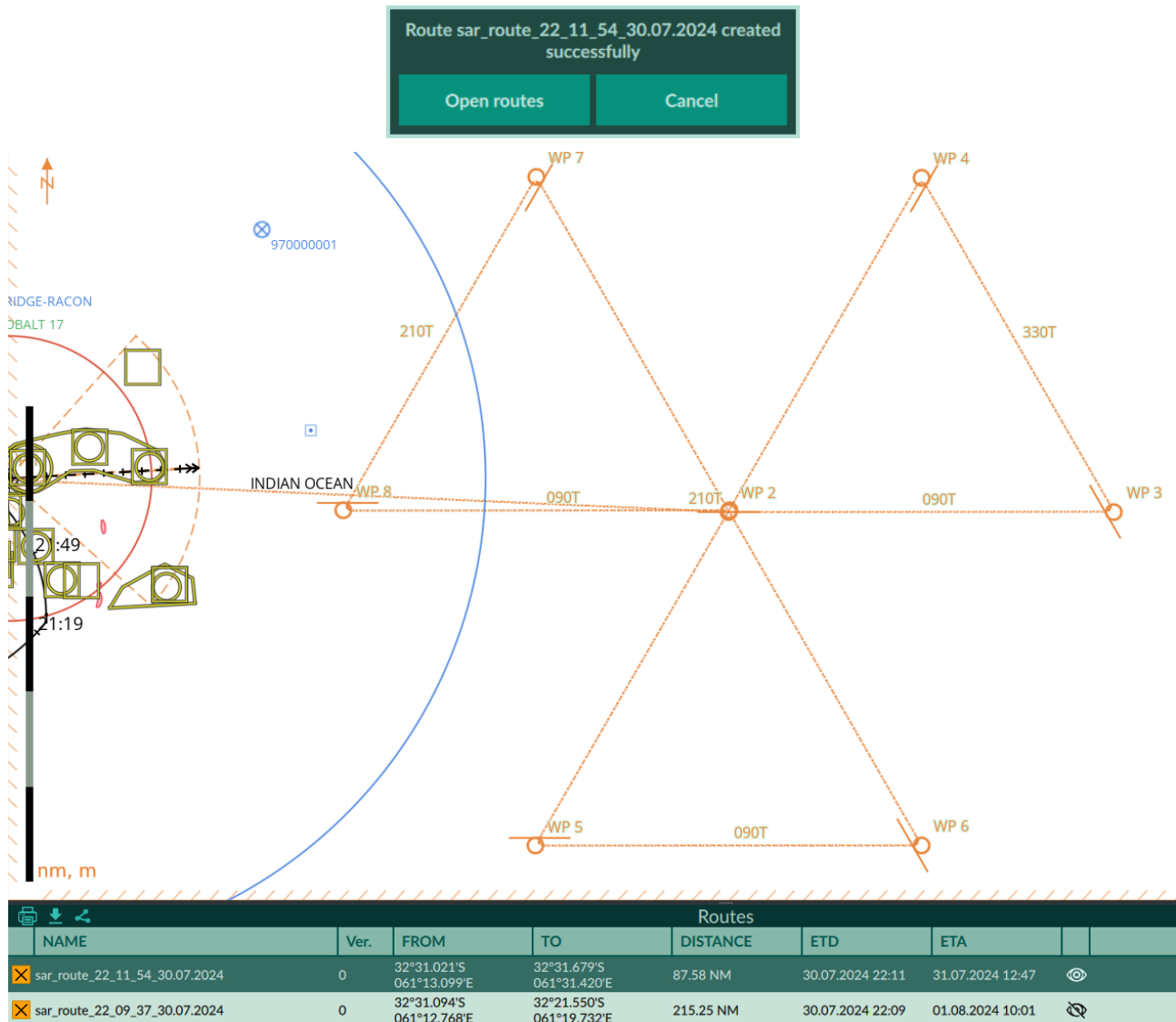
9.8.2 Sector Pattern

ECDIS can calculate and construct a SAR route based on the **Sector** search pattern using the specified criteria

1	Pattern: Standard template for calculating and constructing the search route
2	Search Radius: The radius of the search area.
3	Search Width: The width of the search lane, based on the vessel's speed.
4	Generate Route: Creates the search route using the provided parameters and saves it to the route list.
5	Leg Bearing: Direction of the first leg of the search route.
6	Speed: Defines the search speed, which determines the search lane width.
7	Side: Specifies the turning side (port or starboard).
8	V_{eco}) - Sets the search speed to the vessel's economic speed.
9	Starting Point Coordinates: Allows the navigator to set the starting point of the route. Options include:
10	Current Ship Position: Uses the ship's current location
11	Man Overboard (POB) Coordinates: Sets the POB event location as the starting point (active only when POB mode is enabled).

12 Cursor Coordinates: Uses the cursor's current position on the chart

After generating the search route, navigate to Go to the **Route Collection** to review, modify, and activate the route



SAR Route Details

The route consists of:

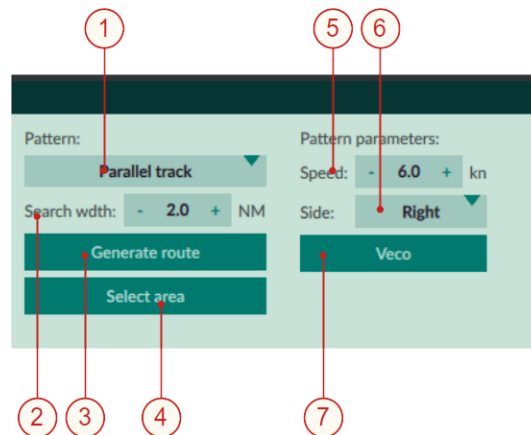
- A segment from the vessel's current position to the search route's starting point.
- The search route itself.

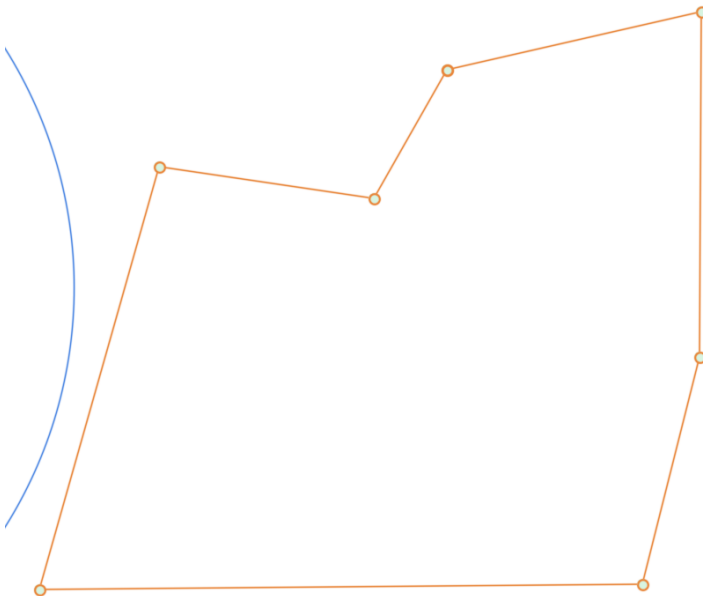
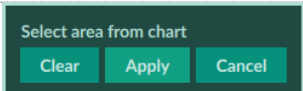
The route complies with the guidelines in IAMSAR Vol. III.

Navigators must use IAMSAR nomograms to determine the optimal search lane width and speed for effective search performance

9.8.3 Parallel Tracks Pattern

ECDIS can calculate and plot a SAR route using the **Parallel Tracks** search pattern based on the specified criteria.

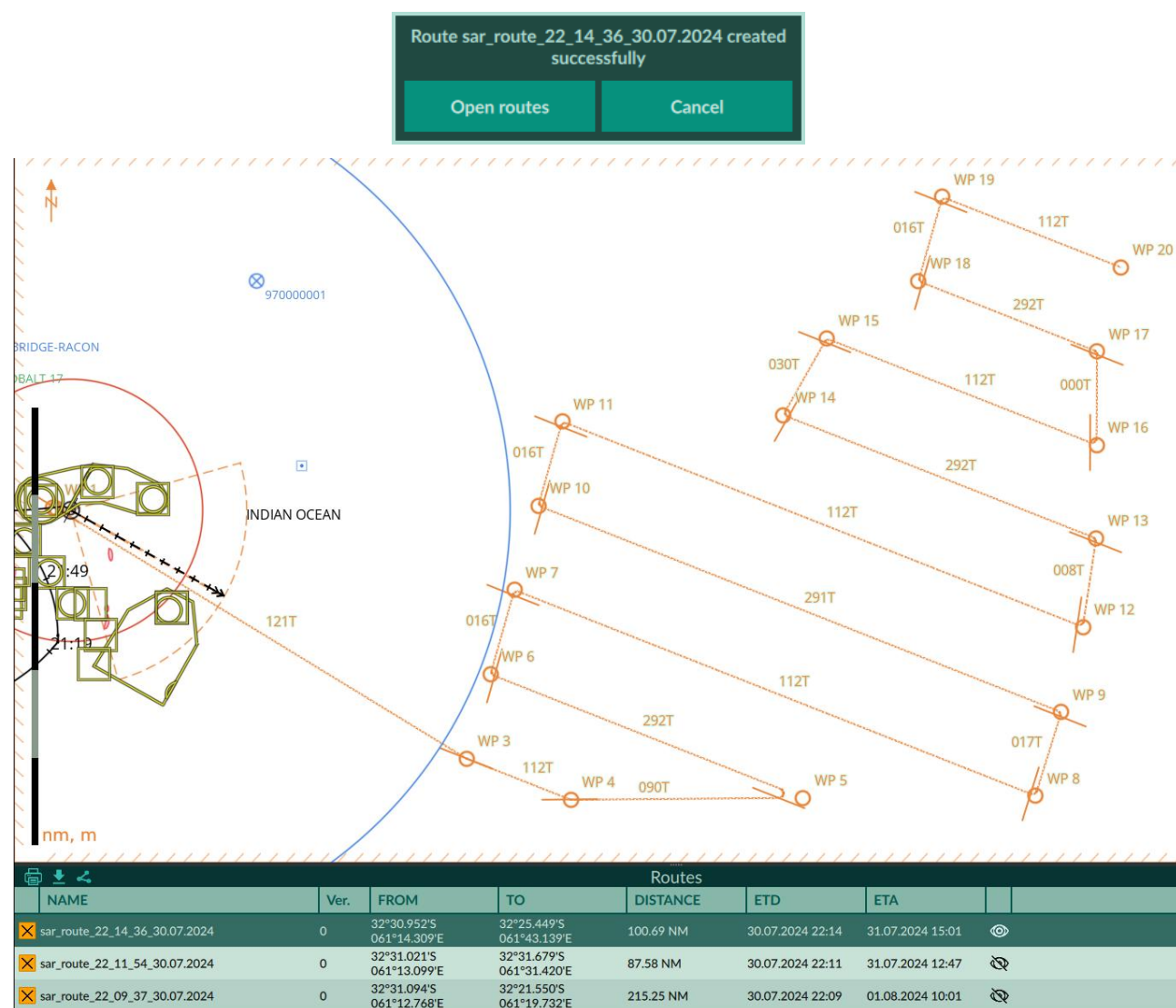


1	Pattern: A standard template for constructing the search route
2	Search Width: The width of the search strip, determined by the vessel's speed
3	Generate Route: Creates the search route based on the criteria and saves it to the routes list
4	Select Area: Defines the search area by drawing boundaries on the chart with the cursor
	
 Clear: Deletes the previously built search area from the chart Apply: Confirms the search area for calculations	

	Cancel: Exits the search area building function.
5	Speed: Defines the search speed, which determines the search lane width.
6	Side: Specifies the turning side (port or starboard).
7	V_{eco} - Sets the search speed to the vessel's economic speed.

The route starts from the vessel's current position. The entry point is the closest point of the search area to the vessel. The search route is generated within the defined area, considering the specified search lane width.

After building the route, Navigate to the **Route Collection** to review, modify, and activate the search route.



SAR Route Details

The route consists of:

- A segment from the vessel's current position to the search route's entry point.
- The search route itself.

The route complies with guidelines in IAMSAR Vol. III.

Navigators should refer to IAMSAR nomograms to determine the optimal search lane width and speed for effective performance.

9.9 Geodesic calculator

The Geodesic Calculator is used to solve direct (DGP) and inverse (IGP) geodetic problems.

Navigate to:

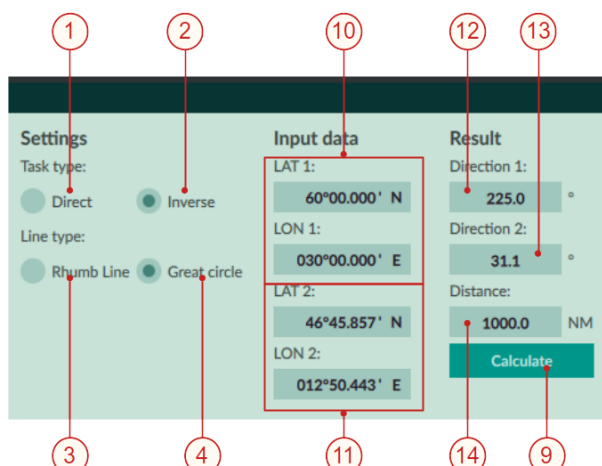
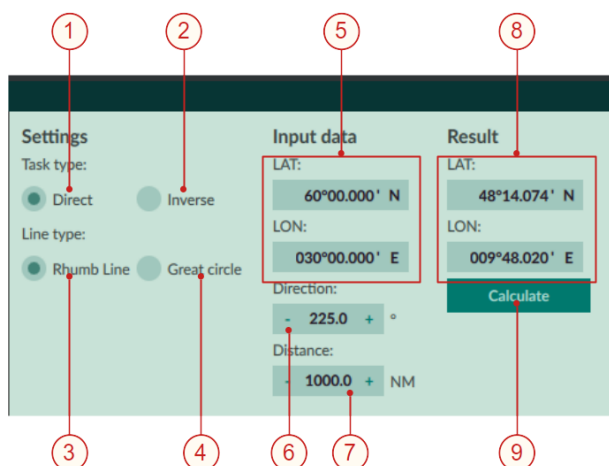


The calculator can solve problems:

- **On the Plane (Loxodromy/Rhumb Line):** Calculations are based on constant bearing.
- **On the Sphere (Orthodromy/Great Circle):** Calculations follow the shortest path on a sphere.

How to Use the Geodesic Calculator:

1. Select the **Task Type**;
2. Select the **Line Type**;
3. Enter the required data;
4. Press **Calculate** to perform the computation.



Settings
Task type:
☒ Direct ☐ Inverse
Line type:
☐ Rhumb Line ☒ Great circle

Input data
LAT: 60°00.000' N
LON: 030°00.000' E
Direction: - 225.0 °
Distance: - 1000.0 NM

Result
LAT: 46°45.857' N
LON: 012°50.443' E

Settings
Task type:
☐ Direct ☒ Inverse
Line type:
☒ Rhumb Line ☐ Great circle

Input data
LAT 1: 60°00.000' N
LON 1: 030°00.000' E
LAT 2: 46°45.857' N
LON 2: 012°50.443' E

Result
Direction 1: 217.5 °
Direction 2: 37.5 °
Distance: 1002.4 NM

1	Direct Geodetic Problem (Direct): Solve a problem to determine the endpoint's coordinates based on a starting point, direction, and distance
2	Inverse Geodetic Problem (Inverse): Solve a problem to calculate the direction and distance between two known points
3	Loxodromy (Rhumb Line): Solve the problem on a constant bearing (plane navigation)
4	Orthodromy (Great Circle): Solve the problem using the shortest path on a sphere
5	Starting Point Coordinates: The initial point from which calculations are made
6	Direction: The bearing or azimuth from the starting point.
7	Distance: The distance from the starting point
8	Result: The calculated coordinates of the endpoint
9	Calculate -
10	Point #1 Coordinates: Enter or view the coordinates of the first point
11	Point #2 Coordinates: Enter or view the coordinates of the second point.
12	Direction (Point #1 → Point #2): The calculated bearing from Point #1 to Point #2.
13	Reverse Direction (Point #2 → Point #1): The calculated bearing from Point #2 to Point #1
14	Distance: The calculated distance between Point #1 and Point #2.

After the calculation is completed, the input data remains available for further use.

9.10 Manual Position Fix (Manual observations)

Navigation:



Manual observation allows position correction using visual or radar methods.

9.10.1 Available Position Fix Methods:

Position by Bearings: Using 2 or 3 bearings.

Position by Courses: Using 2 or 3 courses.

Position by Bearing and Distance: Using a single landmark.

• NOTE

When measuring navigational parameters, prioritize parameters that change slowly.

For bearings:

- Measure landmarks near the fore or aft course angles first, then those near the traverse.

For distances:

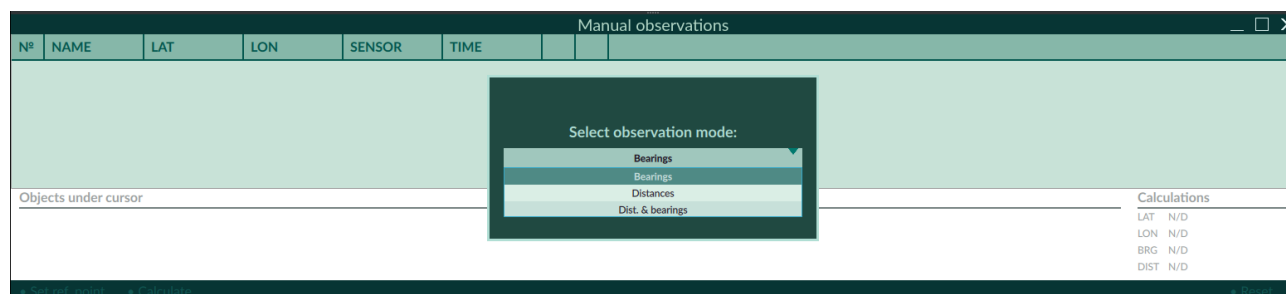
- Measure landmarks near the traverse first, then those near the fore or aft course angles

9.10.2 Steps for Manual Position Fix

1. Select Observation Type

Choose from the dropdown: Bearings, Distances, or Bearing and Distance.

The number of Lines of Position (LoP) corresponds to the number of measurements taken



2. Set Reference Point

Click **Set Ref. Point**, then select a landmark on the chart

The **Objects under Cursor** table will display chart objects at the cursor position, including the cursor itself as a landmark.

Objects under cursor			
Cursor		32°22.648'S	061°01.811'E
Landmark		32°22.697'S	061°01.823'E
		32°22.610'S	

3. Select Landmark

From the list of objects  in the **Objects under Cursor** table, select an object and click **Add**

The selected object will be added to the **Landmark Table**

Manual observations									
Nº	NAME	LAT	LON	SENSOR	TIME	DIST (NM)			
1	Isl Blencathra	32°22.772' S	061°01.546' E	STB	20:04:30 01/08/2024	- 1.70 +			
2	cap Lingmell	32°25.062' S	060°58.729' E	STB	20:04:58 01/08/2024	- 2.60 +			
3	cap Honister	32°23.742' S	060°58.838' E	STB	20:05:24 01/08/2024	- 1.30 +			

Manual observations									
Nº	NAME	LAT	LON	SENSOR	TIME	BEARING (°)			
1	Landmark	32°24.572' S	060°58.750' E	STB	19:55:49 01/08/2024	183.9			
2	Landmark	32°20.237' S	060°55.555' E	STB	19:56:25 01/08/2024	288.8			
3	Landmark	32°22.238' S	060°56.141' E	STB	19:56:53 01/08/2024	248.5			

1	Landmark Name (Manual Entry). Some ENC landmarks may lack a name or represent unnamed features (e.g., a conspicuous stretch of coastline)
2	Landmark Name (Automatic). If several objects or a composite object are under the cursor, the navigator must manually select the correct object
3	Measurement Sensor. Identifies the sensor used for measurements (e.g., starboard/port optical direction finder or radar station). The selected sensor is considered when calculating the vessel's position, taking the CCRP (Common Reference Point) into account.
4	Measurement Time. All navigation parameter measurements are time-referenced to the last recorded measurement
5	Navigation parameter. Displays the specific parameter measured (e.g., bearing, distance)
6	Delete position line. The navigator can delete a navigation parameter line as needed. Deletion is only possible until the task is solved.
7	Positioning on the landmark. Indicates the landmark used for positioning
8	Master Mode (Black Text). In Master mode (see section20), ECDIS allows the observed location to be accepted for position fix.
9	BackUp Mode (Grey Text). In BackUp mode (see section21), manual location detection is available, but observed positions cannot be used for position fix.

Calculating Position Fix

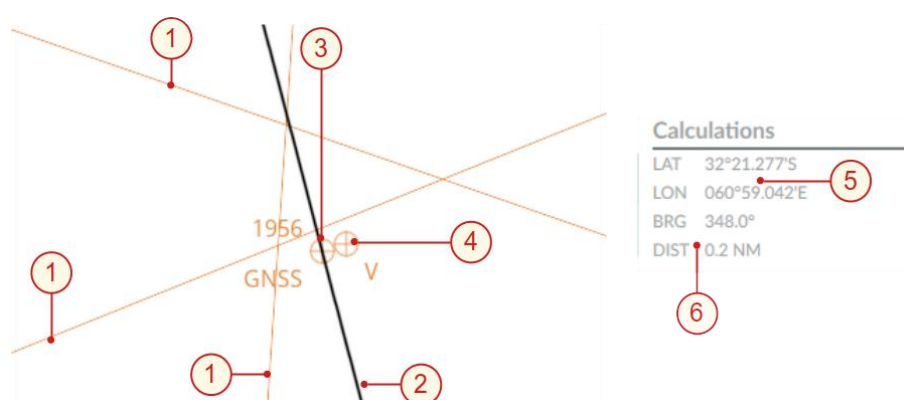
Calculate: Press **Calculate** to determine calculated (observed) position value.

Recording Results.

Observation results, including measured navigation parameters, landmark coordinates, names, and ENC numbers, are automatically recorded in the **Navigation Log**, regardless of whether the observation is accepted for calculation.

Display Results.

The observation (calculated position) is displayed on the chart, and the results appear in the **Results Window**, showing the observed coordinates and any discrepancies



1	Lines of Position: Lines representing measurements used to determine the vessel's position.
2	Ship's Track Line: The line showing the vessel's course over ground.
3	Ship's Position (Primary Correction): Vessel's position based on the primary correction method, with the time of the last manual observation indicated.
4	Position from Manual Observation: Position calculated from manual observation results, including the method used.
5	Coordinates of the Observerd Location: The determined coordinates of the observed site
6	Discrepancy: The difference between the position based on the primary correction method and the observerd location.

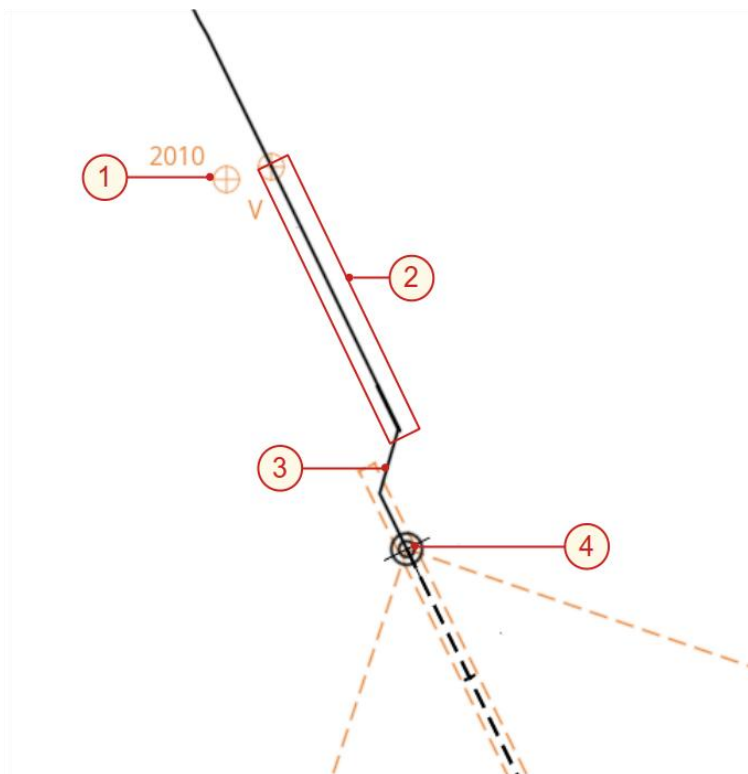
Accept the Observed Position for Position Fix - click Apply.

Confirm the selection in the dialogue box.

Accept as DR origin?
 LAT: 32°23.039'S; LON: 060°59.799'E

Apply
 Cancel

The ship's position will be updated to the new coordinates. ECDIS will switch DR mode (see section 9.11.1).



1	Manual Observation: The manual observation used for updating the ship's position.
2	Track Segment: The path the ship traveled before the observation was accepted for calculation.
3	Position Adjustment: The ship's position is updated to align with the track calculated from the observed position.
4	Current Calculated Position: The ship's present position based on the updated calculation

9.10.3 Viewing the Navigation Log



Manual observations		Observations log												
Time	λ	LAT	LON	GNSS mode	HDOP	COG (°)	SOG (kn)	STW (kn)	HDG (°)	ENC	LAT obs.	LON obs.	Misclosure	Status
01/08/2024														
20:10:15	+03:00	32°23.029'S	060°59.836'E	Differential	N/D	153.5	6.0	6.0	153.5	N/D	32°23.039'S	60°59.799'N	253.0 - 253 m	Accepted
20:05:24	+03:00	32°22.622'S	060°59.595'E	Differential	N/D	153.5	6.0	6.0	153.5	N/D	32°22.598'S	60°59.583'N	337.2 - 337 m	Accepted
19:56:53	+03:00	32°21.279'S	060°59.032'E	Differential	N/D	165.1	6.0	6.0	165.1	N/D	32°21.277'S	60°59.042'N	72.8 - 73 m	Not accept...
19:52:20	+03:00	32°20.881'S	060°58.906'E	Differential	N/D	165.0	6.0	6.0	165.0	N/D	32°20.881'S	60°58.870'N	268.4 - 268 m	Not accept...

To view detailed information about an observation, double-click the desired record in the log.

Manual observations		Observations log					
Date	Sensor	Type	Distance (NM)	Bearing (°)	ENC	Ref. poin...	Ref. point L...
20:04:30 01/08/2...	STB	Distance	1.70	0.0		isl Blencat...	32°22.772'S 61°01.546'N
20:04:58 01/08/2...	STB	Distance	2.60	0.0		cap Lingmell	32°25.062'S 60°58.729'N
20:05:24 01/08/2...	STB	Distance	1.30	0.0		cap Honister	32°23.742'S 60°58.838'N

• NOTE

To ensure accurate calculation of observed coordinates and prevent navigation errors, a **Pelorus** sensor (see section [11.12](#)) and/or " and/or a **Radar** sensor (must be configured. (see section 22)

• TIP

If ECDIS cannot identify an object under the cursor, use the **Cursor Object** with refined coordinates and an assigned name.

9.10.4 Return to GNSS location correction

Navigation:



• NOTE

When determining ship coordinates astronomically, enter the observed coordinates in the **Manual Input and Correction** section. Alternatively, the position can be plotted using **Mariner's Objects**.

9.11 Dead reckoning

Navigation



The Dead Reckoning (DR) method calculates the ship's position continuously based on its course and speed.

ECDIS switches to DR mode in the following situations:

- Automatically when no data is received from the GNSS receiver.
- When a manual observation is accepted for calculation.

9.11.1 DR Mode Functionality

ECDIS enters DR mode, calculating the track without accounting for drift.

The estimation starts from the last valid position, and COG/SOG updates stop.

If speed (STW) and/or heading (HDG) sensors are available, coordinates are calculated using compass and log data.

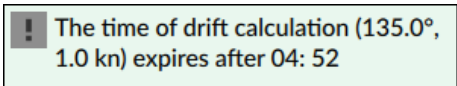
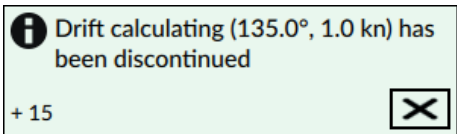
• NOTE

When navigating in dead reckoning mode, errors accumulate over time. To correct these errors, manual or alternative methods of position correction must be applied regularly.

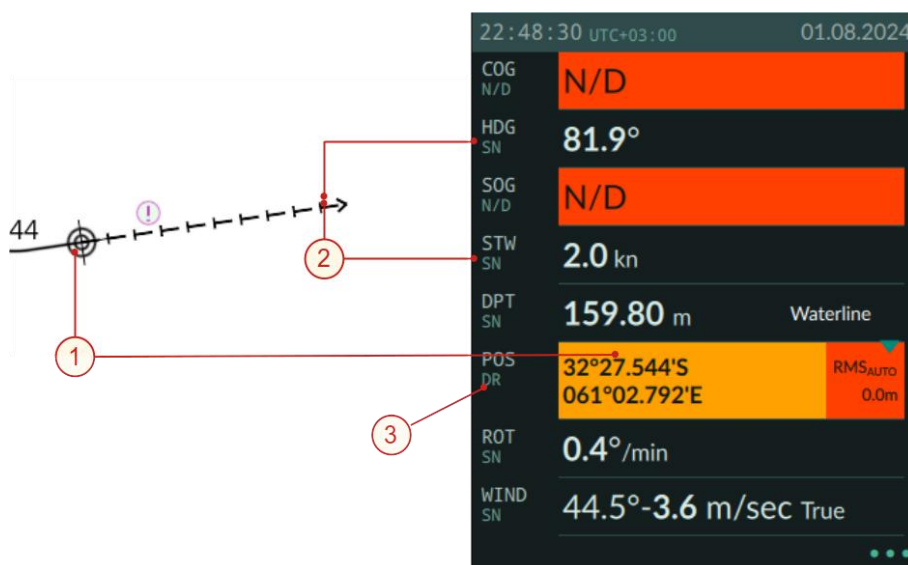
The screenshot shows the 'Dead reckoning:' interface with the following elements and callouts:

- 1**: LAT input field showing 32°27.456' S
- 2**: Apply button
- 3**: Manual Input toggle switch (checked)
- 4**: Manual observation button
- 5**: Course input field showing 81.8 °
- 6**: Course toggle switch (checked)
- 7**: STW input field showing 2.0 kn
- 8**: STW toggle switch (checked)
- 9**: LAT correction input field showing - 0.000 + °
- 10**: LON correction input field showing - 0.000 + °
- 11**: Course correction input field showing - 0.0 + °
- 12**: Speed correction input field showing - 0.0 + kn
- 13**: Drift speed input field showing 1.0 kn
- 14**: Drift direction input field showing 90.0 °
- 15**: Drift timer input field showing 1.0 h
- 16**: Drift accounting toggle switch (checked)

1	Estimated Coordinates: Displays calculated coordinates. When DR mode is off, these fields receive data from the primary position sensor. To shift the ship's position to manually entered coordinates (e.g., after astronomical fixes), press Apply (2)
2	Apply: Applies the coordinates entered in (1) Available only when DR mode is enabled (3)

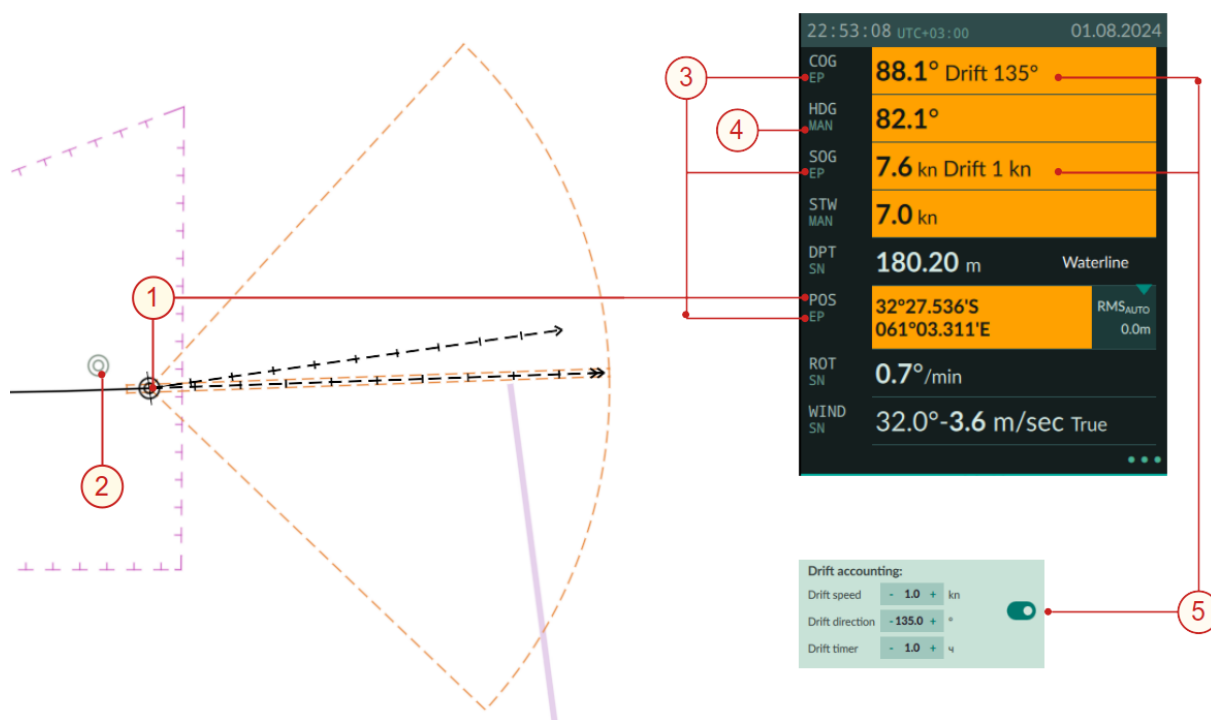
3	Forced activation of DR mode: Enables Dead Reckoning mode manually
4	Switch to Manual Observation: Opens the manual observation tool for position fix
5	Manual course entry. Enter course manually. When (6) is off, the field receives data from the heading sensor
6	Enable Manual Course Input. Activates manual course entry
7	Manual Speed Entry. Enter speed manually. When (8) is off, the field receives data from the speed sensor.
8	Enable Manual Speed Input: Activates manual speed entry relative to water
9	Latitude correction: Enter a correction value for latitude.
10	Longitude correction: Enter a correction value for longitude
11	Course correction: Enter a correction value for heading
12	Speed Correction: Enter a correction value for speed
13	Total drift Speed
14	Total drift direction. The direction of total drift is derived from the compass and displayed in ECDIS.
15	Total Drift Timer. The maximum drift accounting time is 3 hours. The timer starts when the drift selector (16) is activated or when drift parameters are updated. The ECDIS displays a countdown notification 5 minutes before the total drift count time expires:  Timer Expiry: ECDIS stops drift accounting and issues a notification. 
16	Drift Accounting Selector: Activates or deactivates total drift accounting

When the system switches to Dead Reckoning (DR) mode, the data source "DR" is displayed on the navigation panel, and the values are highlighted in yellow.



1	Estimated Vessel Position: Displays the ship's position without accounting for total drift. In DR Mode , the coordinate field is highlighted in orange
2	Ship's Speed Vector
3	DR Indicator: Indicates the system is in Dead Reckoning (DR) Mode without considering total drift.

When total drift accounting is enabled, ECDIS calculates the track vector and displays the track line relative to the ground.



1	Estimated Vessel Position (Including Total Drift): Displays the ship's position with total drift accounted for. In DR Mode , the coordinate field is highlighted in orange.
2	Position from an Alternative Coordinate Source For example, position derived from GNSS .
3	EP Indicator: EP Indicates that total drift calculation mode is active.
4	MAN Indicator: Indicates manual entry of course and speed values.
5	Total Drift Direction and Speed Indication: Displays the direction and speed of total drift on the navigation panel

9.12 DR/Manual Input

Navigation:



Dead reckoning:

LAT

32°32.565' S

LON

061°05.398' E

Manual observation

Apply

☒

Course

-

36.0

+

°

☒

STW

-

1.0

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This function allows the navigator to **manually** enter coordinates, heading, and speed for calculations. **ECDIS prioritizes the data entered by the navigator, ignoring input from navigation sensors** when manual data is used

Manually entered data is shown in yellow on the navigation display.

The data source is labeled as **MAN**

9.12.1 Coordinates Correction

The navigator can enter constant corrections for coordinates received from a continuous positioning system.

• NOTE

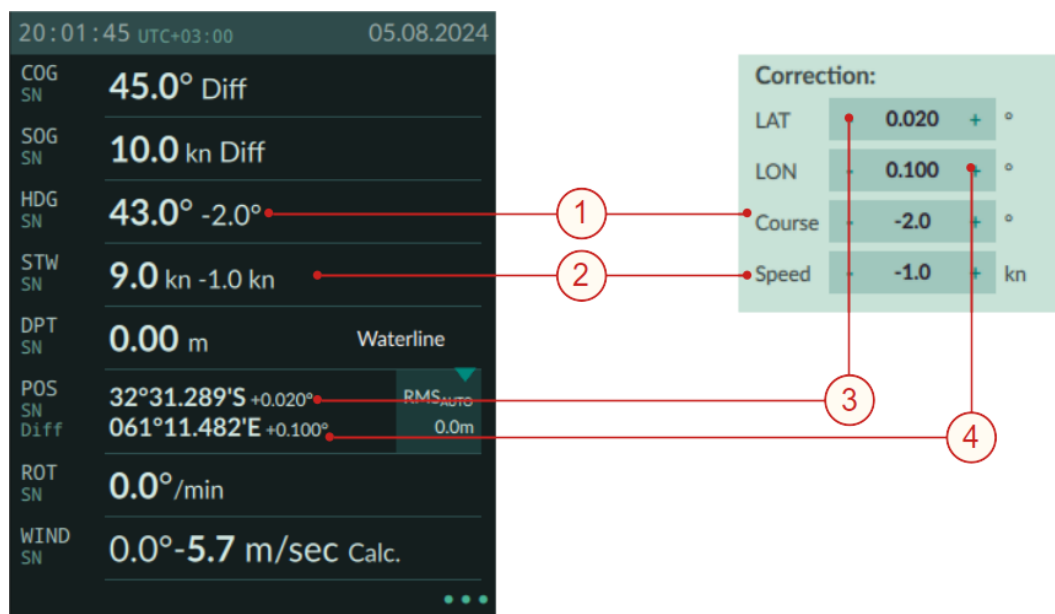
It is not recommended to apply permanent corrections to WGS-84 coordinates when using official ENC vector charts.

When to Use Corrections

Course Correction: The navigator should apply this correction if the course indicator has a systematic error.

Speed Correction: This correction is necessary if the speed sensor provides inaccurate data.

All corrections are automatically applied by ECDIS. The corrected values and their adjustments are displayed next to the parameter on the navigation panel.



1	Compass Correction: For adjusting the course.
2	Speed Sensor Correction: To fix speed inaccuracies.
3	Speed Sensor Correction: To fix speed inaccuracies.
4	Longitude Correction: To adjust longitude values.

9.13 Safety Depth, Safety Contour and Air draft

Automatic generation of an anti-grounding alarm or warning, and indication of charted objects dangerous for the ship within her Safety Zone are the major advantages of the ECDIS concept compared with the paper navigational charts.

The ECDIS Performance Standards require setting for Safety Depth and Safety Contour values. Manual setting of these parameters assumes implicit consideration by a mariner of the factors affecting the selection of the Safety Depth value and the selection of the Safety Contour from the depth contours

available on the chart in use.

NES 3000 ECDIS offers the setting of Safety Depth through the parameters that are always available in the Ship Particulars documentation and the automatic selection of Safety Contour as the deeper depth contour closest to Safety Depth available on the chart in use.

It is important to note that ECDIS will actually select one Safety Contour to be shown on the displayed chart and will use possibly different Safety Contour picked up from a Best (largest) scale chart for the purpose of generating anti-grounding alerts. NES 3000 ECDIS is prepared to effectively use High Resolution ENC and real-time Tide data that become available for particular shallow areas.

The picture below gives a graphical presentation of the factors affecting Safety Depth:

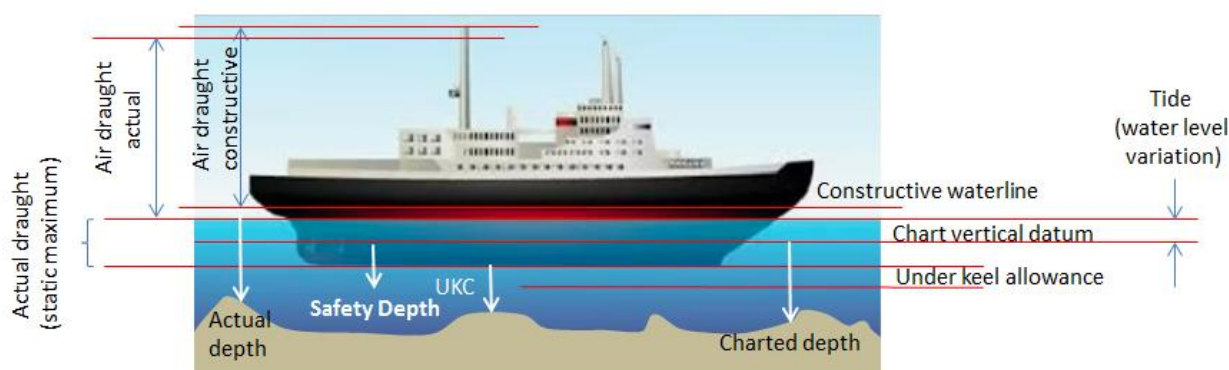


Fig. 2 Safety Depth definition

The user is expected to input the following parameters:

- draft of Constructive waterline: it is a fixed parameter for a particular ship that corresponds to the Dead Weight in sea water;
- Air draft constructive: it is a fixed parameter for particular ship, defining the distance from the constructive waterline to the highest point of the vessel;
- Actual draft (maximum, static): the maximum value of the draft (along of the hull) depends on the current loading of the ship;
- Under keel allowance (UKA): the estimated minimum under keel clearance (UKC) for a particular area. The procedure for calculating of UKA is normally defined in the Ship Operation Manual as the UKC Policy. It is assumed that UKA includes Moving allowance (Squat, Heel), Water density correction, Wind-induced Recession, Sea state, uncertainties of chart data (see IHO S-67), draft measurement, tide estimation, etc;
- Height of Tide: predicted or reported height of tide for a period of time (tide window). The tide value should be POSITIVE if the resulted water level is ABOVE the depth datum and NEGATIVE if the resulted water level becomes BELOW the depth datum;
- Tide correction duration: period of time during which the ECDIS will keep accounting for the tide correction in the Safety Depth calculation. When this time expires, the ECDIS will ask for an update of the tide correction or zero it.

Once the input is completed, the NES 3000 ECDIS will calculate the Safety Depth and the actual Air draft as follows:

$$\text{Safety Depth} = AD + UKA - HT,$$

$$\text{Actual Air draft} = CAD + HT + AD - CD,$$

Where:

- AD - Actual draft,
- UKA – Under Keel Allowance,
- HT - Height of Tide,
- CAD - Air draft from constructive waterline,
- CD – draft of ship from constructive waterline.

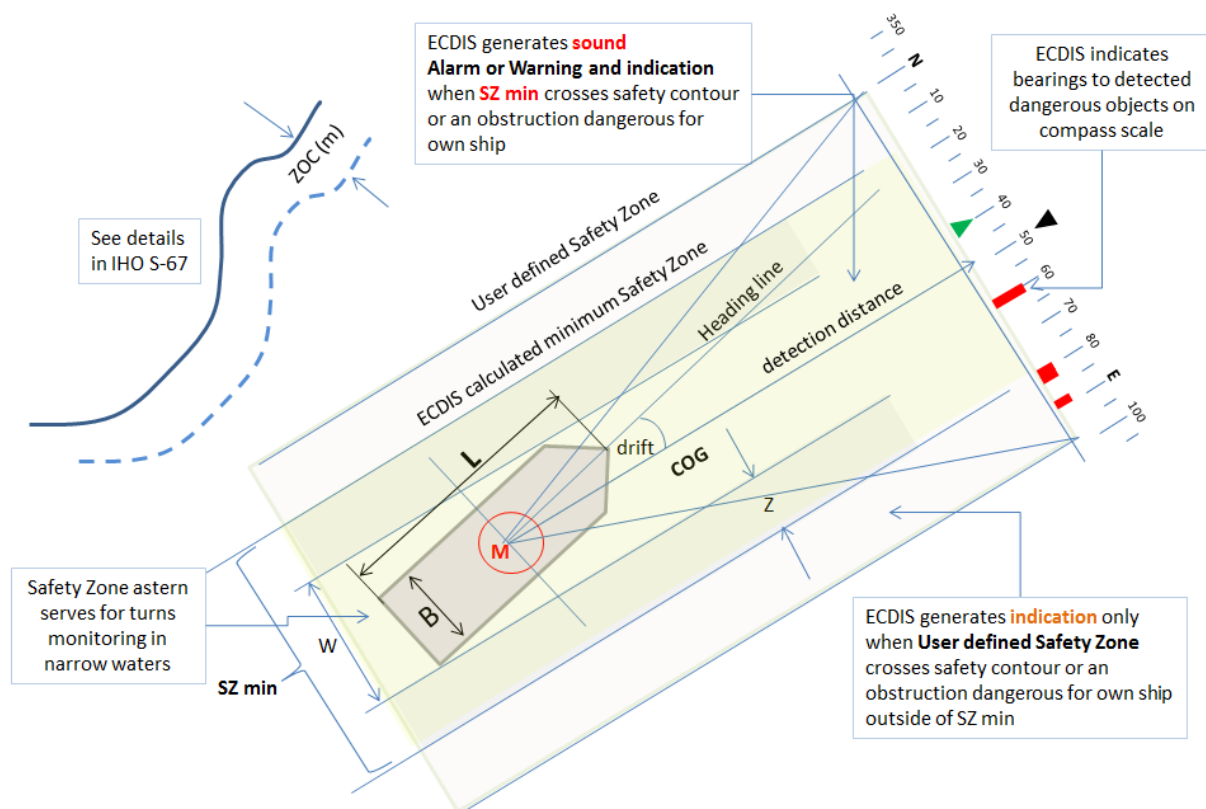
NOTE that the **Safety Depth is referenced to the charted depth datum** and intended only for indication of ENC's spot soundings or submerged objects with encoded depth equal to or above the Safety Depth. The Safety Depth parameter should never be used in conjunction with the measured depth.

The **Actual Air Draft is referenced to the water lever, taking into account the current draft** and the tide correction. It is used by ECDIS to check if the vertical clearance of the bridges and other constructions allows the ship to pass through with the current draft and tide.

9.14 Safety Zone

A Safety Zone defined by the user as the distance to obstructions from CCRP (the conning position) of their own ship or the distance to obstructions from the planned route during route planning. The ECDIS constantly checks the chart data and mariner's objects within the Safety Zone and generates alerts/ indications of various types if it discovers a dangerous object or an area for which special conditions exist.

NES 3000 ECDIS automatically calculates the width of the minimum Safety Zone (SZmin) as a lane occupied by the ship, taking into account her dimensions, speed, drift, accuracy of position, and the horizontal uncertainty of bottom relief as encoded in ENC by the attribute CATZOC of the Meta object M_QUAL (see the IHO S-67 Guideline).



Geometric representation of minimum limit of the Safety Zone

The minimum limit of the Safety Zone shown as SZ min on Fig. 3 is calculated as following:

$$\begin{aligned} \text{SZ min} &= W + Z, \\ W &= L \cdot \sin \alpha + B \cdot \cos \alpha + t_s \cdot \sin \beta \cdot V, \\ Z &= \sqrt{M^2 + \text{ZOC}^2}, \end{aligned}$$

where:

- L – length of ship, m
- B – width of ship, m
- α – drift,
- $t_s \cdot \sin \beta$ – correction for yawing of the ship, for this application the value “3s” used as a constant,
- V – speed over ground, m/c
- M – error of position with 95% probability, m. The “ M ” is calculated using the error ellipse axis if GNSS receiver provides it together with GNS sentence, or it can be set by the user manually.
- ZOC – the error value that corresponds to attribute CATZOC (Zone of confidence) of the Meta object M_QUAL normally encoded in ENC. The NES 3000 ECDIS takes ZOC value in meters from the table given in the IHO S-67 Guidelines, or the user can set it manually.

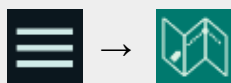
The actual width of the Safety Zone defined by the user should exceed SZ min. NES 3000 ECDIS also offers the navigator the settings of a “viewing sector” directed along the COG vector, and “detection

distances” forward and astern. These parameters define the dimensions of the Safety Zone within which the ECDIS will provide continuous “Look ahead” monitoring of the Safety Contour and the charted objects with a depth equal to or less than the Safety Depth as well as the areas for which special conditions exist. Found objects will be highlighted on the chart. The bearings to obstructions and Safety Contour parts will be indicated on the compass scale indicator. The sound alarm or warning will be generated only if Safety Contour or dangerous objects cross the lane of SZ Min.

The Safety Zone concept is also used in the route planning function. When planning a route, the user will be asked to set the expected drift, speed, estimated error of positioning, and ZOC error value along the route. The calculated SZ min/2 defines the minimum possible XTD to be set for a particular route leg.

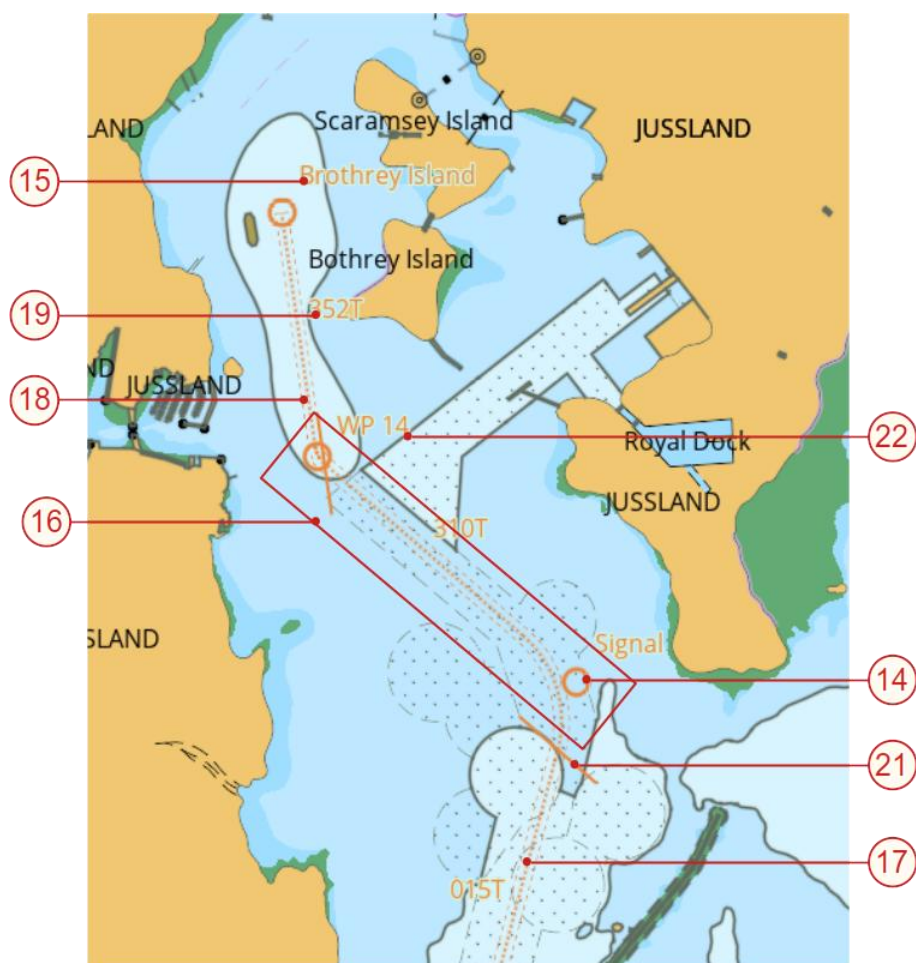
10. Route

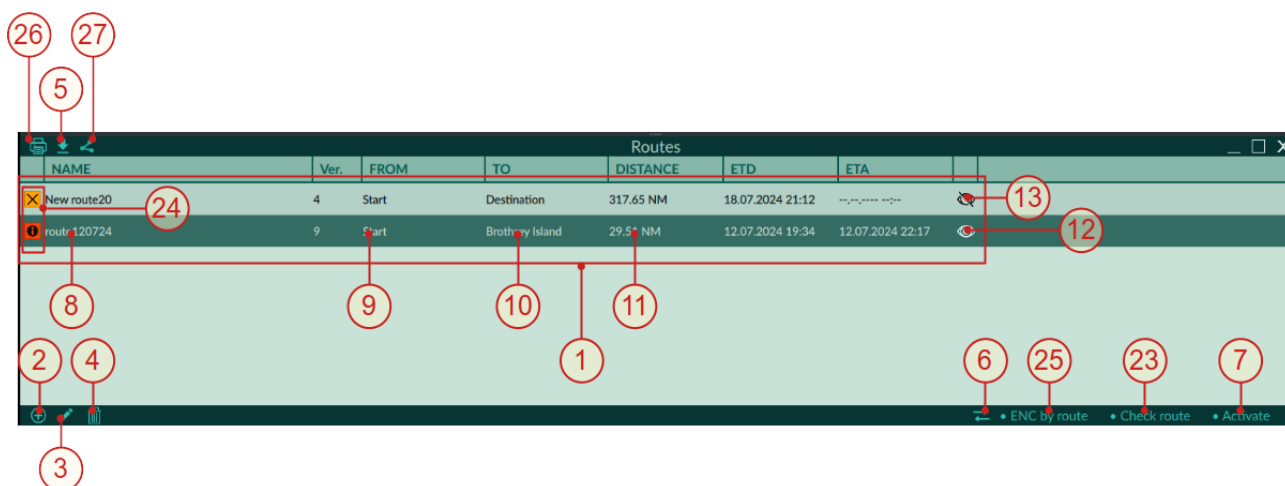
Navigation:



10.1 Route Plan

10.1.1 Route elements





1	Route list
2	Create  - switch to route planning mode (10.1.3)
3	Edit  - switch to the selected route editing mode(10.1.6)
4	Delete  - deletes the selected route (10.1.7)
5	Import  - open the Import Routes window (10.1.8)
6	Export  - open the Route Export window (10.1.9)
7	Activate - ECDIS activates the selected route for route monitoring
8	Route Name
9	Annotated name of the departure WP. The coordinates of WP are displayed if a name is not set during route planning
10	Annotated name of the arrival WP. The coordinates of WP are displayed if a name is not set during route planning
11	Calculated route distance
12	Show/hide the route on the chart (enabled)
13	Show/hide route on the chart (off)
14	Waypoint
15	Waypoint name

16	Route leg
17	Route leg axis
18	Permissible Cross track distance from the route axis (XTD)
19	Bearing of the route leg, T - sign of the true bearing
20	Planned speed on the route leg
21	WOL (Wheel Over Line). The WOL is always drawn in parallel to the next route leg
22	WP number
23	Check route – route safety check (10.1.5)
24	route safety status indicator (displayed after the route safety check)
25	ENC by route – List of ENC intersected by the route (10.1.2)
26	Print the list of WPs. This can be done either to a connected printer or as a pdf file on removable media
27	Control for Export of selected route

• **TIP**

The selected and alternative routes can be displayed simultaneously.

View and edit the selected route (3). Switch to the edit mode in order to view and edit the route parameters in the route table:

WP	LAT	LON	TURNING	XTD	PORT	STB	SPEED	LEG GEOMET	LEG DIST	LEG BEAR	CURRENT	WP NAME	STAY TIME	ETA	ETD
1	32°20.397 'S	061°03.502 'E	200	300	300	12.00	RL	1.78	149.0	173.2	↑	Start	000 00d 00m	12.07.2024 19:43	12.07.2024 19:43
2	32°21.943 'S	061°04.595 'E	200	300	300	12.00	RL	0.87	203.5	151.8	↑	Mickleden	000 00d 00m	12.07.2024 20:22	12.07.2024 20:22
3	32°29.744 'S	061°05.688 'E	200	300	300	12.00	RL	1.00	180.0	151.8	↑	Approach	000 00d 00m	12.07.2024 20:31	12.07.2024 20:31
4	32°30.542 'S	061°05.279 'E	200	300	300	12.00	RL	0.97	151.8	151.8	↑		000 00d 00m	12.07.2024 20:36	12.07.2024 20:36
5	32°31.545 'S	061°05.279 'E	200	300	300	12.00	RL	2.45	188.3	335.9	↑		000 00d 00m	12.07.2024 20:49	12.07.2024 20:49
6	32°32.407 'S	061°05.825 'E	200	300	300	12.00	RL	5.17	263.6	302.7	↑		000 00d 00m	12.07.2024 21:14	12.07.2024 21:14
7	32°34.886 'S	061°05.400 'E	200	300	300	12.00	RL	2.06	261.4	302.7	↑		000 00d 00m	12.07.2024 21:28	12.07.2024 21:28
8	32°35.453 'S	060°59.389 'E	200	46	46	9.00	RL	0.56	302.7	335.9	↑		000 00d 00m	12.07.2024 21:32	12.07.2024 21:32
9	32°35.768 'S	060°56.930 'E	200	56	56	9.00	RL	1.53	335.9		↑				
10	32°35.466 'S	060°56.374 'E	200	46	46	9.00	RL				↑				

1	Create WP - add a new waypoint
2	Delete WP - delete the selected waypoint or the group of selected waypoints (4). If no WP is

	selected, the button will be unavailable
3	XTD - The value adjustment can be done individually or by group selection. If the XTD value is less than the calculated minimum Safety Zone the indicator is highlighted in red . If the indicated XTD value is greater than the value of the distance to the hazard specified in the route check settings, the value is highlighted in orange .
4	LEG GEOMETRY - RL (Rhumb line) or GC (Great Circle). Click on the field to change the geometry type of the selected WP. By default - RL
5	Reserved for future use
6	Centering chart to waypoint
7	WP NAME input fields. The names of the start and end WPs will be used as departure/arrival points, other named WPs allowed
8	Route name entry field, the default name is New route
9	Select - group selection mode, the number of selected points is indicated in brackets
10	Indicators of the safety status of the route leg. Click on the indicator to view the list of detected hazards and areas
11	Check route - check the route navigation safety according to the preset settings.
12	Turning radius at WPs.
13	Total distance of the Route
14	Schedule for the journey along the route. The timetable is calculated automatically when the route is opened for editing. Change ETD (estimated time of departure) to calculate the timetable in accordance with the journey parameters. The parameter Parking time is used to account for the duration of stops during the voyage (10.1.10)
15	Print the route. Print to a connected printer or to a pdf file and save it on a removable storage device.
16	Critical Points  - adds checkpoints to the route leg. (10.1.4)
17	Settings  - open the Route Check Settings window (10.1.5)
18	Save - saves all changes made to the route
19	Cancel - return to the list of Routes (10.1.7)

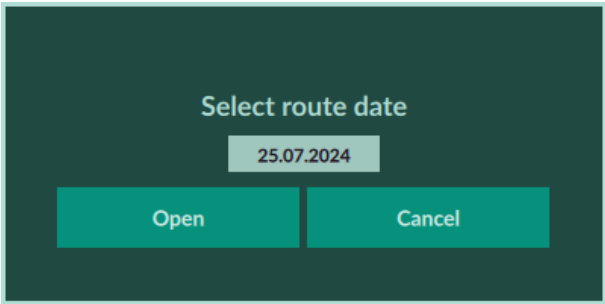
10.1.2 ENC by route

List of ENCs intersected by selected route:



 → Select Route
 → ENC by Route

Specify the start date of the route and press Open.



It opens a table with ENC's for the route. ENC status is checked for a specified date range - from the voyage start date to the voyage end date.

1

2

3

4

5

SET	NAME	Edition No	Update No	Update date	Edition	INFORMATION	PERMIT	For 25.07.2024	
IHO	GB4X0000	2	0	09.04.2001	official		n/d	n/d	6
IHO	GB5X01NW	2	0	06.04.2001	official		n/d	n/d	7
IHO	GB5X01SW	1	0	08.04.2001	official		n/d	n/d	8

6

7

8

- 1

2

3

4

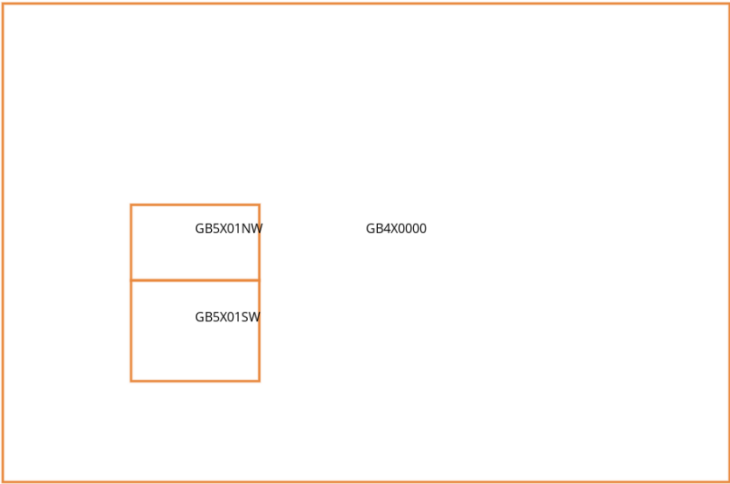
5
- Export - click to export the list of selected ENC's

Edition - type of cell: official/unofficial ENC

Permit - the cell permit expiry date

Status at date (For...) – update status of the cell for duration of voyage

Cell frame - selection of the cell frame on the overview chart



6	Set - name of the ENC dataset the cell belongs to. Cells from different datasets can be included in the selection.
7	Centering cell in the ECDIS chart window
8	Back - return to the previous window

The table contains a list of ENCs the route passes through.

ENCs by route export

The list can be exported from ECDIS in csv format to an external storage medium:

insert the USB drive into the ECDIS USB port

Navigate to



A file with a name in the format **Encs_name_date.csv**, where name is the route name and date is the export date, will be recorded on the media.

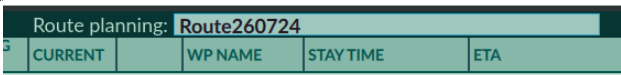
10.1.3 Create New Route

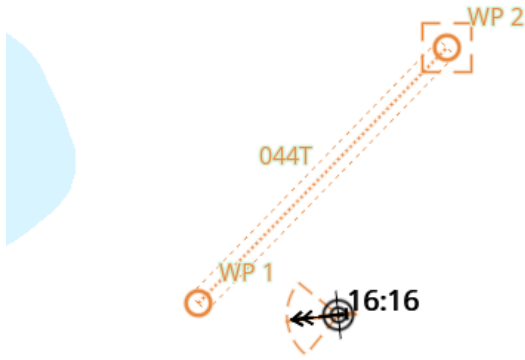
• NOTE

Make appropriate settings in the **Dimensions** section. Vessel dimensions parameters are used by default when creating a route: XTD, turning radius and average speed.

Configure the route safety check criteria: the XTD, and CATZOC values are taken into account when validating the route for navigational safety. The minimum permissible XTD value is calculated automatically.

In the absence of data from the compass, the drift angle is not taken into account when calculating the maneuvering lane.

1	click Create route in the Routes window, the Route planning window will open. The window is identical to the Edit route window.	
2	enter a route name .	

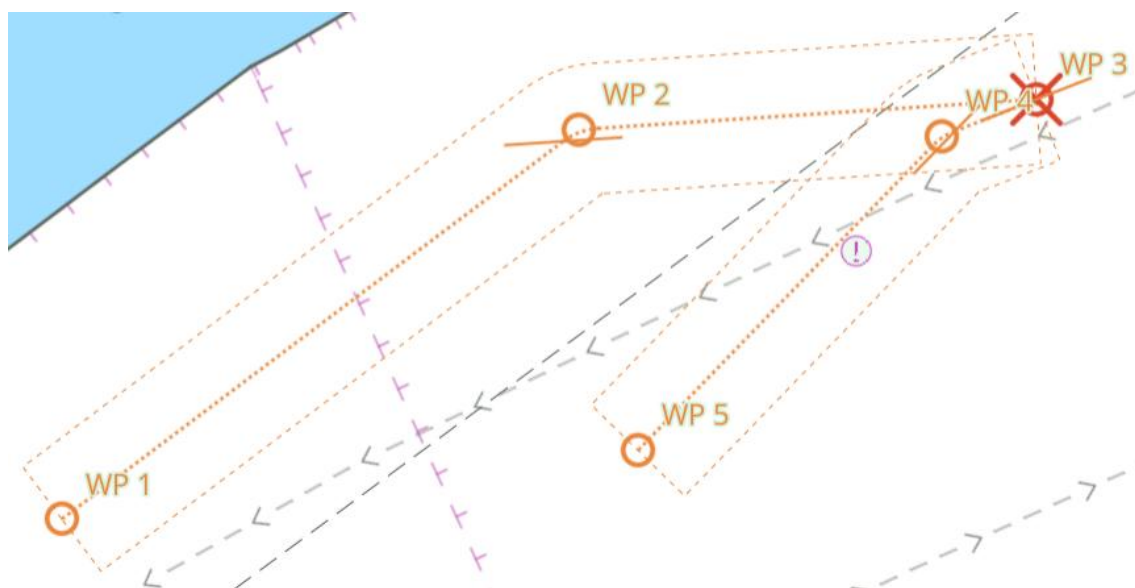
3	configure navigation safety and route verification criteria.	Accuracy of mapping of relief forms - 50 + m Expected positioning error (RMS) - 15.0 + m Minimum distance to hazards - 200 + m Navigation hazards, AtoN and/or prohibited areas, areas for which special conditions exist Route Check Criteria Navigation hazards Safe Water Boys Safety contour The parameters entered are used to calculate the minimum allowable lateral displacement of the vessel. The position uncertainty of relief forms is read from the ENC Near by the WPs. If the encoded CATZOC value > 2 (i.e. RMS > 20 m) then value entered manually is used.																																			
4	add waypoints in any way: tabular - click Create WP, enter WP coordinates in LAT/LON fields. To enter coordinates - place the cursor in the input field, enter the value and press Enter, to confirm the entry Graphical - left mouse button in the necessary place on the chart (later the coordinates can be set more precisely in the navigation table) Graphically using the touch screen - by tapping at the desired location on the chart (coordinates can be adjusted as described above) When creating waypoints, the route is displayed on the chart, the navigation table is filled in synchronously. Waypoints are connected only sequentially as they are created.	 <table><tr><th></th><th>Nº</th><th>LAT</th><th>LON</th><th>TU (m)</th></tr><tr><td>✗</td><td>1</td><td>32°34.990 'S</td><td>061°03.112 'E</td><td></td></tr><tr><td>✗</td><td>2</td><td>32°34.076 'S</td><td>061°04.160 'E</td><td></td></tr><tr><td>✗</td><td>3</td><td>32°33.632 'S</td><td>061°02.957 'E</td><td></td></tr><tr><td>✗</td><td>4</td><td>32°32.581 'S</td><td>061°04.073 'E</td><td></td></tr><tr><td>✗</td><td>5</td><td>32°32.653 'S</td><td>061°04.964 'E</td><td></td></tr><tr><td></td><td>6</td><td>32°33.691 'S</td><td>061°06.673 'E</td><td></td></tr></table>		Nº	LAT	LON	TU (m)	✗	1	32°34.990 'S	061°03.112 'E		✗	2	32°34.076 'S	061°04.160 'E		✗	3	32°33.632 'S	061°02.957 'E		✗	4	32°32.581 'S	061°04.073 'E		✗	5	32°32.653 'S	061°04.964 'E			6	32°33.691 'S	061°06.673 'E	
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	6	32°33.691 'S	061°06.673 'E																																		
5	Leg geometry - selection of geographic line type: RL (Rumb Line) or GC (Great Circle).	<table><tr><th>SPEED kn</th><th>LEG GEOMET</th><th>LEG DIST NM</th></tr><tr><td>12.00</td><td>RL</td><td>1.11</td></tr><tr><td>12.00</td><td>RL</td><td>1.01</td></tr><tr><td>12.00</td><td>RL</td><td>1.41</td></tr><tr><td>12.00</td><td>Great circle</td><td>0.77</td></tr><tr><td>24.00</td><td>GC</td><td>1.81</td></tr><tr><td>12.00</td><td>RL</td><td>0.00</td></tr></table>	SPEED kn	LEG GEOMET	LEG DIST NM	12.00	RL	1.11	12.00	RL	1.01	12.00	RL	1.41	12.00	Great circle	0.77	24.00	GC	1.81	12.00	RL	0.00														
SPEED kn	LEG GEOMET	LEG DIST NM																																			
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24.00	GC	1.81																																			
12.00	RL	0.00																																			

6	reserved for future use	<table><tr><th>BEARING</th><th>CURRENT</th><th></th><th>WP NAME</th></tr><tr><td>44.2</td><td>↑</td><td></td><td>Departure</td></tr><tr><td>293.5</td><td>↑</td><td></td><td></td></tr><tr><td>42.0</td><td>↑</td><td></td><td></td></tr><tr><td>95.4</td><td>↑</td><td></td><td></td></tr><tr><td>125.7</td><td>↑</td><td></td><td></td></tr><tr><td>0.0</td><td>↑</td><td></td><td>Destination</td></tr></table>	BEARING	CURRENT		WP NAME	44.2	↑		Departure	293.5	↑			42.0	↑			95.4	↑			125.7	↑			0.0	↑		Destination							
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0.0	↑		Destination																																		
7	waypoint name. It is recommended to name the start, end and important waypoints.	<table><tr><th></th><th>WP NAME</th><th>STAY TIME</th></tr><tr><td></td><td>Departure</td><td>---d --h --m</td></tr><tr><td></td><td></td><td>000 00d 00m</td></tr><tr><td></td><td></td><td>000 03d 00m</td></tr><tr><td></td><td></td><td>000 00d 00m</td></tr><tr><td></td><td></td><td>000 00d 00m</td></tr><tr><td></td><td>Destination</td><td>---d --h --m</td></tr></table>		WP NAME	STAY TIME		Departure	---d --h --m			000 00d 00m			000 03d 00m			000 00d 00m			000 00d 00m		Destination	---d --h --m														
	WP NAME	STAY TIME																																			
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		000 00d 00m																																			
	Destination	---d --h --m																																			
8	XTD PORT , XTD STBD are calculated automatically and Turn Radius and Speed are filled with default values. The values can be changed if necessary.	<table><tr><th></th><th>TURNING (m)</th><th>XTD PORT (m)</th><th>XTD STB (m)</th><th>SPEED kn</th></tr><tr><td>'E 200</td><td>200</td><td>75</td><td>75</td><td>12.00</td></tr><tr><td>'E 200</td><td>200</td><td>88</td><td>88</td><td>12.00</td></tr><tr><td>'E 200</td><td>200</td><td>88</td><td>88</td><td>12.00</td></tr><tr><td>'E 200</td><td>200</td><td>88</td><td>88</td><td>12.00</td></tr><tr><td>'E 300</td><td>300</td><td>100</td><td>150</td><td>24.00</td></tr><tr><td>'E 200</td><td>200</td><td>75</td><td>75</td><td>12.00</td></tr></table>		TURNING (m)	XTD PORT (m)	XTD STB (m)	SPEED kn	'E 200	200	75	75	12.00	'E 200	200	88	88	12.00	'E 200	200	88	88	12.00	'E 200	200	88	88	12.00	'E 300	300	100	150	24.00	'E 200	200	75	75	12.00
	TURNING (m)	XTD PORT (m)	XTD STB (m)	SPEED kn																																	
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'E 200	200	88	88	12.00																																	
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'E 200	200	88	88	12.00																																	
'E 300	300	100	150	24.00																																	
'E 200	200	75	75	12.00																																	
9	Leg length and Leg bearing are calculated automatically when the coordinates of waypoints are changed, the fields are non-editable .	<table><tr><th>G</th><th>LEG DIST NM</th><th>LEG BEARING (°)</th><th>CURR WP NAME</th></tr><tr><td>1</td><td>1.11</td><td>44.2</td><td>Departure</td></tr><tr><td>2</td><td>1.01</td><td>293.5</td><td></td></tr><tr><td>3</td><td>1.41</td><td>42.0</td><td></td></tr><tr><td>4</td><td>0.76</td><td>95.4</td><td></td></tr><tr><td>5</td><td>1.82</td><td>125.7</td><td>Destination</td></tr></table>	G	LEG DIST NM	LEG BEARING (°)	CURR WP NAME	1	1.11	44.2	Departure	2	1.01	293.5		3	1.41	42.0		4	0.76	95.4		5	1.82	125.7	Destination											
G	LEG DIST NM	LEG BEARING (°)	CURR WP NAME																																		
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4	0.76	95.4																																			
5	1.82	125.7	Destination																																		
10	Save - apply changes and save the route.	Save Cancel																																			

• **TIP**

When editing a route, it is possible to use **group selection and editing**. See more details in the **Tables** section.

When creating a route, it is automatically checked for feasibility of a turn with the specified circulation radius. The turning points of the route sections that have not passed the check will be highlighted in red and crossed out. In this case, it is recommended to change the position of the turning points.



10.1.4 Critical Points (EP by route)

When moving along a route a navigator may need to be notified of an event: mandatory reporting, confirming a port call, etc. ECDIS generates a warning when the ship is about to approach an **Event point (EP)** at a time and/or distance set by the navigator. The warning contains the text entered by the navigator when created.

Creating an Event point:

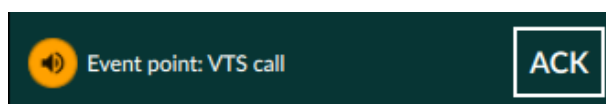


Create event		Delete event		Events by route: route120724;Event: WP 7			
Nº	LAT	LOn	DESCRIPTION	NOTIFICATION FOI (NM)	NOTIFICATION FOI (min)		
1	32°35.264 'S	061°01.383 'E	VTS call	1.00	10		

1	Event Point – it does not necessarily have to be on the route axis
2	Create event - button for creating EP
3	Delete event - deletes the selected or highlighted EPs
4	Description of the event that will be displayed in the notification area when one of the event criteria occurs
5	Distance Notification - the distance to critical point
6	Time notification - time to go to EP. The time of reaching is calculated by the current speed of the vessel
7	Positioning the EP in the center of the screen
8	Select - selection of several EPs
9	Back - return to the previous window

- fields (LAT, LON) can be used for precise coordinate input;
- enter the test description of the EP (Description);
- criteria for warnings generation based on distance and time to EP (Notifications for (NM), Notifications for (min)). - issuing a warning based on the criterion that comes first;
- to save the EPs - press **Back** and **Save**.

You can set event points for different route sections. All event points belonging to the route will be displayed on the chart. Event points have no indication of belonging to the route leg, so to make changes in the settings of any of the points, you just need to open the route for editing and left-click (tap) on the chart at the position of the required point. To move an event point - press the left mouse button (holding your finger) and move it to a new position.



To delete the EP:



10.1.5 Route Check

The route should be checked for navigational safety before it can be activated. **The** safety check settings **are individual** for each route.

Select the route to be checked in the **Routes** window and click **Check route**.

If the route is opened for editing, the check status will be reset to "not checked" and to **check the** route

again, you must click **Check route** in the route editing window.

• **TIP**

It is not possible to manually enter XTD values smaller than the minimum allowable value calculated by ECDIS. If you need to set a lower XTD value, first change the parameters for calculating of the minimum allowable value: drift angle, ENC accuracy, expected position error.

The automatic calculation of the minimum permissible XTD is performed using the formula:

$$XTD = \frac{(B_t + \sqrt{m^2 + c^2})}{2}$$

Where:

B_t - width of ship manoeuvring lane;

m - expected horizontal uncertainty of ship position (95% probability), set manually;

c - expected horizontal uncertainty of charted relief (CATZOC). If $CATZOC > 2$ the value entered manually is used for calculation. (see in the route validation settings).

Calculation of the maneuvering lane is performed according to the formula:

$$B_t = L \cdot \sin \alpha + B \cdot \cos \alpha + (tc \cdot \sin \beta) \cdot V$$

Where:

L - overall length of the vessel in metres

B - overall width of the vessel in metres

α - maximum drift angle

V - planned speed of the vessel on the route leg, in m/s.

$(tc \cdot \sin \beta) \cdot V = 3sV$ - cross track movement caused by yawing β of the vessel

Route check status

By default, after creating or importing a route, the route status is set to "not checked".

	the route has been checked and safe
	route is not verified

	XTD is less than the minimum safety zone, turn is not possible with specified radius
	found navigational hazards, crossing the Safety Contour, areas to be avoided, vertical clearance of a bridge is less than ship's vertical dimension
	there are areas with special conditions applied, aids to navigation (buoys) within the route safety zone, route intersects ENC cells which are not up to date

If any object class or areas are excluded when setting up the check criteria the list of such objects / types of areas is displayed to the user when the **Check route** button is pressed. A route with the status "not checked" is checked when it is activated.

Route planning: route120724													
Nº	LAT	LON	TURNING (m)	XTD PORT (m)	XTD STB (m)	SPEED kn	LEG GEOME	LEG DIST NM	LEG BEARING (°)	CURRENT	WP NAME	STAY TIME	ETA
1	32°20.397 'S	061°03.502 'E	200	300	300	12.00	RL	1.78	149.0	↑	---	---	---
2	32°21.943 'S	061°04.595 'E	200	300	300				173.2	↑	---	000 00d 00m	12.07.2024 1
3	32°29.744 'S	061°05.688 'E	200	300	300				203.5	↑	---	000 00d 00m	12.07.2024 2
4	32°30.542 'S	061°05.279 'E	200	300	300				180.0	↑	---	000 00d 00m	12.07.2024 2
5	32°31.545 'S	061°05.279 'E	200	300	300				151.8	↑	---	000 00d 00m	12.07.2024 2
6	32°32.407 'S	061°05.825 'E	200	300	300				188.3	↑	---	000 00d 00m	12.07.2024 2
7	32°34.886 'S	061°05.400 'E	200	300	300				263.6	↑	---	000 00d 00m	12.07.2024 2
8	32°35.453 'S	060°59.389 'E	200	46	46				261.4	↑	---	000 00d 00m	12.07.2024 2
9	32°35.768 'S	060°56.930 'E	200	56	56				302.7	↑	---	000 00d 00m	12.07.2024 2
10	32°35.466 'S	060°56.374 'E	200	46	46				335.9	↑	---	000 00d 00m	12.07.2024 2
DISTANCE: 29.51 NM													

The route status Reset

ECDIS reset the route status automatically in the following cases:

1. ENC cells intersecting with routes have been changed:

new ENC's have been loaded;

new ENC editions have been loaded;

new updates have been loaded;

cells became withdrawn and new editions are not loaded;

the User manually updated the cells;

new areas to be avoided have been created by the User;

NAVTEX objects are created.

2. User changed the values of:

maximum drift angle;

minimum distance to hazards;

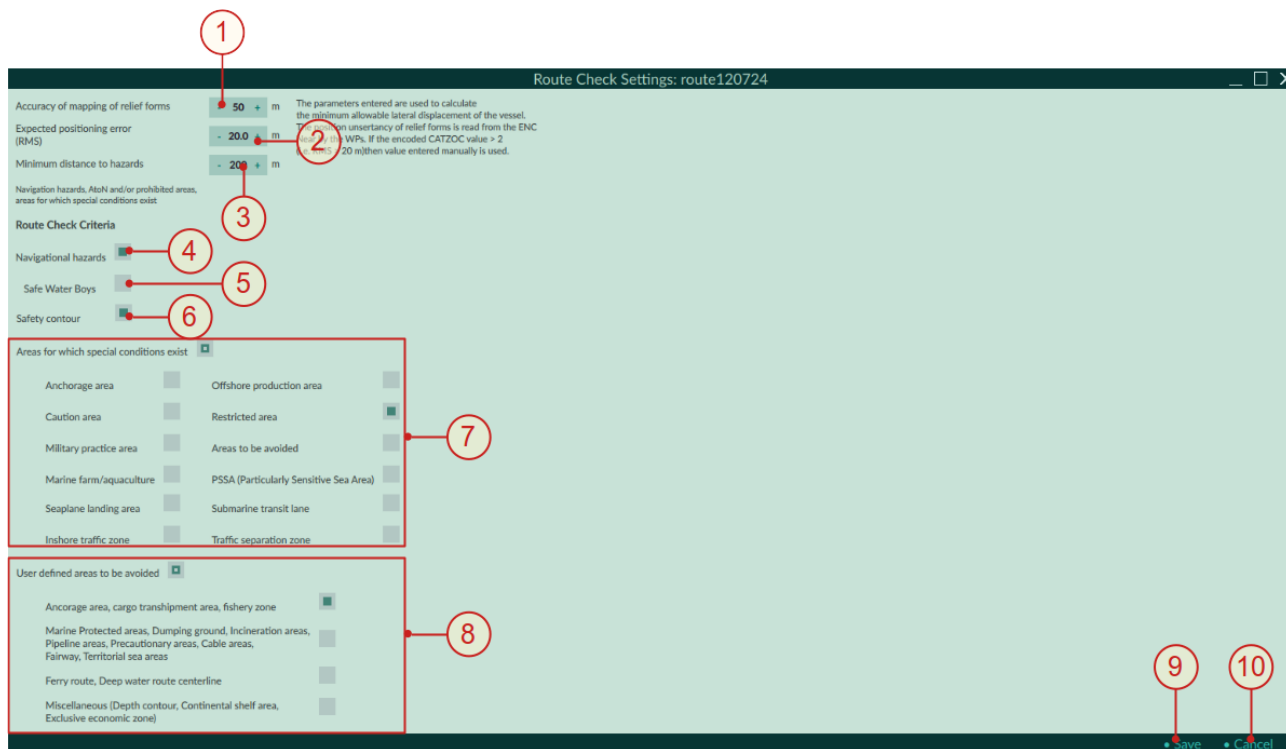
vessel dimensions: these include, but are not limited to, the formation of a barge and towing train.

3. If the calculated Safety depth, Safety contour and Safe height have changed.

4. Routes that have been transmitted in any way also have a status of **Unverified** and are treated as new routes by ECDIS.

Route safety verification

The individual settings for configuring the route safety check are set in the settings window, which is opened by clicking  .

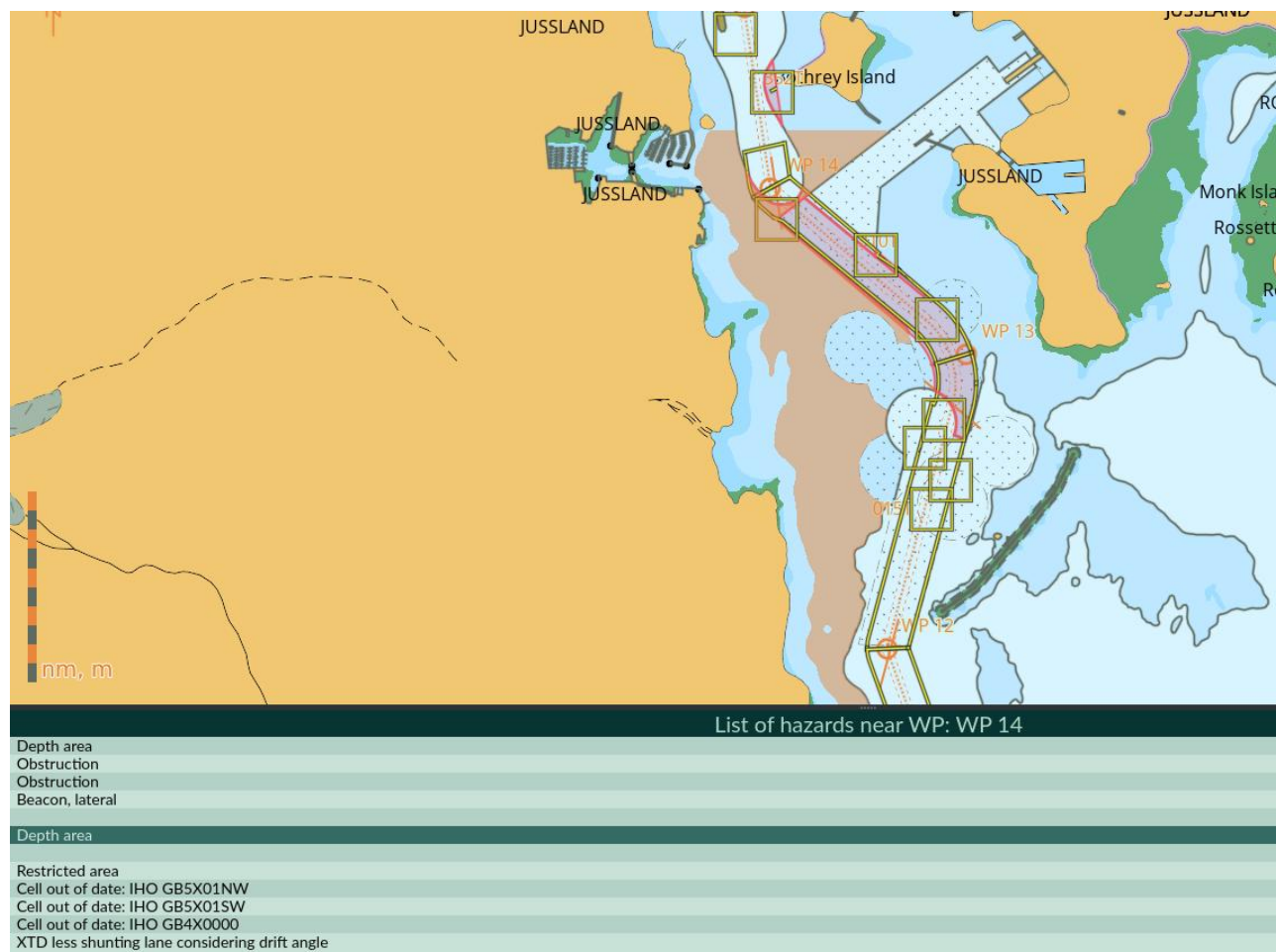


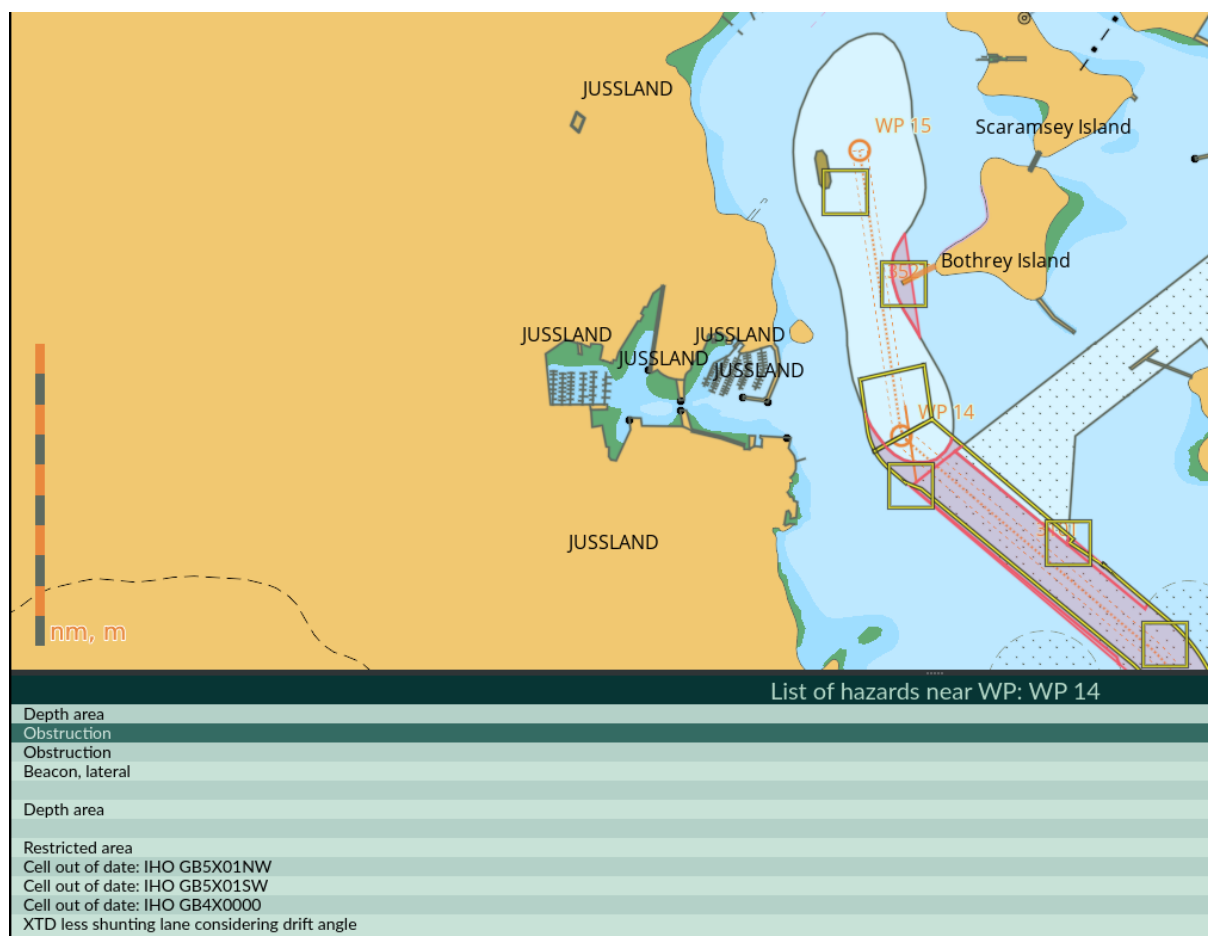
1	Accuracy of chart - manual input of horizontal uncertainty of relief forms in case of CATZOC > 2. Otherwise ECDIS use values encoded in ENC. This parameter affects the calculation of XTD_{min} and hazard monitoring
2	RMS - manual entry of radial error of positioning
3	Minimum distance to hazards
4	Navigation hazards - includes/excludes objects belonging to these categories from the route check
5	Safe water buoy - includes/excludes axial buoys from route check
6	Safety contour - includes/excludes Safety Contour from route check
7	Areas for which special conditions applied - includes/excludes from route check
8	User defined areas to be avoided - includes/excludes from route check
9	Save - settings are applied
10	Cancel - return to the route creation/editing window without saving the monitoring settings.

List of hazards

The status icon shows whether or not hazards have been found on the given leg. Clicking on the icon opens a window with the list of found hazards in the area of the selected waypoint and the next route leg. The route being checked is displayed on the chart.

To view a detected hazard select the hazard from the list. The hazard will be highlighted on the chart.





• **TIP**

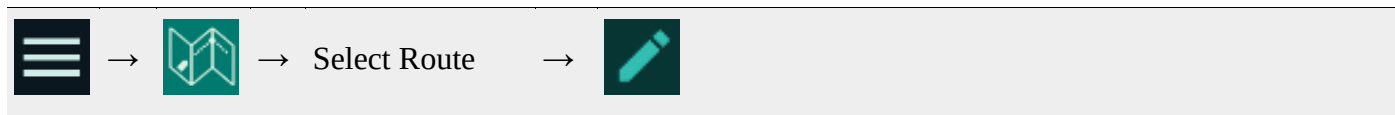
When creating a route, make sure that the vessel dimensions and the route check settings are correct. If the check identifies hazards, examine the list and edit the route so that it is completely safe!

• **NOTE**

Checking a route for navigational safety is performed on all intersected cells of all scales within the XTD.

10.1.6 Route Edit

To edit a route:



1. the **Edit route** window opens;
2. change the waypoint position in any convenient way:
 - using the **table** - place the cursor with the left mouse button (by touching) in the field to be changed in the Latitude/Longitude columns, enter a new value and press **Enter** to confirm the input;
 - graphically - move the waypoint to a new position by pressing the left mouse button;
 - using the **touch screen** - move the waypoint to a new position by holding the WP;
3. add/modify/delete Event (Critical points) on the route;
4. change the **XTD PORT**, **XTD STBD**, **Speed**, **Route Name**, **WP Name**, and **Radius** fields. Group editing is available, see the **Tables** section for details;
5. **Leg length** and **Leg bearing** are recalculated automatically when WP coordinates are changed;
6. press **Save** to apply the change;

10.1.7 Route Delete

• NOTE

Any route is available for deletion except the activated one

To delete a route:



10.1.8 Route Import

ECDIS supports Route **Import** in the *.rtz format.

ECDIS supports 2 ways of Route import:

Method 1: Import using a removable USB drive.

Method 2: Import via net-450.

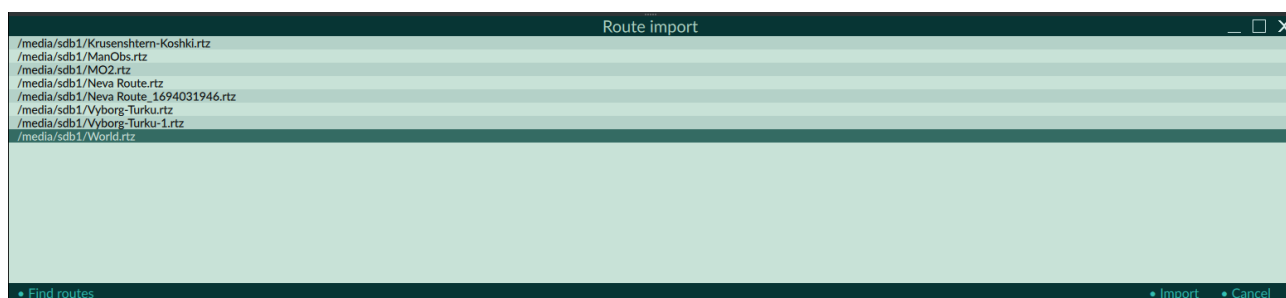
Import from USB-drive

Route Import Using a removable USB drive:

Insert a USB stick with a route in *.rtz format into the ECDIS USB port



Select the route to be imported from the routes list



Imported route will be added to the route list with the status “not checked”;

Routes								
NAME	Ver.	FROM	TO	DISTANCE	ETD	ETA		
test route	1	32°34.462'S 061°04.700'E	32°36.158'S 061°07.420'E	18.18 NM	26.07.2024 17:00	26.07.2024 21:02		
Route260724	1	Departure	Destination	6.12 NM	26.07.2024 18:30	26.07.2024 19:01		
New route20	4	Start	Destination	317.65 NM	18.07.2024 21:12	---		
route120724	9	Start	Brothrey Island	29.51 NM	12.07.2024 19:34	12.07.2024 22:17		
World	3	60°02.210'N 029°24.037'E	59°55.265'N 028°39.236'E	33783.08 NM	01.03.2024 11:52	26.06.2024 19:05		

Click **Cancel** to return to the **Routes** window.

Import via 450-network

Route import via network-450:

The route is received via network-450 from other ECDIS.

For correct route reception by the network, a **Routes** sensor must be configured in ECDIS.

10.1.9 Route Export

Exporting routes to an external media in *.rtz format.

ECDIS supports 2 ways of routes export:

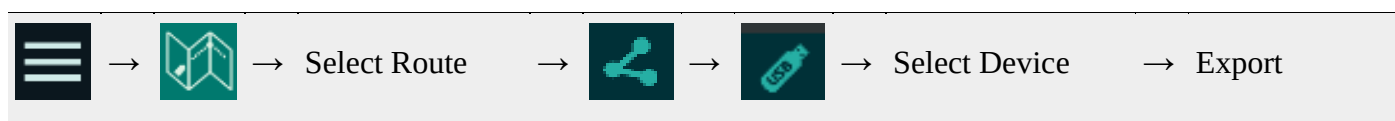
Method 1: Export using a removable USB drive.

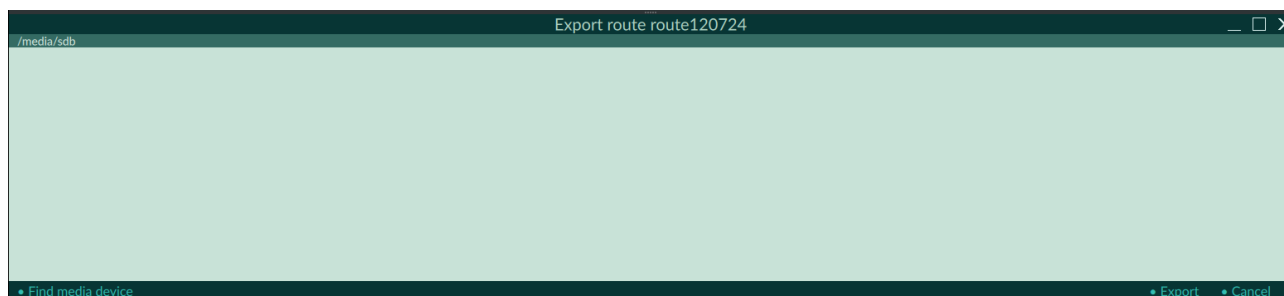
Method 2: Export via network-450.

Export via USB-drive

Route export using a removable USB drive:

Insert a USB drive into the ECDIS USB port





Select the USB drive you want to export the route to;

Press Export;

Press **Cancel** to return to **Routes**.

Verify the route export by viewing the media content. The media should have a file named [Name_timestamp.rtz], where timestamp is the date and time the route was created in the ECDIS.

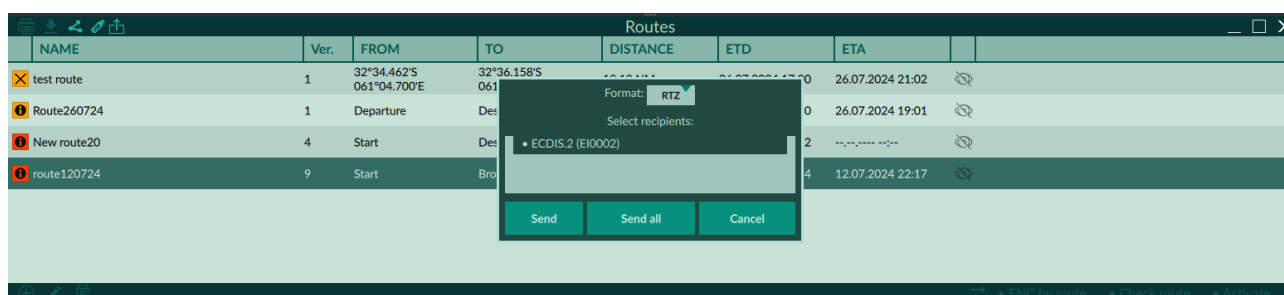
Export via 450-network

The route is transmitted via network-450 to any recipient in *.rtz format: ECDIS, Radar.

The **Routes** sensor must be configured in ECDIS to transmit the route correctly by the network.



Select the recipient or recipients of the route. There can be more than one recipient in an integrated bridge.



View the process of sending the route to the recipients:



Routes exchange						
NAME	VERSION	DATE CH...	RECEIVER	STATUS	SENT	
route120724	9	18:16:33 25.07.2024	EI0002	Waiting	18:49:21 26.07.2024	

Clear table Back

The Status column displays the result of sending the route file for each recipient:

Waiting - the file transfer process is in progress. If the file size is large, the transfer may take some time.

Received - file received.

No Response - no response. The receiving station has not responded on receiving the file.

Return to the route list - click **Back**.

10.1.10 Timetable

Navigation:



ECDIS calculates the **timetable** for the planned route, taking into account the planned speed on each leg and the stay time specified for particular WP.

To make the voyage schedule for a specific date and time:

Set the stay time in WP(s), if necessary

Route planning: Route260724			
WP NAME	STAY TIME	ETA	ETD
Departure	--d --h --m	--:--:-- --:--	26.07.2024 18:30
	00d 00h 00m	26.07.2024 18:35	26.07.2024 18:35
	00d 01h 00m	26.07.2024 18:40	26.07.2024 19:40
	00d 00h 30m	26.07.2024 19:47	26.07.2024 20:17
	00d 00h 00m	26.07.2024 20:21	26.07.2024 20:21
Destination	--d --h --m	26.07.2024 20:25	--:--:-- --:--

Set the departure date and time.

<

July 2024

>

Mon

Tue

Wed

Thu

Fri

Sat

Sun

30	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31	1	2	3
4	5	6	7	8	9	10

23:00

55

00

05

50

45

40

35

30

25

20

15

10

Clear

Apply

Cancel

The schedule will be recalculated.

Route planning: Route260724			
WP NAME	STAY TIME	ETA	ETD
Departure	--d --h --m	--:--:-- --:--	30.07.2024 23:00
	00d 00h 00m	30.07.2024 23:05	30.07.2024 23:05
	00d 01h 00m	30.07.2024 23:10	31.07.2024 00:10
	00d 00h 30m	31.07.2024 00:17	31.07.2024 00:47
	00d 00h 00m	31.07.2024 00:51	31.07.2024 00:51
Destination	--d --h --m	31.07.2024 00:55	--:--:-- --:--

10.1.11 Route Activate

Route Activation:

☰

→

🗺️

→

Select Route

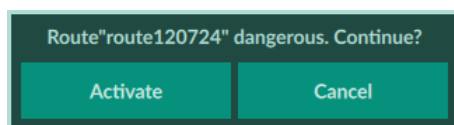
→

Activate

Routes							
NAME	Ver.	FROM	TO	DISTANCE	ETD	ETA	
test route	1	32°34.462'S 061°04.700'E	32°36.158'S 061°07.420'E	18.18 NM	26.07.2024 17:00	26.07.2024 21:02	🗑️
Route260724	3	Departure	Destination	6.12 NM	30.07.2024 23:00	31.07.2024 00:55	🗑️
New route20	4	Start	Destination	317.65 NM	18.07.2024 21:12	--:--:-- --:--	🗑️
route120724	9	Start	Brothrey Island	29.51 NM	12.07.2024 19:34	12.07.2024 22:17	🗑️

Select the route, press **Activate**

When a route is activated the route status is checked. If the route is safe the route will be activated, in other cases a notification will be displayed. The route can be activated forcibly.



NOTE

Before activating a route ensure the dimensions entered in the system are accurate and correspond to the vessel's actual specifications.

In the **Route Check Settings**, select the area groups that will be monitored for interceptions during the execution of the route.

On activation:

the route will be displayed on the chart, the first waypoint will be set to the centre of the screen;

The Route Monitoring Panel will become available in the right pane;

an out-of-scale indicator of the vessel's position on the route will become available (0);

Voyage Timeline will be displayed at the bottom of the chart window;

ECDIS will generate warnings when the vessel exceeds the XTD boundaries;

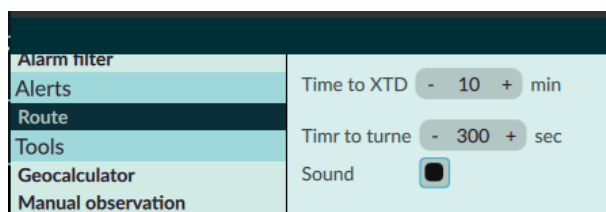
ECDIS will generate warnings of approaching turning points visually on the out-of-scale indicator and by sounding an audible alarm (0).

While navigating an activated route, ECDIS provides the following additional alerts to ensure safe passage:

when **any** point of **the vessel's contour goes beyond the** maximum lateral displacement of the vessel from the set track line set by the shipmaster.

XTD outlier forecast warnings/alerts

monitoring criteria are customizable:



Time to turn - time to warn of an impending turn.

Turning off the **Sound** switch changes the type of messages generated from warnings to cautions.

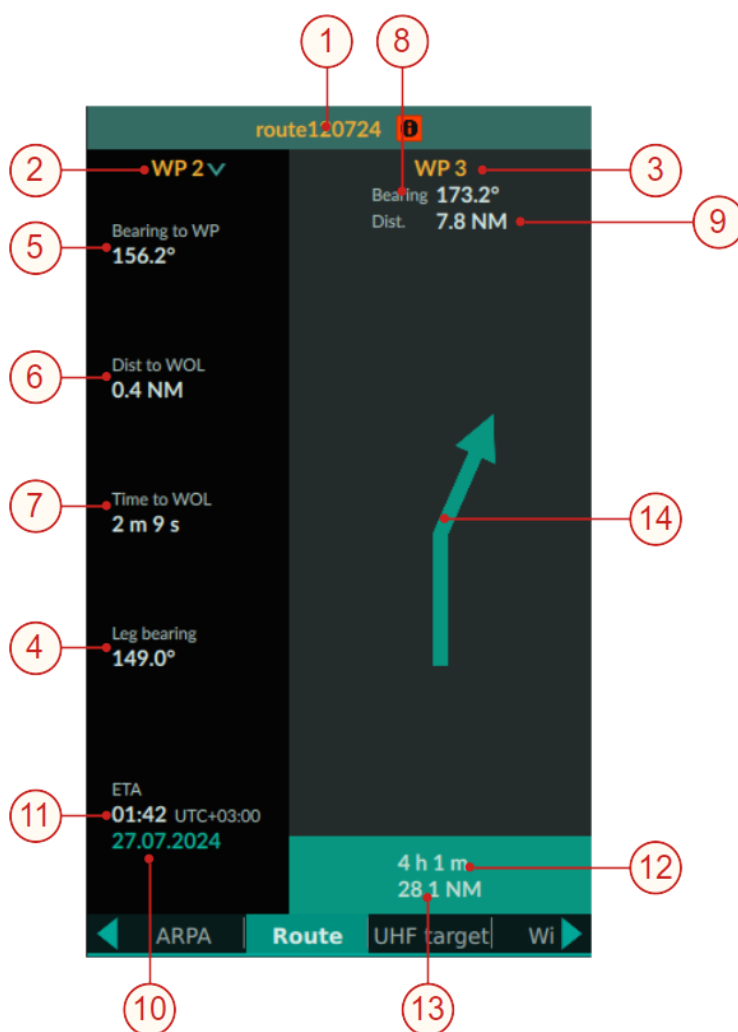
Cautions have a lower priority and are not audibly signaled.

NOTE

In the absence of heading data, XTD out-of-bounds control is performed relative to the track vector.

10.2 Route Monitor

10.2.1 Route monitoring panel:



1	Active route name with check status indicator
2	WP*** - number or name of the current waypoint
3	WP*** - number or name of the next waypoint
4	Leg bearing - true course of the set path line to the waypoint of the current route leg

5	Bearing to WP - bearing to the next waypoint
6	Distance to WOL - distance to the turn start point (calculated taking into account the circulation radius)
7	Time to WOL - time to turn start point
8	Bearing is the true heading of the next leg of the route
9	Dist. - length of the next route arm
10	Estimated date of arrival at the final waypoint of the route
11	ETA - estimated time of arrival at the final waypoint of the route
12	Estimated travel time to the final waypoint
13	Distance to the final waypoint.

10.2.2 Voyage timeline

When you activate a route, a voyage time diagram is generated.

A single left mouse click (tap) expands the diagram. The diagram includes:

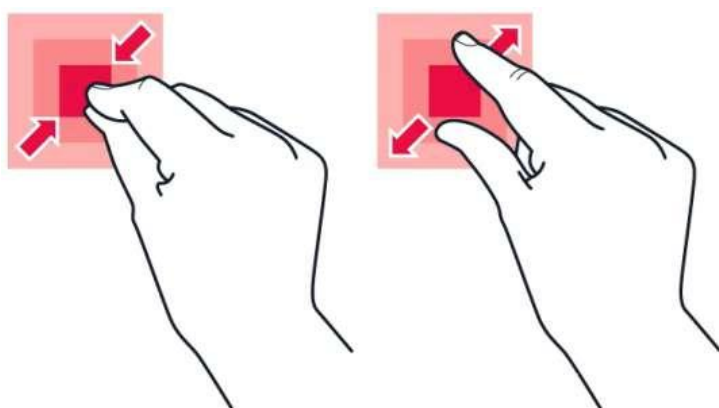
NAME	Start	WP 2	WP 3	Mickled	WP 5	WP 6	WP 7	Approach	WP 10	WP 11	WP 12	Signal	WP 14
DPT	50.0m	100.0m	50.0m	30.0m	30.0m	50.0m	10.0m	10.0m	10.0m	10.0m	10.0m	5.0m	10.0m
SPD	12.0kn	12.0kn	12.0kn	12.0kn	12.0kn	12.0kn	12.0kn	9.0kn	9.0kn	9.0kn	9.0kn	9.0kn	9.0kn
Course	149.0° ▲	173.2° ▲	203.5°	180.0°	151.8°	188.3°	263.6° ▼	261.4° ▲	302.335.9° ▲	340.2° ▲	15.1° ▲	310.3° ▼	351.7° ▼
ETA	N/D	12.07.2024 19:43	26.07.2024 00:12	26.07.2024 00:12	27.07.2024 00:12	27.07.2024 00:12	27.07.2024 00:24	27.07.2024 00:50	27.07.2024 01:00	27.07.2024 01:00	27.07.2024 01:00	27.07.2024 01:00	27.07.2024 01:00
STAY	N/D	00d 00h 00min	00d 00h 00min	00d 00h 00min	00d 00h 00min	00d 00h 00min	00d 00h 00min	00d 00h 00min	00d 00h 00min	00d 00h 00min	00d 00h 00min	00d 00h 00min	00d 00h 00min
ETD	12.07.2024 19:43	12.07.2024 19:43	26.07.2024 00:12	26.07.2024 00:12	27.07.2024 00:12	27.07.2024 00:12	27.07.2024 00:24	27.07.2024 00:50	27.07.2024 01:00	27.07.2024 01:00	27.07.2024 01:00	27.07.2024 01:00	27.07.2024 01:00
DIST	1.8 NM	7.8 NM	0.9 NM	1.0 NM	2.5 NM	5.2 NM	2.1 NM	0.6 NM	1.5 NM	1.4 NM	1.4 NM	1.5 NM	1.0 NM

1	NAME	Start	WP 2
2	DPT	50.0m	100.0m
3	SPD	12.0kn	12.0kn
4	Course	149.0° ▲	173.2° ▲
5	ETA	N/D	12.07.2024 19:43
6	STAY	N/D	00d 00h 00min
7	ETD	12.07.2024 19:43	12.07.2024 19:43
8	DIST	1.8 NM	7.8 NM

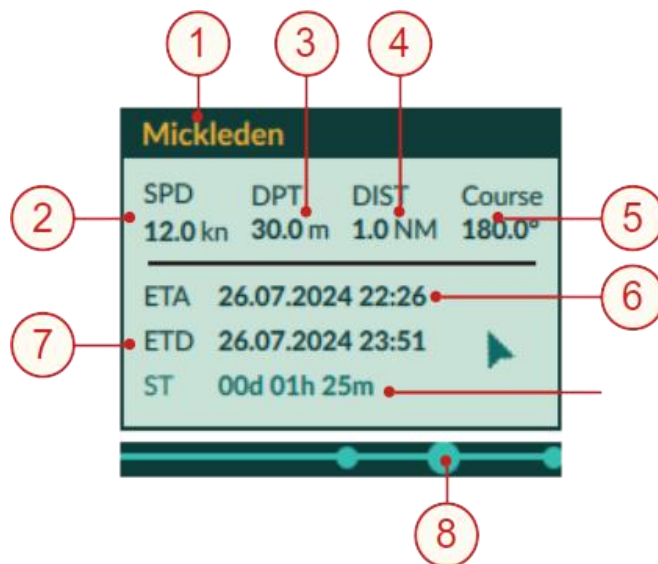
1	WP Name
2	Minimum depth on the route leg taken from the ENC, taking into account the current manually entered level value (6.2)
3	Planned speed on the route leg
4	Course on the leg of the route
5	WP arrival time
6	Stay duration at the WP

7	Time of departure from WP
8	Distance between WPs

Short sections of the route can overlap with each other. To view the hidden information in the diagram, change the diagram scale. To zoom in: put the cursor on the hidden route section and scroll the mouse wheel. Scrolling the wheel performs both zooming in and zooming out of the diagram. In case of a touch screen, zooming in and out of the diagram is performed by moving two fingers together on the segment of interest.



In the collapsed form on the diagram, you can view information on any route point by clicking on the desired point.



1	WP Name
2	Planned speed on the route leg
3	Minimum depth on the route leg taken from the ENC, taking into account the current manually entered level value (6.2)

4	Distance between WPs
5	Course on the leg of the route
6	WP arrival time
7	Time of departure from WP
8	Time spent in WP
9	Selected WP

• **TIP**

If ECDIS operation is interrupted for any reason, the activated route will continue to be followed when operation resumes.

The information for all points is displayed in the expanded view.

When the last waypoint is passed, the route is automatically **deactivated**.

The **Deactivate** button forcibly stops route monitoring.

10.3 Navigation log

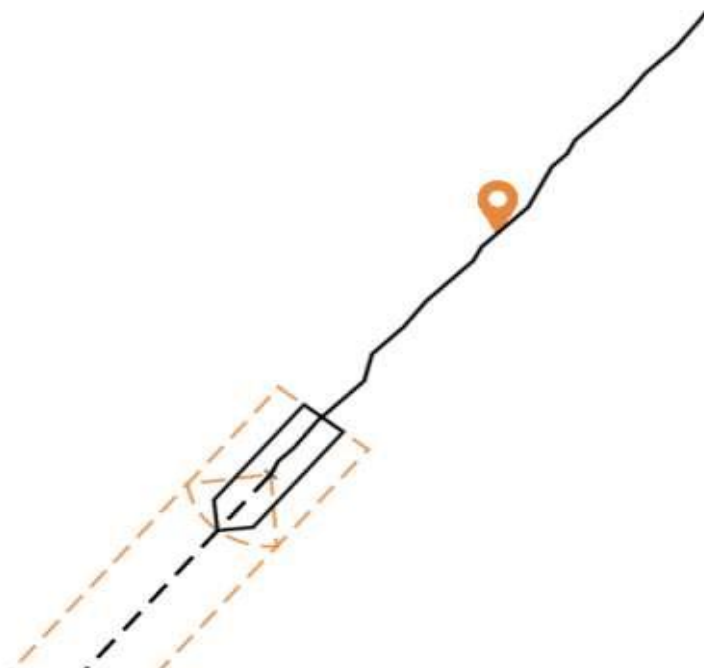
10.3.1 Operational Mark

Action:



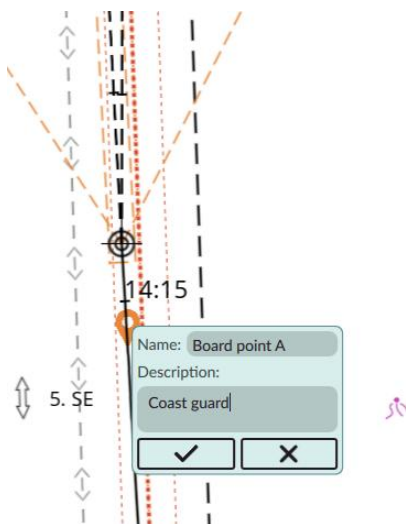
Ctrl+J

Operational marks are saved in a separate layer of map objects. To display the layer - enable in the **Chart objects** section of the settings.

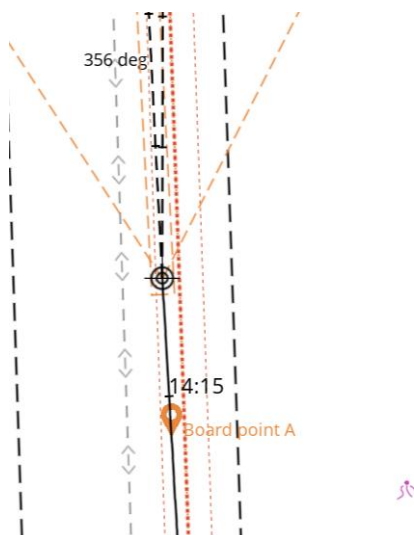


The mark is entered into the ESS as a standard Event record. All operational marks set by the shipmaster will lie on the ship's trajectory.

The navigator, at his discretion, can give the operational mark a name and an extended description. Select (touch) the mark on the map with the left mouse button.



In the window, enter a title, description and save the changes by clicking . After saving, the title will be displayed next to the check mark.



Edit the name and/or description of an operational mark - call the dialog again, or in the **navigation log (Log book)**.

• **NOTE**

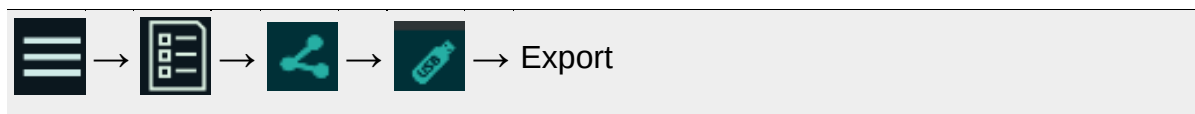
It is not possible to delete operational marks from the logbook.

The Operational Marks map displays only marks set after the current NES-3000 power-on (session). Display of marks for previous sessions is available only through the EDS when the corresponding date range is selected. Symbols selected for displaying marks via the LCD will be red in color.

10.3.2 Export of ESL

Export of Navigation Log data for a selected time interval is implemented in ECDIS. **Export** is available from any EJIS mode.

Exports:

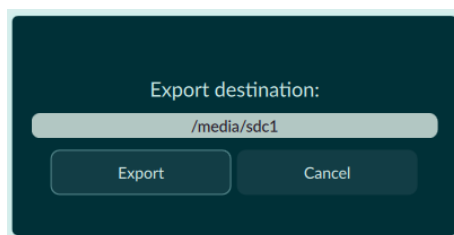


Perform export settings.



Select the data to be exported in the window, click **Export**.

In the dialog box, select the media to export and click **Export**.



Wait for the export to complete.

11. Sensor Management

ECDIS can get and display the information from different sensors. To the safety voyage, any sensor should be installed correctly. Sensors can be connected: via Ethernet or via serial port.

11.1 Sensor Type

The user can choose the sensors according to the situation. The system supports multiple kinds of sensors.

• NOTE

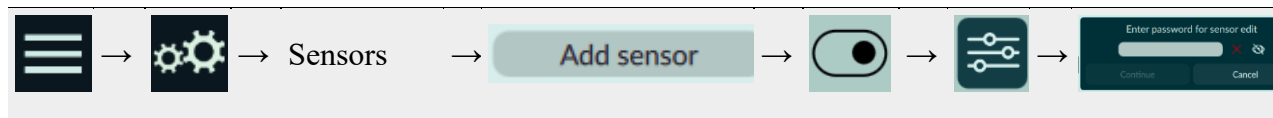
For correct operation of ECDIS Minimum set of sensors: Position, Heading, Speed Log.

Information about the sensor settings is required for correct connection and adjustment of the sensor, for correct connection and testing.

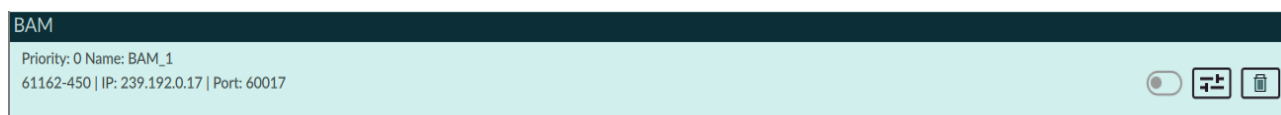
11.2 Sensor Setting

Sensor connection:

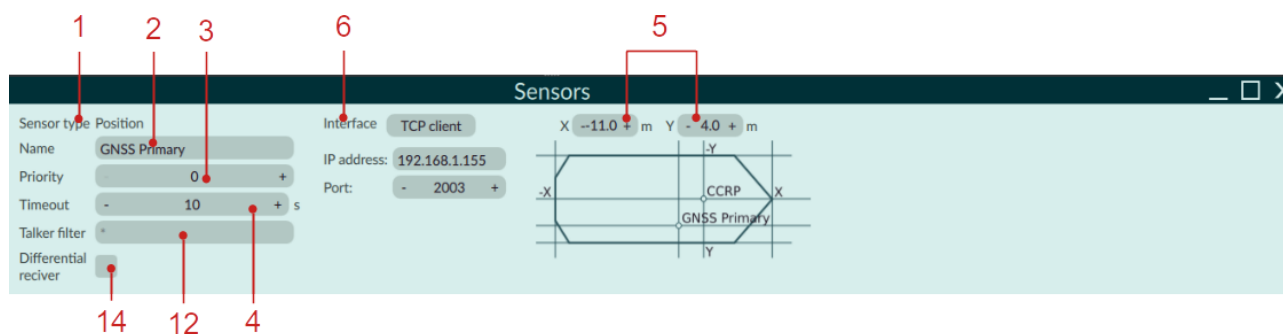
1. connect the sensor to the device or to the network depending on the network layout;

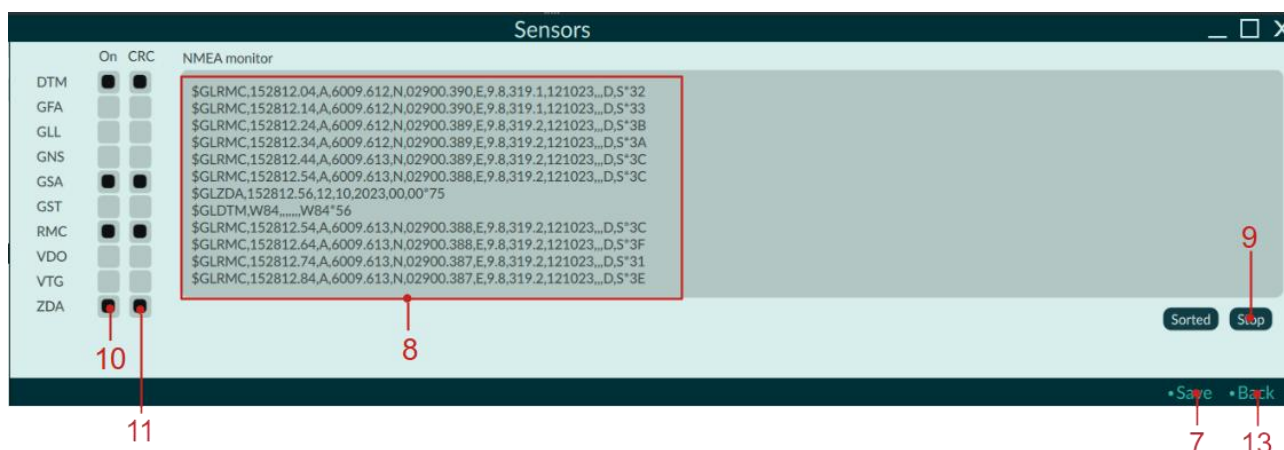


2. A new sensor of the selected type appears in the list of navigation sensors;



To apply the settings or make changes to the settings, click **Save**.





1. **Sensor type** - the selected sensor;

2. **Name** - A **name** that identifies the sensor;

3. **Priority** - if there are several sensors of the same type, determines the chain of transitions in case of sensor failure from the sensor with a high priority to the sensor with a lower priority. The sensor priority is assigned automatically by ECDIS. The ship operator can change the priority at his discretion. The value is **0**, the **highest priority**.

4. **Timeout** - the delay of data arrival to the port - the period after which a sensor failure warning will be generated due to lack of data from the sensor. By default, the delay is 10 seconds. Setting a shorter period is **not recommended**, as it can lead to false alarms due to poor quality of the communication channel or individual peculiarities of the sensor operation.

5. **X** and **Y** - coordinates of the sensor in the ship's coordinate system relative to **CCRP**. For sensors GNSS, heading, speed, AIS, Radar, Direction Finder - input of coordinates is obligatory, because NES-3000 brings navigation parameters of these sensors to CCRP.

6. When connecting the sensor to a bridge network, the **Interface** parameter must be set to **TCP-client, TCP-Server, UDP receiver UDP, UDP-sender or 61162-450**, and the parameters are available for configuration: **IP address** and **Port**. Set the values of these parameters according to the connection scheme;

When **connecting the sensor via serial port (COM)**, set the Interface to **Serial**. The serial port settings are available, set them to match the sensor port settings:

- **Port** - The hardware port to which the sensor is connected;
- **Mode** - the mode of operation of the port. Available operating modes: RS-232/RS-422/RS-485W2/RS-485W4, **default: RS-232**;
- **Speed** - baud rate, default: 4800;
- **Bits** - the number of data bits. Available values: 5, 6, 7, or 8 bits of data. The first bit is the least significant bit, default value: 8;
- **Parity** - A bit used to check parity. It is used for error detection. It can take the following values: No (not used), Even (even), Odd (odd), default: No;
- **Stop bit** - a bit indicating the end of message transmission, can take the values 1, 1.5 (Data bit=5)

and 2, default: 1.

1. When you are **finished** configuring the sensor, click **Save (8)**;

2. If the transducer is properly configured, the **NMEA monitor (9)** will **display** readable received messages from the transducer. This monitor is used to check and monitor the received data, the sampling rate is 1 Hz;

3. **Stop** - stops operation of **NMEA monitor (9)** only, the sensor is **not** disabled. Pressing again restores the monitor operation;

4. turn on the switches corresponding to the **types of** NMEA messages to be received (12).

5. set the switches of the **CRC** column - check the checksums of messages. If the sensor transmits messages with incorrect checksums, such messages will not be received by ECDIS. If it is necessary to receive such messages, disable checksum verification;

6. **Talker filter (header)** - filtering of messages. In this field, the headers that the system accepts are specified separated by commas. Messages with other headers will be ignored, and data from such messages will not be taken into account in ECDIS operation.

7. **Back** - returns to the list of navigation sensors.

8. **Differential receiver. Differential receiver** (for GNSS sensor) - activation of differential corrections control. When the switch is on, NES-3000 monitors the sign of differential mode of GNSS receiver operation. If the receiver does not operate in differential mode, the NES-3000 will generate a warning.

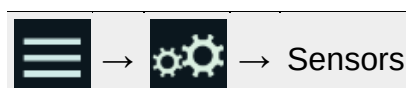
Sensor removal:



• **TIP**

Information on setting up other types of sensors is described in the corresponding sections of the documentation: Position, Heading, AIS, ATS and Echo sounder.

11.3 Navigational sensors setup



There are two methods to connect navigational sensors to the ECDIS software:

1. Via Ethernet:

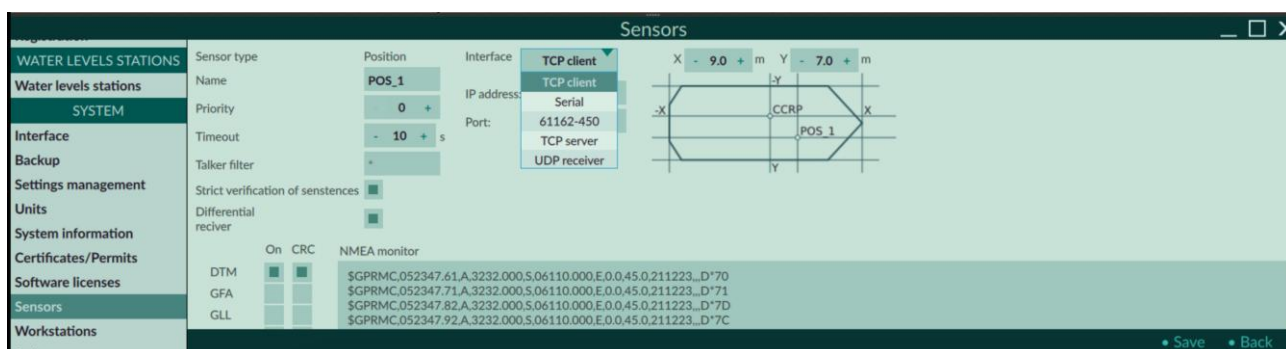
- You can use a direct connection or a COM-Ethernet adapter, such as the Moxa NPort series or a similar device.

2. Via RS-232/422/485:

- In this case, your computer must have onboard serial RS-ports.

To add a sensor in either scenario:

- Enter the password (Default password: **Nsr#66733733**).
- Add the necessary sensor.
- Turn the sensor on. 
- Click the **Settings** icon button to access the sensor settings menu.



• NOTE

It is crucial to set the sensor's position relative to the vessel's CCRP (Common Reference Point), as ECDIS uses this correction data to ensure consistent and accurate measurements.

11.3.1 Ethernet connection

To set up an Ethernet connection, you should select the appropriate option from the **Interface** dropdown menu, depending on the type of interface your sensor uses:

- TCP Client** (ECDIS as TCP Client)
- TCP Server** (ECDIS as TCP Server)
- UDP Receiver** (ECDIS as UDP Receiver)
- 61162-450** (ECDIS as 450-Node)

• NOTE

When using the NMEA 61162-450 protocol, make sure to set the System Function Identifier (SFI) as described in the **System Information** section (Navigate to Menu ->

11.3.2 Serial Port Connection

WATER LEVELS STATIONS

Water levels stations

SYSTEM

Interface

Backup

Settings management

Units

System information

Certificates/Permits

Software licenses

Sensors

Workstations

Sensor type

Name

Priority

Timeout

Talker filter

Strict verification of sentences

On

CRC

NMEA monitor

Speed Log

Interface

Port

Mode

Speed

Bits

Parity

Stop bit

Serial

STW_1

0

- 10 + s

*

☒

☐

☐

STW_1

8

232

115200

4

No

1

X -16.0 + m

Y - 6.0 + m

CCRP

STW_1

Save

Back

- **NOTE**

11.3.3 NMEA Monitor

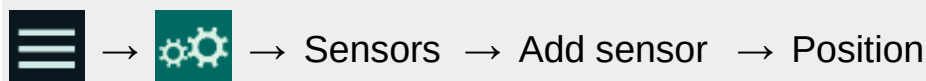
If your connection settings are correct and the ECDIS sensor is switched on, you will see NMEA sentences received from the connected sensor. You can view the raw data flow or sort the sentences by Talker ID and sentence type using the "**As is/Sorted/Raw**" button



11.3.4 Additional settings

- **Name** - name identifying the sensor. This name will appear in Navigational Widget on ECDIS main screen.
- **Priority** - Priority determines the switching sequence between the sensors of the same type in case of sensor failure. Operator can change the priority automatically assigned by ECDIS at his discretion. A value of 0 is the highest priority.
- **Timeout** - delay of data input to the port - the period after which the warning about sensor failure due to lack of input data will be generated. Default value is 10 seconds. Setting a shorter period is not recommended, as it can lead to false alarms due to poor quality of the communication channel or individual peculiarities in the sensor operation.
- **Talker filter** - filtering of messages by header. The headers that the system accepts are specified in commas. Messages with other headers will be ignored and data from such messages will not be processed by the ECDIS.
- **Strict verification of sentences** - depending on the sensor manufacturer, different implementations of sentence generation may be encountered. When the checkbox is ON, the ECDIS verifies sentences in strict accordance with the IEC 61162-1 standard. When the checkbox is OFF, the ECDIS ignores some non-critical deviations from the IEC 61162-1 standard, making it possible to process such messages. For example, it ignores missing letters in fixed sentence fields, the presence of which does not affect the quality of the parsed information.
- **NMEA Message Type Selection** - Check the boxes corresponding to the types of NMEA messages to be received.
- **CRC Column Switches** - Enables the verification of message checksums. Messages with incorrect checksums will not be received if this checkbox is enabled. Disable checksum verification if necessary to receive such messages.

11.4 Position Source



The sensor must be connected and configured according to the procedure outlined in 11.3.

The coordinate source can be the **INS (Integrated Navigation System)**. For details, refer to section 12

ECDIS considers the position of the GNSS antenna relative to the **CCRP (Common Reference Point)**. It is mandatory to set the GNSS antenna's position within the ship's coordinate system.

GNSS receivers support multiple satellite navigation systems. Each SNS is identified by specific

sentence headers:

- GN - Global navigation satellite system (GNSS)
- GL - GLONASS positioning system
- GP - Global positioning system (GPS)
- GA - Galileo positioning system
- GB - BeiDou positioning system
- GI - IRNSS positioning system
- GQ - QZSS positioning system
- SN - Electronic positioning system, other/general.

• **NOTE**

The type of positioning system is identified by its sentence header:

- **GLONASS:** Uses the GL header in its sentences.
- **GPS:** Uses the GP header in its sentences.

In ECDIS, the navigator can configure the sentence filter to select data from a specific GNSS or from all available GNSS simultaneously (refer to the list above). For details, see **Sensors** in the relevant section.

The ECDIS time is automatically synchronized with UTC time received from GNSS through the **ZDA sentence**:

- **At Startup:** Synchronization occurs each time ECDIS is switched on.
- **During Operation:** Synchronization is performed whenever the difference between system time and received time exceeds **5 seconds**.

If time synchronization data is unavailable or compromised:

- The current system time of the ECDIS computer is used for calculations until the time source is restored.
- The ship operator cannot manually change the system time.

11.4.1 Position sensor features

The positioning sensor data is processed by ECDIS to account for the receiver's offset relative to the ship's CCRP (Common Reference Point). The recalculated data is and displayed in the Navigational Panel. 4.6 and Log book, under Track - 16.

11.4.2 Track Vector Generation

The ship's track vector is generated based on positioning sensor data.

For vector display settings, refer to section 6.3.

The track vector is plotted from the CCRP as defined in the ship's dimensions (see section 6.2).

11.4.3 Differential Receiver Warnings

If the Differential Receiver is enabled in the GNSS settings and the differential signal is lost:

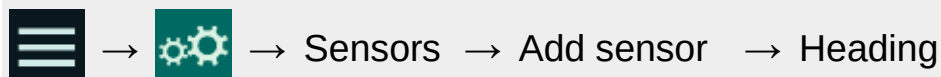
ECDIS generates a warning: "Differential signal lost" (see the Alerts table).

Coordinate and motion indicators in the Navigation Indicator will be highlighted in yellow.

Table 5: Program messages from the positioning sensor

TEXT	CATEGORY	CONDITION
Position (COG/SOG) error: <sensor name>	Warning	When the sensor data ceases to be received by a configurable timeout.
NDOP exceeded: <sensor name>	Caution	When the HDOP parameter value is greater than 4. Only works when broadcasting GNSS HAP messages \$--GSA,GNS.
No GNSS solution: <sensor name>	Warning	The Mode indicator in the message has the value N (No fix) for packages: GLL, GNS, RMC.
Position lost: <sensor name>	Alarm	Positioning system mode Indicator takes value E in messages: RMC, GLL, GNS or when it is impossible to get latitude/longitude from any packet: RMC, GLL, GNS.
Differential signal lost: <sensor name>	Warning	Positioning system mode Indicator changes from D to any other value in messages: RMC, GLL, GNS, or when it is impossible to get latitude/longitude from any packet: RMC, GLL, GNS.
Differential corrections do not apply: <sensor name>	Warning	Age of differential GPS data (in GGA, GNS messages - empty field. If the receiver was in differential mode before that
GNSS data integrity violated: <sensor name>	Warning	If the parcel fails the CRC check.

11.5 Heading Source



The sensor is connected and configured according to the procedure described in section **11.3**.

The source of the heading can be the compass or the **INS**.

Make sure that the processing of received messages is set correctly in the sensor settings.

Cursors, depending on the physical principle of operation, convey the following sentence headings:

- HC - magnetic compass
- HE - gyrocompass, free in azimuth
- HF - induction magnetic compass
- HN - gyrocursor, gyroazimuth
- GP, GL, GA, GB, GN - satellite compass
- SN - data from inertial navigation system
- U0...U9 - non-standard header (usually used by manufacturers of non-standard equipment). It is rarely used.

The pointer has no specific settings.

11.5.1 Heading sensor features

The heading provided by the sensor is displayed in:

- Navigational Panel
- Danger Course Indicator
- Logbook Track



11.5.2 When Heading Sensor Data Is Unavailable

If the heading sensor does not provide data:

The vessel symbol on the chart is shown without a heading line.

ECDIS displays a notification about the missing heading data.

11.5.3 Functions Enabled by the Heading Sensor

Drift Calculation: Calculates total drift and applies it to navigation.

Wind calculation.

Drift Motion Monitoring: Calculates the vessel's drift and defines a monitoring zone.

Anchor Watch: Activates anchor watch to monitor the vessel's position while at anchor.

Vessel Outline: Displays the vessel's outline on the chart at the current scale.

Table 6: Program messages from the heading sensor

TEXT	CATEGORY	CONDITION
Heading error: <sensor name>	Warning	When the sensor data ceases to be received by a configurable timeout.
Simulation Mode: <sensor name>	Warning	In the THS message, the Mode indicator field has the value S - simulation mode.
Course calculation mode: <sensor name>	Warning	In the THS message, the Mode indicator field has the value E - numeric mode.
Manual course entry:<sensor name>	Warning	In the THS message, the Mode indicator field is set to M - manual entry.
Heading data is incorrect: <Sensor name>	Warning	In the THS message, the Mode indicator field is set to V - data is invalid.
Magnetic declination unknown: <sensor name>	Warning	It is not possible to obtain or calculate True Course, i.e. HDG message is used to calculate and display course in the System and there is no magnetic declination data.

11.6 Speed Source



Sensors → Add sensor → Speed Log

11.6.1 Setup and operating features

The speed sensor must be connected and configured according to the instructions in 11.2.

Data Sources for speed sensor

- Speed Log.
- INS (Integrated Navigation System).

When relative speed data is received, ECDIS displays the speed vector relative to the water.

• NOTE

If multiple speed logs transmit **VBW** and/or **VHW** messages:

- Configure each log as a separate navigation sensor.
- Enable processing for only one **VBW** or **VHW** message to avoid conflicts.

ECDIS calculates the total relative speed vector using the longitudinal and transverse components of the speed vector from the VBW message.

11.6.2 Functions Enabled by the Speed Sensor

When a speed sensor is operational, ECDIS enables:

- **Drift Accounting:** Calculates and accounts for total drift.
- **True Wind Calculation:** Determines true wind impact on navigation.
- **Drift Motion Monitoring:** Calculates the vessel's drift motion and constructs a monitoring zone.

The ship's relative speed data, source name, sensor status, and speed type are displayed on the **Navigational Pane**.

Table 7: Program messages from lag

TEXT	CATEGORY	CONDITION
STW error: <sensor name>	Warning	When the sensor data ceases to be received by a configurable timeout.
STW sensor data is incorrect	Warning	In the message \$--VBW in the Status field of the relative velocity V = the data is incorrect.

11.7 ECDIS and AIS



Connect and configure the transducer according to the procedure described in **Vessel settings (Vessel data)**.

Make sure that the processing of received messages is correctly configured in the sensor settings: header and type processing, checksum verification are enabled.

The NES-3000 receives the following messages:

messages: 1,2,3 and 5 (AIS Class A and AIS-SART);

messages: 18, 19 and 24 (AIS Class B);

messages: 9 (AIS on aircraft search and rescue);

messages: 21 (AIS SNO);

messages: 12 and 14 (MSI messages).

AIS Message Header:

1. AI - Mobile AIS station;
2. AR - NMEA 4.0 AIS Receiving Station;

Once the **AIS** sensor has been configured and enabled, the **AIS (AIS)** window will become available in the **Multifunction Window**.

• TIP

If the AIS sensor is set to receive VDM and VDO messages, but VDM is not broadcast, the AIS will be considered faulty. This is due to the fact that if there are no reports from other vessels, the message is not transmitted. At the same time, the own vessel report transmitted to VDO is obligatory.

11.8 ECDIS and Echo



Connection and initial setup of the transducer is performed according to the procedure described in the **11.3** section.

Make sure that the processing of received messages is correctly configured in the sensor settings, i.e. the processing of the corresponding headers is enabled and the checksum check is configured.

The sounder transmits sentences with the following headings:

1. SD - Sounder, depth;
2. SS - Sounder, scanning;
3. YX - Transducer.

Verify Sensor Settings:

Message Processing: Confirm that the processing of received messages is properly configured.

Header Processing: Ensure header processing is enabled.

Checksum Verification: Verify that checksum validation is correctly configured.

Once the Echo Sounder sensor is created and configured, the **Echo mode** will be accessible in the **Multifunction window**.

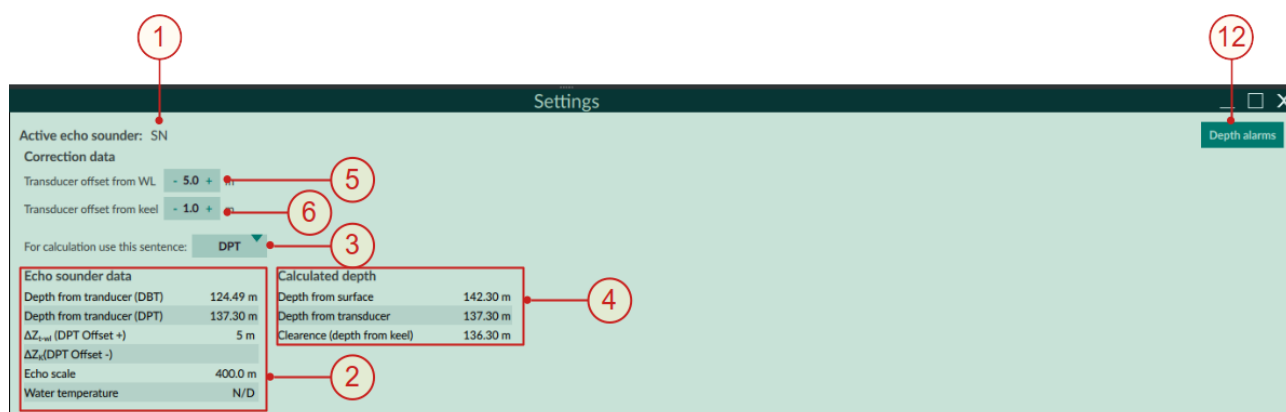
Echo sounder operation features

To begin using the Echo Sounder in ECDIS, you must configure the primary sounder. If only one echo sounder is connected, it will automatically be designated as the main one. If multiple echo sounders are connected, priorities must be assigned to ensure proper operation. The echo sounder with the highest priority will be selected as the main one.

Navigate to Echo settings:



In the Echo Settings, you can configure corrections and select the echo sounder sentence (e.g., DBT or DPT) to be used for depth calculations.

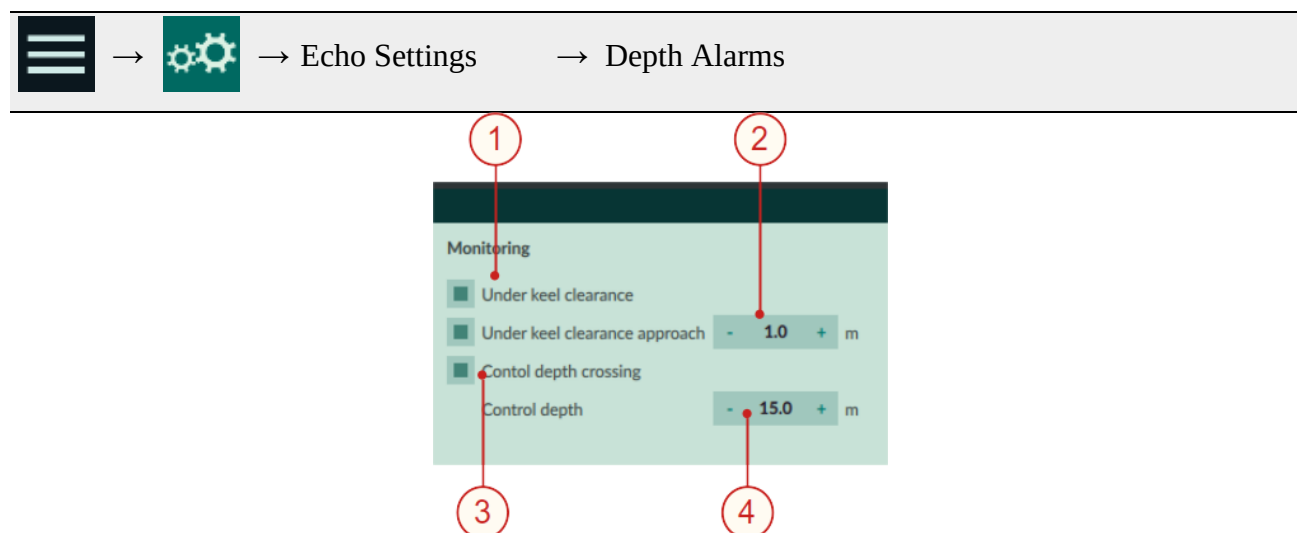


1 Active Echo Sounder: Displays the name of the main echo sounder in use

2	Echo Sounder Data: Shows the data values from the sentences broadcast by the active echo sounder.
3	For Calculation Use This Sentence: Select the sentence (DBT or DPT) for depth calculations
4	Calculated Data: Displays the depth value with corrections applied.
5	Transducer Offset from WL: Set the transducer offset from the waterline (0 to 29.9 m, default is 0).
6	Transducer Offset from Keel: Set the transducer offset from the keel (0 to 29.9 m, default is 0).

11.8.1 Alerts

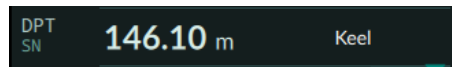
Navigation:



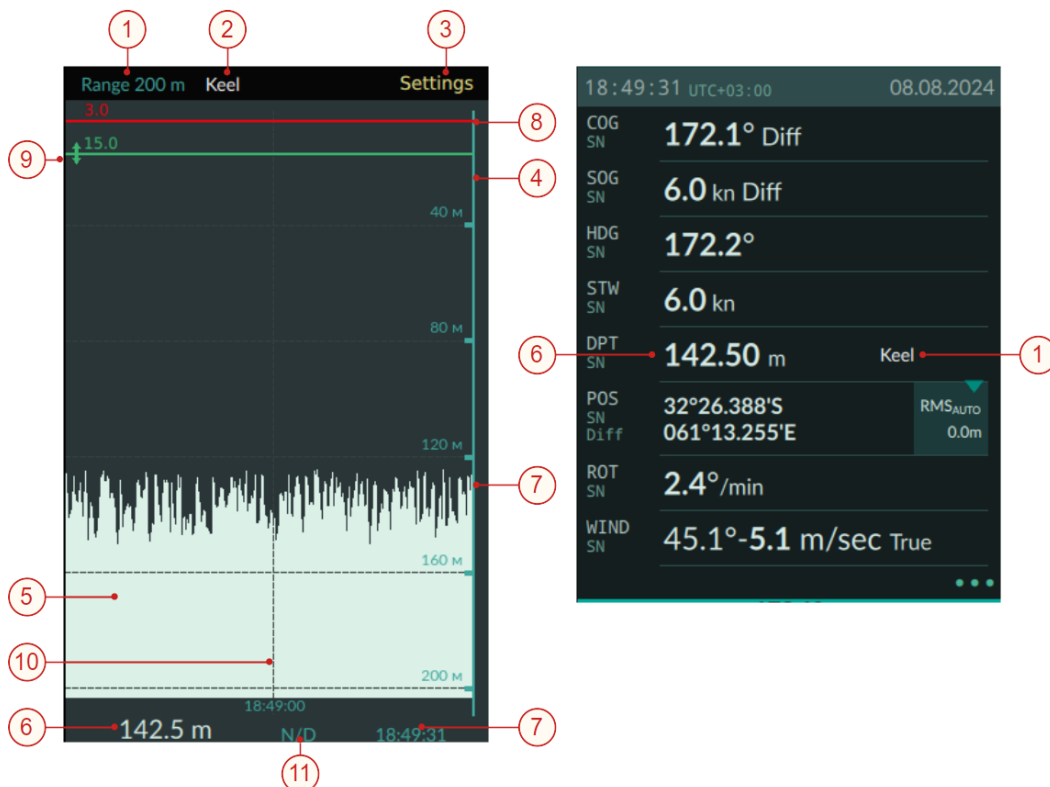
1	Under Keel Clearance: This alarm monitors the minimum depth reserve, ensuring that the vessel has adequate clearance under the keel. The value can be set in the Ship Dimensions under the Under Keel Water Reserve field.
2	Under Keel Clearance Approach: This feature provides an advance notification before the vessel reaches a critical depth. It's configurable to alert when the vessel is a specified number of meters away from the minimum depth.
3	Control Depth Crossing: Enables an alarm when the vessel crosses a predetermined control depth, helping to ensure the vessel stays within safe operational depth limits.
4	Control Depth: The specific depth value that will trigger the Control Depth Crossing warning when the vessel reaches or exceeds it.

11.8.2 Depth Data Display

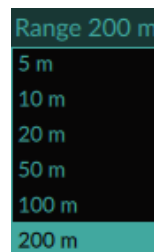
The measured and corrected depth data is displayed in the **Navigation Panel**, giving you real-time depth information.



To view the **echogram**, go to the **multifunction window** and press the **Echo** button. This will show you the graphical representation of the seabed and any objects detected by the echo sounder.



- 1 Scale drop-down list:** Adjusts the scale of the echogram.



- 2 Depth reference line:** Select from options like **Waterline**, **Transducer**, or **Keel**, which determine the reference point for depth measurement. Depth recalculation is done based on the settings entered in the **echo sounder settings**.

		Keel Waterline Transducer Keel
3	Settings: Opens the depth monitoring settings .	
4	Echogram scale: Displays the echogram's scale in meters	
5	Echogram scale: Displays the echogram's scale in meters	
6	Depth value: Shows the depth at the selected point on the echogram.	
7	Current depth and timestamp: Displays the real-time depth and time.	
8	Under keel clearance: Shows the clearance value based on the Under Keel Clearance alarm settings (0)	
9	Reference depth: Set in Echo Sounder Monitoring settings , this depth is adjustable by dragging the line on the echogram.	
10	Time stamps: Displayed on the echogram to show when measurements were recorded.	
11	Water temperature: The temperature measured by the echo sounder, shown in degrees Celsius.	

The echogram in ECDIS displays the last 15 minutes of echo sounder operation. To view previous depth values:

- **Move through the echogram:** Press and hold the left mouse button (or touch the screen) on the graph, then drag the cursor (or finger) to the right to view earlier data.
- **Return to current readings:** Left-click (or touch) the current time stamp indicator to jump back to the live readings.

11.8.3 Navigation log entry

All depth values **are recorded** in the **Navigation Log** (see 16.1).

NOTE

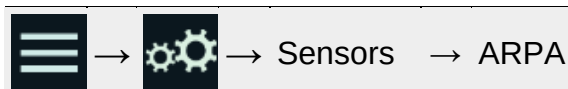
The depths measured by the echo sounder are recorded in the Navigation Log only at the frequency of data received from the GNSS receiver. Echo sounder data received by ECDIS between GNSS observations are not recorded in the Navigation Log.

Table 8 Program messages from the Echo sounder

TEXT	CATEGORY	CONDITION
------	----------	-----------

Echo sounder sensor malfunction <sensor name>	Alarm	Triggered when the sensor data ceases to be received within a configurable timeout
Reference depth <sensor name>	Warning	Activated when the measured under keel clearance from the echo sounder is less than or equal to the depth value set in the reference depth field.
Dangerous stock under keel <sensor name>	Warning	Triggered when the measured under keel clearance is less than or equal to the value set in the ship's dimensions, plus the value from input field 2
Minimum stock under keel <sensor name>	Alarm	Triggered when the measured under keel clearance is less than or equal to the under keel clearance value set in the ship's dimensions.
Depth below hazardous isobath: <sensor name>	Alarm	Triggered when the measured total depth is less than or equal to the hazardous isobath value set in the settings

11.9 ECDIS and ARPA



Verify that: received message processing is correctly configured, header and message processing is enabled, and checksum verification is enabled.

If an ATS sensor is present, the NES-3000 processes messages with **RA** header only.

Once the ARPA is created and configured, the **ARPA** target data display mode will become available in the Multifunction Window.

11.10 ECDIS and BAM



ECDIS can connect to the **Bridge Alert Management (BAM)** system.

Features of BAM operation

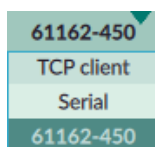
When working together with BAM, ECDIS receives and transmits the statuses of alarms, warnings and cautions circulating in the navigation bridge network. The alarms, warnings and cautions generated by ECDIS are sent to BAM via the configured communication channel. BAM performs processing, analysis, tracking of received messages, including escalation from warnings to alerts according to time criteria.

Confirmation of an alarm, warning or caution on the ECDIS will be sent to the network for processing by the BAM. In other words, the acknowledgement of generated alarms, warnings, cautions is equivalent on the ECDIS as the acknowledgement on the BAM workstation.

All received alarms are displayed in the alarms, warnings, cautions display area (see 4.1).

BAM connection

It is possible to connect to a limited set of interfaces.



The setting is made according to the requirements of the navigation bridge network.

The remaining settings are carried out according to 11.2.

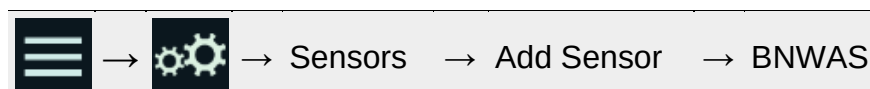
Alarm Acknowledgment

Acknowledging an alarm, warning, or caution on ECDIS sends the acknowledgment to BAM.

This means acknowledgment on ECDIS is treated as equivalent to acknowledgment on the BAM workstation.

All received alarms, warnings, and cautions are displayed in the **Alerts Display Area** (see section 4.15).

11.11 ECDIS and BNWAS



ECDIS communicates with the Bridge Navigational Watch Alarm System (BNWAS) by sending periodic updates.

A message (**\$EIEVE**) is transmitted every 15 seconds if the ship operator interacts with the graphical interface, including:

- Pressing buttons
- Moving the mouse or trackball
- Touching the touchscreen
- Network and Communication:

Connection to the internal secure bridge network and BNWAS is implemented according to the relevant documentation and standards.

This functionality ensures integration with the BNWAS, promoting operational safety and compliance.

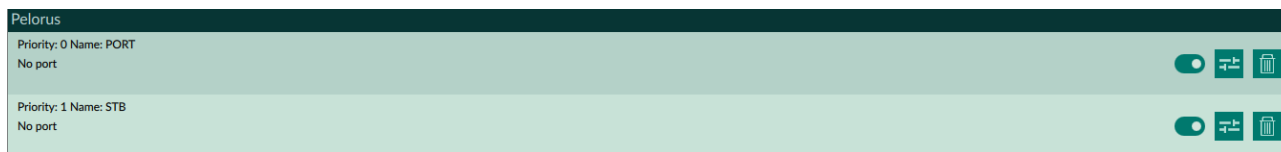
The sensor is configured according to the procedures described in the **Navigational sensors** section.

11.12 ECDIS and Pelorus

Pelorus is not a sensor to be connected to ECDIS. Pelorus is an installation point for optical direction finders. It is primarily used for visual bearing observations of navigational marks (landmarks, buoys, etc.).

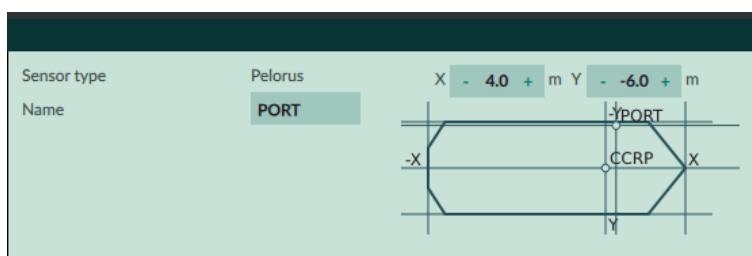
The Pelorus amount created in ECDIS is not limited in number.

The Pelorus amount in ECDIS shall correspond to the actual equipment of the vessel.



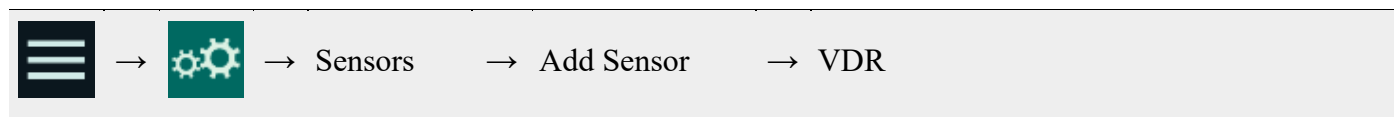
The Pelorus name should indicate the Pelorus location and avoid misinterpretation of the device used for measurements.

The Pelorus installation coordinates must be specified to an accuracy of 0.1 meters relative to the CCRP.



On large vessels, special care must be taken regarding the position of the Pelorus on either side of the ship or along its length. If the Pelorus position relative to the CCRP (Consistent Common Reference Point) or the ship's coordinate system is not correctly accounted for, errors may occur in the bearing calculations.

11.13 ECDIS and VDR

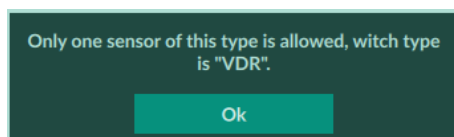


The Voyage Data Recorder (VDR) is used to record voyage data.

ECDIS sends information to the VDR at set intervals.

In ECDIS, the VDR functions as a sensor.

You can configure only one VDR in ECDIS.

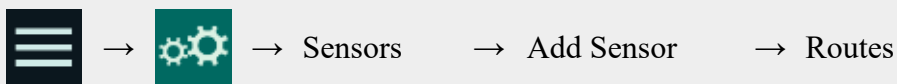


The VDR settings differ from the standard navigation sensors settings.

1	Network Protocol to transmit a data set: RRUDP - data transmission with acknowledgement of data reception RAUDP - data transmission without acknowledgement of data reception
2	Protocol version of data transmission - must correspond to the protocol version implemented in the VDR. Incorrect selection of the transmission protocol will result in non-receipt of VDR data from ECDIS
3	Device - number of the device receiving data sets.
4	Channel - data transmission channel in the network-450 (for VDR always 1)
5	VDR SFI is the unique network identifier of the receiving device. Must match the VDR SFI.
6	Interval of packages to be sent (active ECDIS) - interval of transmission in Master role.
7	Interval of packages to be sent (inactive ECDIS) - transmission interval in Backup role.
8	Image format - ECDIS transmits screenshots to VDR. The image format must correspond to the format accepted by the recorder
9	Network settings - network settings-450. Default settings correspond to the basic recommended settings. Manual settings allow you to manually configure the Network-450 settings.
10	Address (multicast) - address in the network-450 for transmission of multicast data set.

11	Port - network-450 port
12	IP address - address of the ECDIS network device where connection to the network-450 is configured. Enter the address when there are 2 or more network devices on the ECDIS computer. Address 0.0.0.0 (default) when there is one network device.

11.14 ECDIS and Route sensor



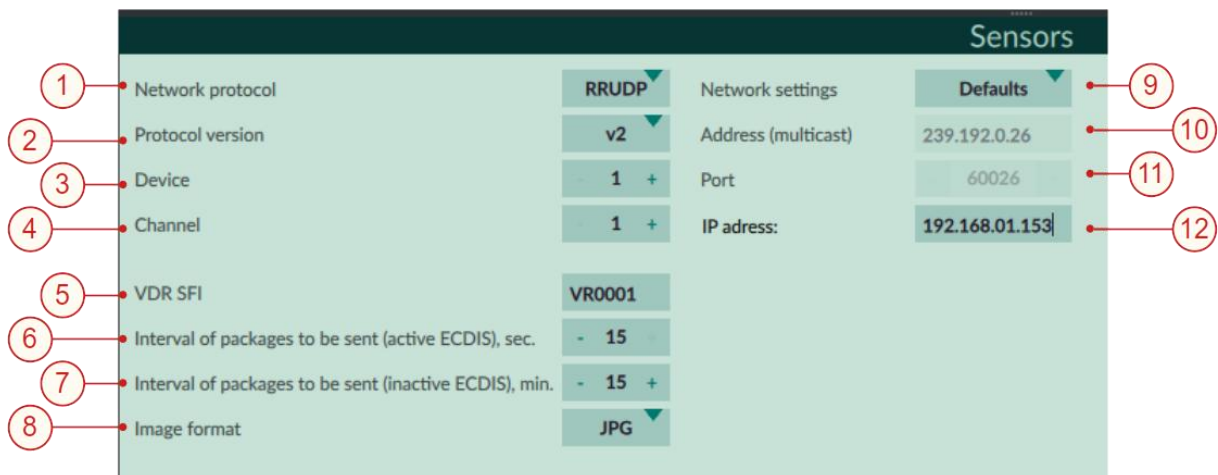
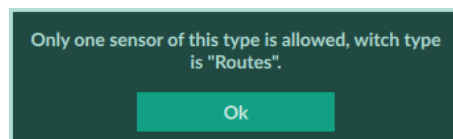
The **Route** sensor is designed to transmit the route generated in ECDIS to external consumers in the network-450 or to receive routes from devices in the network-450

The **Route** sensor settings differ from the standard settings for navigation sensors.

ECDIS sends and receives routes in **RTZ** format only.

ECDIS treats **Route** as a sensor.

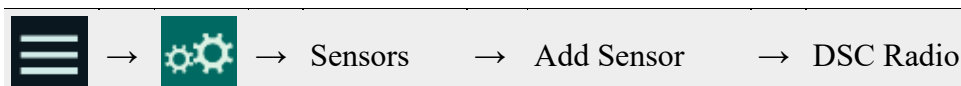
Only one **Route** sensor can be created in ECDIS.



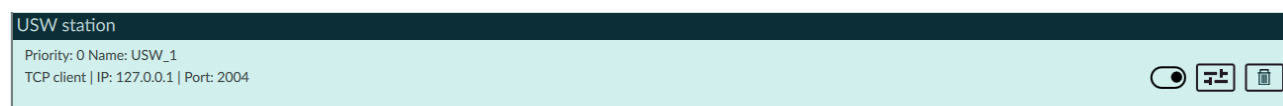
1	Network Protocol: This parameter defines the data transmission protocol RRUDP RAUDP RRUDP
---	--

	RRUDP: Ensures data transfer with reception confirmation. RAUDP: Transfers data without reception confirmation;
2	Protocol Version: The version of the data transmission protocol used. It must match the protocol version implemented on the VDR. Incorrect protocol selection will result in ECDIS failing to send data to the VDR.
3	Device: The device number that receives data packets.
4	Channel: The data transmission channel in Network-450. For VDR, the channel is always set to 1.
5	VDR SFI: The VDR's unique network identifier (SFI). This must match the VDR's specified SFI.
6	Interval of Packages to be Sent (Active ECDIS): The interval for data transmission when ECDIS operates in Master mode.
7	Interval of Packages to be Sent (Inactive ECDIS): The interval for data transmission when ECDIS operates in Backup mode
8	Image Format: ECDIS sends screen captures to the VDR. The image format must match the one supported by the recorder.
9	Network Settings: These define the Network-450 settings: Defaults: Recommended configuration settings. Manual: Allows manual configuration of Network-450 parameter
10	Address (Multicast): The multicast address in Network-450 for transmitting data packets.
11	Port: The port used in Network-450.
12	IP Address: The IP address of the ECDIS network interface connected to Network-450. If the ECDIS computer has multiple network interfaces, the correct IP address must be specified. The default address 0.0.0.0 should be used when there is only one network interface.

11.15 ECDIS and DDCS

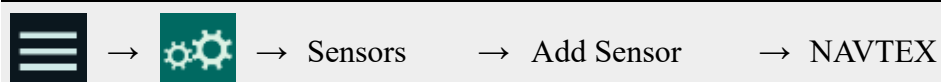


1. Connect and configure the transducer according to the procedure described in 11.2.



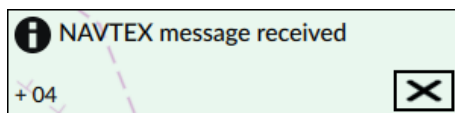
2. Make sure that the processing of received messages is correctly configured in the sensor settings: header and type processing, checksum verification are enabled.
3. CCCB message header:
 - CD - digital selective calling (DSC);
4. Once the **DDCS** sensor has been configured and enabled, the **DDCS** window will become available in the **Multifunction Window**.

11.16 ECDIS and NAVTEX



The ECDIS, when connected to a NAVTEX receiver, is capable of receiving and processing NAVTEX messages. These messages are displayed in the NAVTEX window, stored for future reference, and can be managed using mariner's objects specifically designed for this purpose.

When the ECDIS receives a message from the NAVTEX receiver, a notification will appear in the Notification Area.



Navigation:



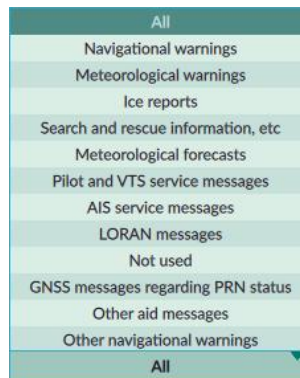
The list of received messages will be displayed in ECDIS, showing all messages transmitted by the NAVTEX receiver. ECDIS does not limit the number of stored messages and does not filter messages by coverage area.

Time of message (U...)	Transmitter	Subject	Number	Frequency	Status	
• 18:27 09/08/2024	M	Navigational warnings	00	Not over air	Valid	🗑️
18:20 09/08/2024	J	Navigational warnings	00	Not over air	Valid	🗑️
• 18:20 09/08/2024	J	Search and rescue information...	00	Not over air	Valid	🗑️
• 18:20 09/08/2024	J	Meteorological warnings	00	Not over air	Valid	🗑️
• 18:19 09/08/2024	J	Meteorological warnings	00	Not over air	Invalid	🗑️
• 18:15 09/08/2024	A	Navigational warnings	00	Not over air	Valid	🗑️
• 18:16 25/07/2024	A	Navigational warnings	00	Not over air	Valid	🗑️
• 18:16 25/07/2024	A	Navigational warnings	00	Not over air	Valid	🗑️
• 18:16 25/07/2024	A	Navigational warnings	00	Not over air	Valid	🗑️

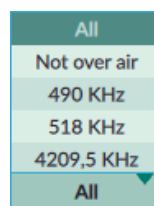
Filter: Transmitter ▼ Subject ▼ Frequency ▼ Delete all

1	Message reception time
2	Identifier of the station that transmitted the message
3	Type of message received
4	Number of messages in a composite (long) message
5	The frequency on which the message was transmitted
6	Status of the message received from the receiver
7	Deleting a message
8	Message not viewed
9	Message viewed
10	Filtering the table by transmitting station All A B C D E F G H I J K L M N O P Q R S T U V W X All

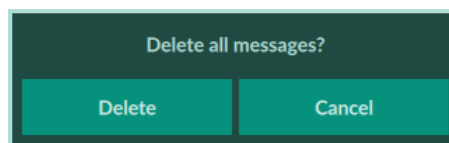
11 Filtering of the table by type of received messages:



12 Filtering the table by the frequency at which messages were received:



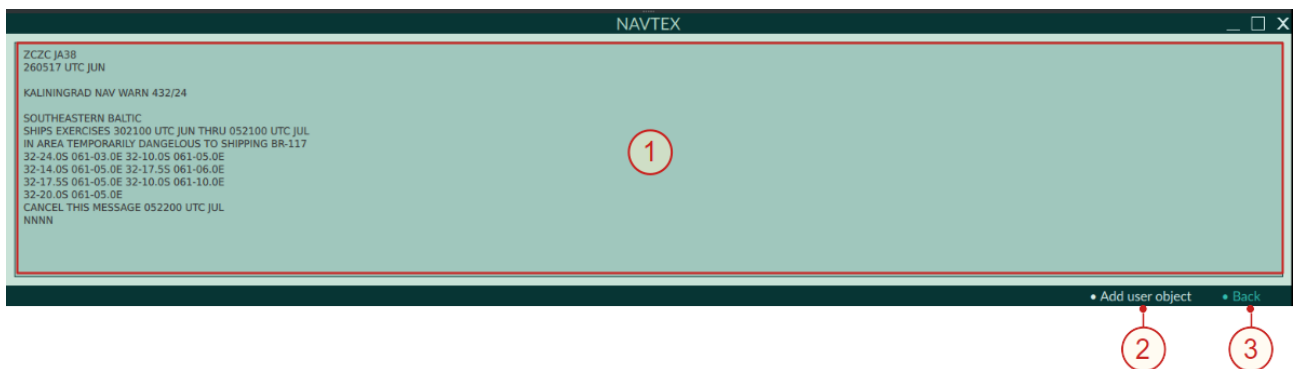
13 Delete all - the button of deleting all messages in the table.



NOTE

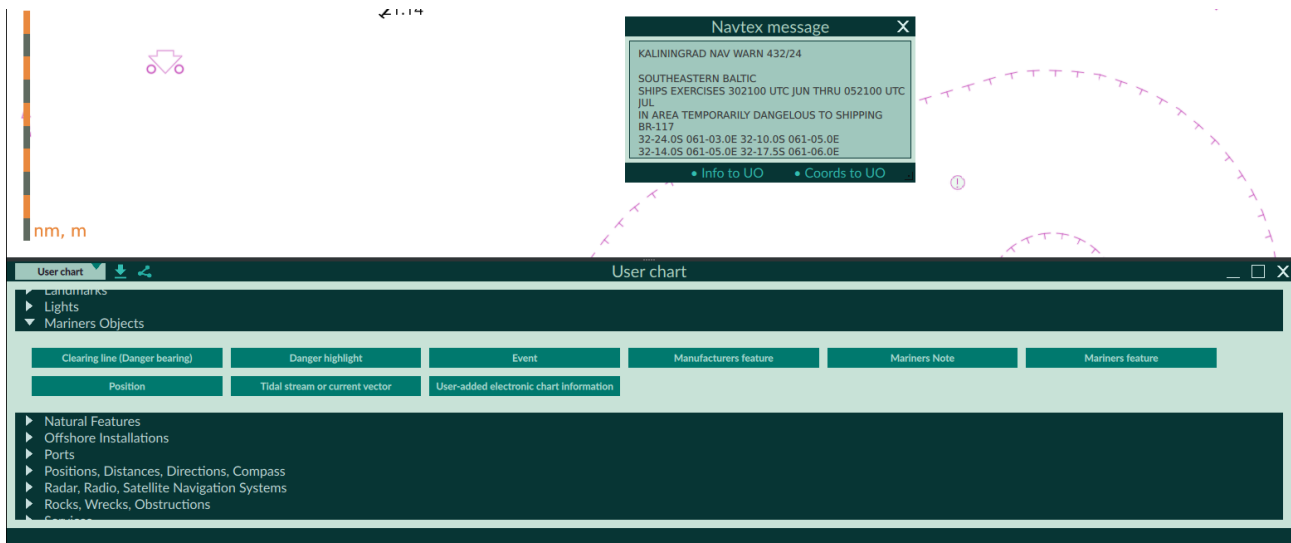
Filtering data in the message table only affects its display in ECDIS and does not impact the actual data received from the NAVTEX receiver.

To view the full text of a message, click on the corresponding line in the message table.

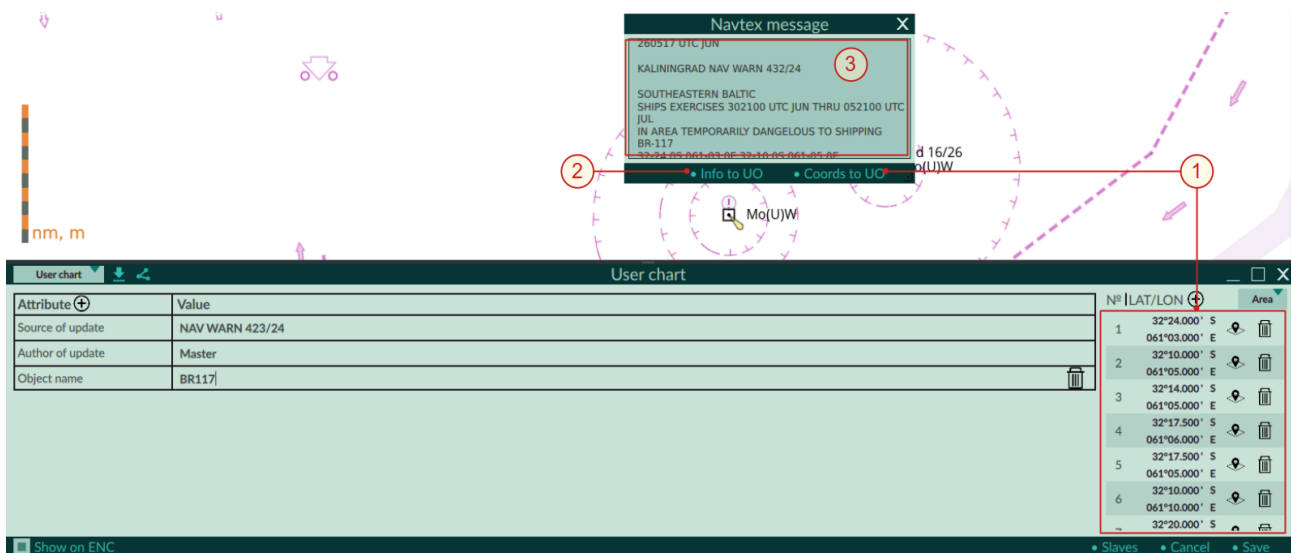


1	Message Text Field: Displays the message "as is" without correction or analysis by ECDIS, except for recognizing coordinates of objects.
2	Add User Object: A button to open the "Create User Objects" window for mapping data from messages (refer to relevant instructions)
3	Back: Returns to the list of received messages.

Objects are mapped using the "User Objects" tool.



Select the appropriate object type (Point, Area, or Circle geometry) for accurate mapping



1	Coordinates to UO: Transfers recognized coordinates from the message to User Objects. If coordinates are partially recognized, only valid coordinate pairs will be transferred. Unrecognized values must be entered manually.
---	---

	If no coordinates are recognized, a notification will appear in the message window. There are no recognized coordinates
2	Info to UO: Transfers additional object information to User Objects If an information attribute is missing in the selected object, a notification will alert the user in the message window The user object has no information attribute
3	Message Text: Displays full unedited message content for further reference.

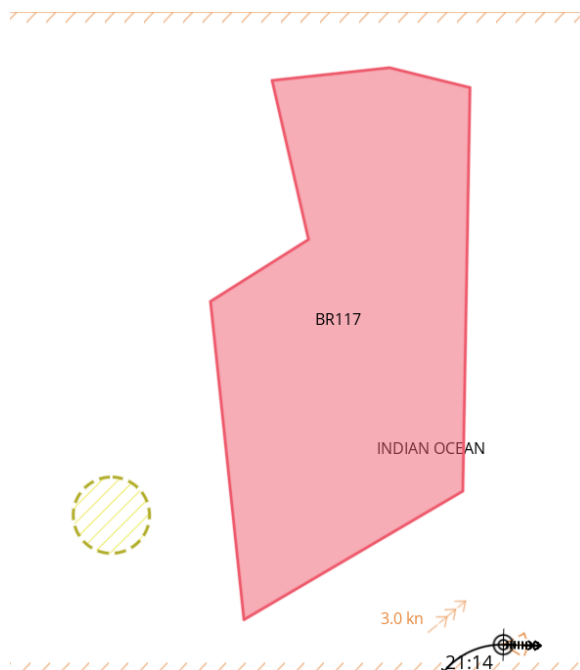
NOTE

The reason for the inability to decode object coordinates from the received message depends not only on the quality of reception but also on the format used to record the coordinates. The format for recording coordinates is not standardized in the regulations.

If a situation arises where the data can be read, but the ECDIS does not recognize the coordinates, it is necessary to take a photograph or a screenshot of the screen and send a notification to the ECDIS manufacturer.

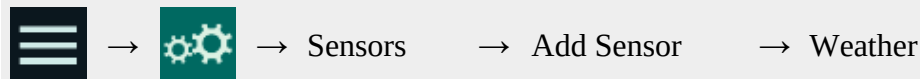
The ECDIS manufacturer will add the new coordinate recording format, release a software update, and send it to your address.

After saving the User Object (UO), the resulting object will be displayed on the chart.



11.17 ECDIS and Weather Instrument

Navigation:



11.17.1 Weather Instrument purpose

When a wind sensor is connected to the ECDIS, it provides wind characteristics that can be tailored to the navigator's specific needs. This allows for more informed decision-making during navigation.

A **Wind Tab** will appear in the **Multifunction Window**, providing detailed wind-related data.

Wind data, such as speed and direction, will also be displayed in the **Navigational Panel** to ensure this critical information is easily accessible during operations.

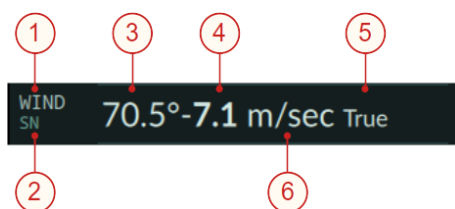
11.17.2 Weather Instrument Settings

To ensure the correct operation of the wind sensor, follow these steps:

- **Verify Receiver Settings:** Ensure that the receiver settings are accurately configured to process the received data messages.
- **Enable Header Processing:** Ensure that header processing is enabled in the system configuration to properly interpret the incoming signal.
- **Configure Checksum Verification:** Ensure that checksum verification is activated to validate the integrity of the received data.
- **Data Transmission:** The wind sensor transmits data in sentences with the following heading:
- **WI - Weather Instrument**

11.17.3 Weather Instrument operation features

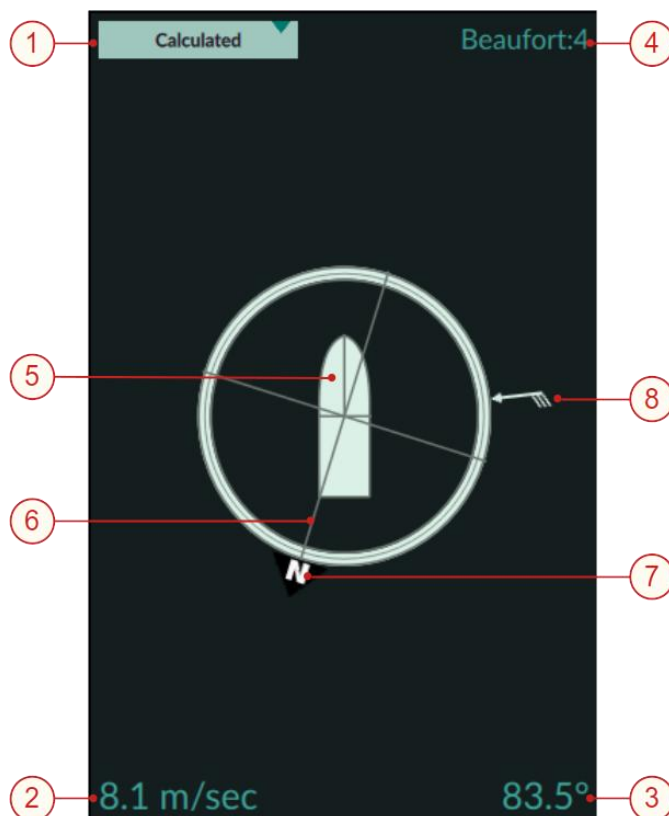
The wind data is displayed in the **Navigational Panel**.



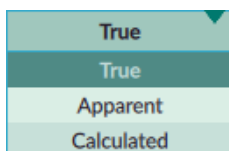
1	Parameter name
2	Sensor name
3	Wind direction depending on (5)

4	Wind speed depending on (5)
5	Wind type selected in the Multifunctional window Wind tab
6	Wind speed units.

In the Wind tab, the selected wind direction relative to the vessel is graphically displayed, providing the navigator with a clear visual representation of the wind's behavior in relation to the vessel's heading.



1	Wind type selection
2	Selected wind type speed
3	Selected wind type direction
4	Wind intensity in Beaufort number
5	Vessel symbol (bearing – always vertical)



6	Compass meridian (true by gyrocompass, magnetic by magnetic compass)
7	North compass direction
8	Selected wind type vector

	Узлы	Км/ч	М/с		Узлы	Км/ч	М/с
	0	0	0		33–37	61–65	17–18
	1–2	2–4	0,5–1		38–42	68–76	19–21
	3–7	7–10	2–3		43–47	79–83	22–23
	8–12	14–22	4–6		48–52	86–94	24–26
	13–17	25–29	7–8		53–57	97–101	27–28
	18–22	32–40	9–11		58–62	104–112	29–31
	23–27	43–47	12–13		63–67	115–119	32–33
	28–32	50–58	14–16				

An anemometer, depending on its model, can transmit data using specific standardized sentences, as outlined below:

- **\$--MWD** – Wind Direction and Speed

This sentence provides the wind direction and speed relative to the true or magnetic meridian.

It broadcasts accurate values of both wind speed and direction, which are crucial for understanding the overall weather conditions impacting navigation.

- **\$--MWV** – Wind Speed and Angle

This sentence conveys the wind speed and the wind angle.

The data can represent either the relative wind (wind relative to the ship's movement) or the estimated (design) wind relative to the true or magnetic meridian.

ECDIS, depending on the type of received sentence, recalculates the wind direction for the navigator's convenience:

1. **\$--MWD** — True (broadcast), Relative, Design.
2. **\$--MWV** — Relative: Relative (broadcast) and Estimated: Estimated (broadcast).

The wind direction is calculated using the formulas:

$$V_{tw} = \sqrt{STW^2 + V_{aw}^2 - 2STWV_{aw}\cos(K_{aw})} \quad (3)$$

$$K_{tw} = HDG + K_{aw} \pm KK \quad (4)$$

$$KK = \arccos \left[\frac{(V_{aw} - STW \cos K_{aw})}{V_{tw}} \right] \quad (5)$$

when:

STW — vessel speed, knots.

HDG — vessel heading.

V_{aw} — relative wind speed, knots.

K_{aw} — relative wind direction (convert to circular geographical system direction calculation by formulas (1) and (2)).

V_{tw} — true wind speed, knots

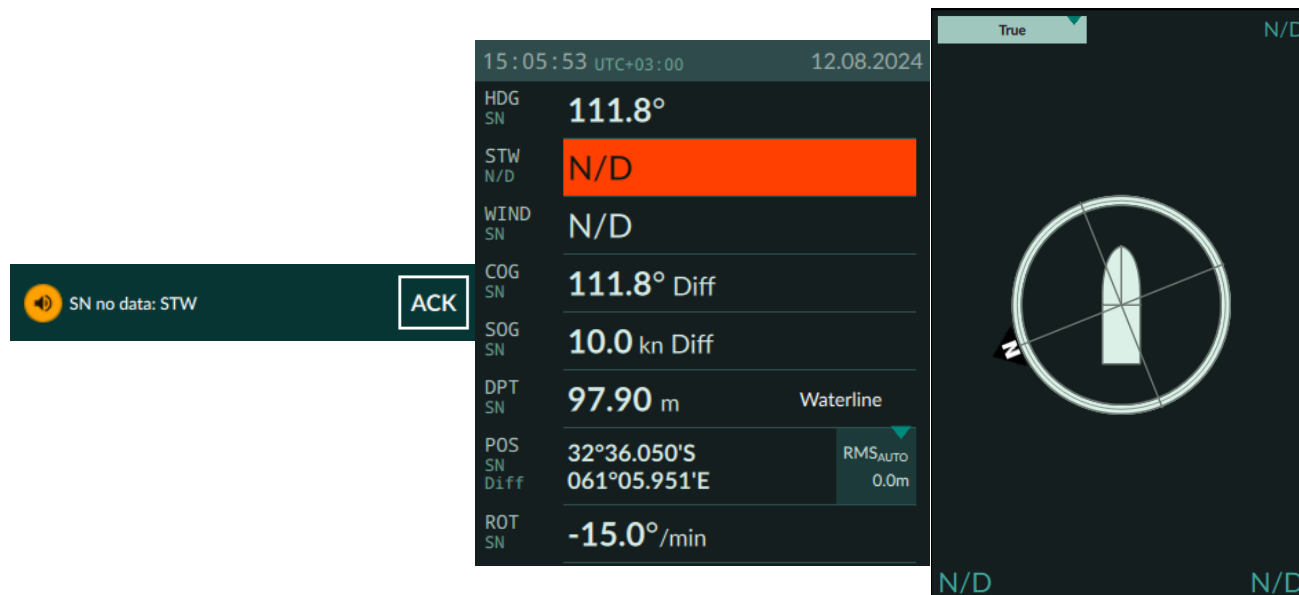
K_{tw} — true wind direction

KT — design wind direction

VT — design wind speed

KK — angle between true and relative wind

The wind conditions are calculated only when heading and speed data from the sensors are available. If heading and speed data are lost, the wind values cannot be recalculated:



 SN no data: Course

ACK

15:07:06 UTC+03:00		12.08.2024	
HDG N/D	N/D		
STW SN	10.0 kn		
WIND SN	N/D		
COG SN	98.6° Diff		
SOG SN	10.0 kn Diff		
DPT SN	113.70 m	Waterline	
POS SN Diff	32°36.097'S 061°06.160'E	RMS _{AUTO}	0.0m
ROT N/D	N/D		

True

N/D



N/D

N/D

12. INS

The Integrated Navigation System (INS) provides the following data:

- Vessel's position
- Vessel's heading
- Vessel's speed (STW)
- Speed generation mode
- Course over Ground (COG)
- Speed over Ground (SOG)
- Depth
- Time

When setting up the sensors for Positioning, Heading, Speed, and Depth, it is necessary to configure the connection to the INS according to the ship's documentation.

INS sends the **\$INNSR** sentence, which includes information about integrity, data confidence, and speed generation mode.

The ECDIS, upon receiving data from the INS, generates warnings and cautions regarding the status of the INS data. Additionally, the data statuses are displayed in the navigation panel.

12.1 INS settings

The configuration of the Integrated Navigation System (INS) depends on the system's architecture. INS may broadcast data to a single port or multiple ports to avoid overloading communication channels.

NOTE

During sensor configuration, it is important to consider that the **CCRS** (Consistent Common Reference System) is reduced to the **CCRP** (Consistent Common Reference Point)

When configuring sensors, ensure that the INS is set to transmit the following mandatory sentences:

Positioning:

\$--GLL

\$--DTM

\$--VTG

\$--ZDA

Heading:

\$--THS

Speed:

\$--VBW.

\$--VDR.

Depth:

\$--DPT

All sensors connected to the INS must receive the mandatory \$INNSR sentence.

If redundant sentences were selected during sensor configuration, enabling reception of the \$INNSR sentence will automatically disable any non-mandatory sentences.

The navigator, based on the console view results, can enable the reception of additional sentences from the INS for the specific sensor type, at their discretion.

12.2 INS messages

The INS may not support or perform data integrity and reliability assessments. This limitation can depend on the vendor, the protocol version implementation, or other specific reasons.

Table 9: Program messages, INS notifications (for all data types)

TEXT	CATEGORY	CONDITION
Malfunction of the <INS> sensor	Alarm	When the sensor data ceases to be received by a configurable timeout.
The course is unreliable.	Warning	Displayed in the Alarms, Warnings, and Cautions area.
The integrity of <parameter name> has been compromised.	Warning	Displayed in the Alarms, Warnings, and Cautions area.
The integrity of <parameter name> is questionable.	Warning	Displayed in the Alarms, Warnings, and Cautions area.
<parameter name> are unreliable.	Warning	Displayed in the Alarms, Warnings, and Cautions area.

NOTE

The navigator's response to INS warnings is determined by the prevailing conditions and circumstances.

Additionally, the \$INNSR sentence conveys the ship's speed generation mode, which is displayed in the **STW** line in the **Navigational Panel**:

- **Normal operation mode:** Only the speed value is displayed.
- **Estimated mode:** The speed is calculated without direct measurements relative to the water and is displayed as "Estimated."
- **Manual input mode:** The speed is manually entered from the INS and displayed as "Manual."

13. Discrepancy

13.1 Position discrepancy



Sensors



Position

When several positioning sensors are connected, ECDIS calculates the discrepancy between the observations.

ECDIS accepts the sensor with the highest priority (primary) as the reference sensor. The looseness is calculated only between the highest priority sensor and lower priority sensors (backup sensors). There can be several redundant sensors.

When switching to the numerical mode, the data entered by the navigator has the highest priority: the discrepancy is calculated relative to the calculated position.

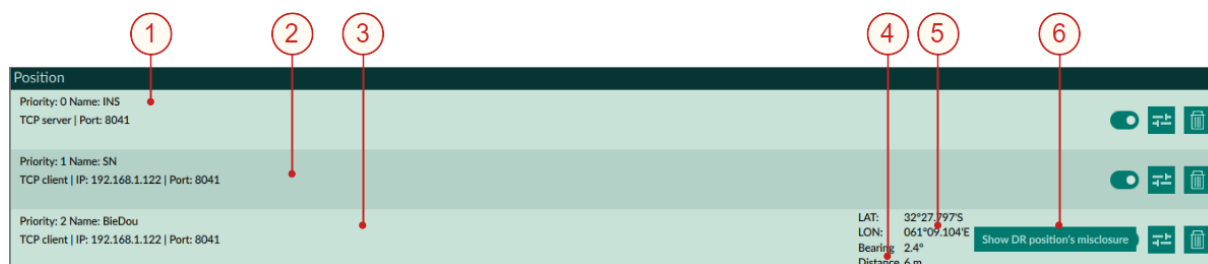
NOTE

Discrepancy is only calculated as a coordinate difference. The COG/SOG difference from the sensors is not evaluated.

The highest priority sensor is always only one.

Discrepancy is calculated with the frequency of sensor data arrival.

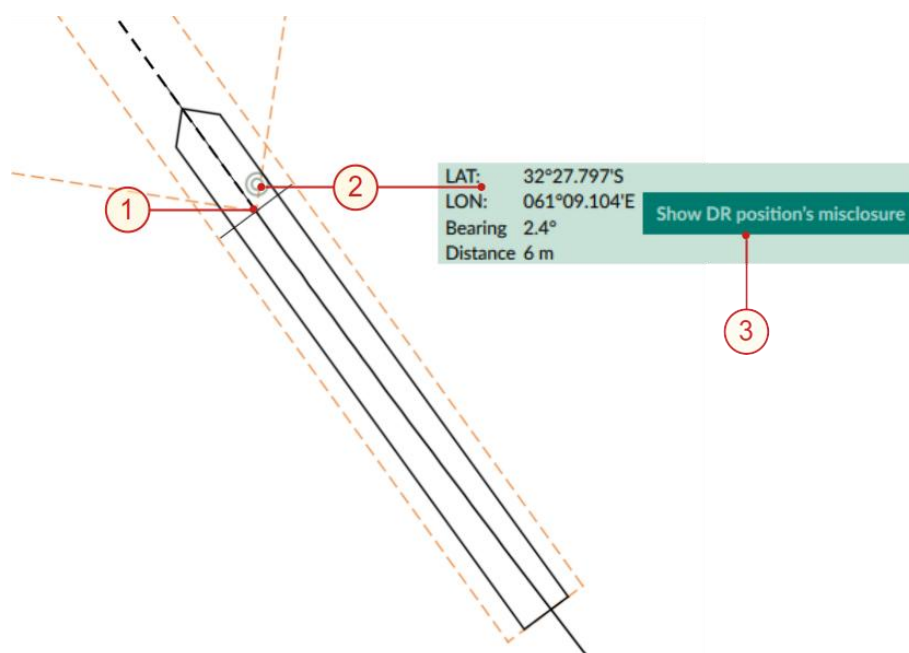
The discrepancy value is displayed in the redundant sensor row in Sensors.



1	Priority 0 Primary Sensor - No sensor data is received
2	Priority 1 Secondary sensor - sensor data is being received
3	Priority 2 Secondary sensor - sensor data is being received
4	Priority 2 Secondary sensor position
5	Discrepancy - instantaneous value of bearing and distance from the main sensor position to the backup sensor position
6	Show discrepancy - displays the position of the second sensor on the ENC.

NOTE

Discrepancy is calculated taking into account the distance of the sensor antennas from the DOT (CCRP)



1	Primary Sensor Position
2	Secondary sensor Position
3	Show discrepancy: press the button - displays the position of the second sensor on the ESC, press the button - removes the position of the second sensor from the ESC.

When switching to the numeric mode, the uncertainties are calculated for Primary and Secondary sensor positions entered manually by the navigator.

Position	
Priority: 0 Name: INS TCP server Port: 8041	
Priority: 1 Name: SN TCP client IP: 192.168.1.122 Port: 8041	LAT: 32°27.712'S LON: 061°09.035'E Bearing 146.5° Distance 20 m Show DR position's misclosure
Priority: 2 Name: BieDou TCP client IP: 192.168.1.122 Port: 8041	LAT: 32°27.712'S LON: 061°09.035'E Bearing 5.4° Distance 6 m Show DR position's misclosure

NOTE

Inconsistencies from two or more sensors are not displayed on the ENC at the same time.

13.2 Heading misclosure



Sensors



Heading

When multiple heading sensors are connected, ECDIS calculates Heading misclosure.

ECDIS accepts the sensor with priority 0 (main) as reference. The discrepancy is calculated only between the sensor with the highest priority and sensors of lower priorities (backup sensors). There can be several redundant sensors. The physical principle of operation of the sensors is not taken into account when calculating course divergence, with the exception of the magnetic compass. The divergence is calculated as the course difference.

NOTE

ECDIS calculates the discrepancy only between data of the same type.

When switching to the numerical mode, the data entered by the navigator has the highest priority: the

discrepancy is calculated relative to the manually entered heading.

The highest priority sensor is always only one.

The discrepancy is calculated with the frequency of data arrival.



1	Primary Sensor
2	Secondary sensor
3	Misclosure - instantaneous value of the difference between the courses of the main sensor and the backup sensor

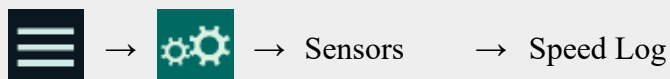
When switching to the calculation mode (when manually entering the course), the course discrepancy is counted relative to the manually entered course for each sensor connected to ECDIS, the data from which are received.

NOTE

The course divergence is calculated by taking into account the distance of the sensors from the CLO (CCRP).

There is no function for displaying the Backup Sensor course on the ENC.

13.3 Speed Log misclosure



When several speed sensors are connected, ECDIS calculates the discrepancy between the readings .

ECDIS accepts the sensor with priority 0 (main) as the reference sensor. The slack is only calculated between the highest priority sensor and lower priority sensors (backup sensors). There can be more than one redundant speed sensor. The physical principle of speed measurement of the sensors is not

taken into account when calculating the velocity discrepancy. The divergence is calculated as a course difference.

The type of speed sensor, relative or absolute, should be taken into account by the ship operator when setting up the ECDIS.

NOTE

ECDIS calculates the discrepancy only between data of the same type.



1	Primary Sensor
2	Secondary sensor
3	Misclosure - instantaneous value of speed difference between the main lag and the backup lag. Units - corresponds to the units set in the Units section. If the main and standby lags produce velocity values in different units, ECDIS brings them to the one set in the settings.

NOTE

The velocity discrepancy is calculated by taking into account the distance of the sensors from the DOT (CCRP).

When switching to numeric mode (when entering speed manually), the difference in speeds is counted against the manually entered speed.

There is no function to display the speed vector of the Backup Sensor on the ENC.

14. Target Management

14.1 General

The objects of target management are AIS and ARPA. The main functions contain show/hide the targets, view the information of the targets, etc.

14.2 AIS Target

14.2.1 Sensor configuration

Message Processing

Make sure that the processing of received messages is correctly configured in the sensor settings: header and type processing, checksum verification is enabled

Ensure proper configuration of received messages:

Header and Type Processing: Enabled.

Checksum Verification: Enabled.

Supported AIS Messages:

ECDIS accepts the following AIS message types:

Class A and AIS-SART: Messages 1, 2, 3, and 5.

Class B: Messages 18, 19, and 24.

Search and Rescue Aircraft: Message 9.

AIS Aids to Navigation (AIS OSS): Message 21.

Maritime Safety Information (MSI): Messages 12 and 14.

Application-Specific Messages (ASM).

AIS Message Headers:

- AI: Mobile AIS station.
- AR: NMEA 4.0 AIS receiving station.

After the AIS sensor is correctly configured and enabled, the AIS Window will be available in the Multifunction Window of ECDIS.

• TIP

If the AIS sensor is set to receive both VDM (messages from other vessels) and VDO (messages from own vessel):

The AIS may be considered faulty if VDM messages are not received.

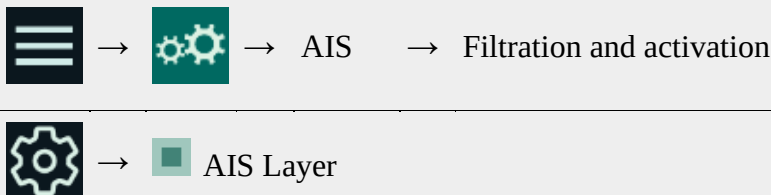
This occurs because the absence of other vessels' reports prevents VDM transmissions. However, VDO (own vessel reports) is always mandatory and should still be transmitted.

14.2.2 AIS operation features

To start using AIS:

Enable the display of AIS targets on the chart.

Navigation:

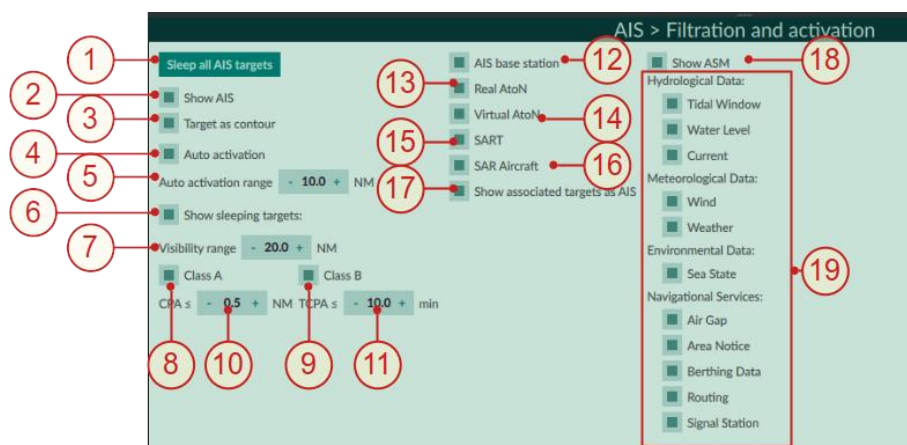


AIS Display:

Set the **Visibility Radius** to define the target display area.

Filter AIS targets by **class** and **convergence criteria**.

The navigator can switch the AIS layer display on or off in the **Quick Settings** (see Section 4.7).



1	Sleep All AIS Targets: Sets all AIS targets to sleep mode, making them inactive
2	Show AIS: Activates the AIS layer on the chart for target visualization.

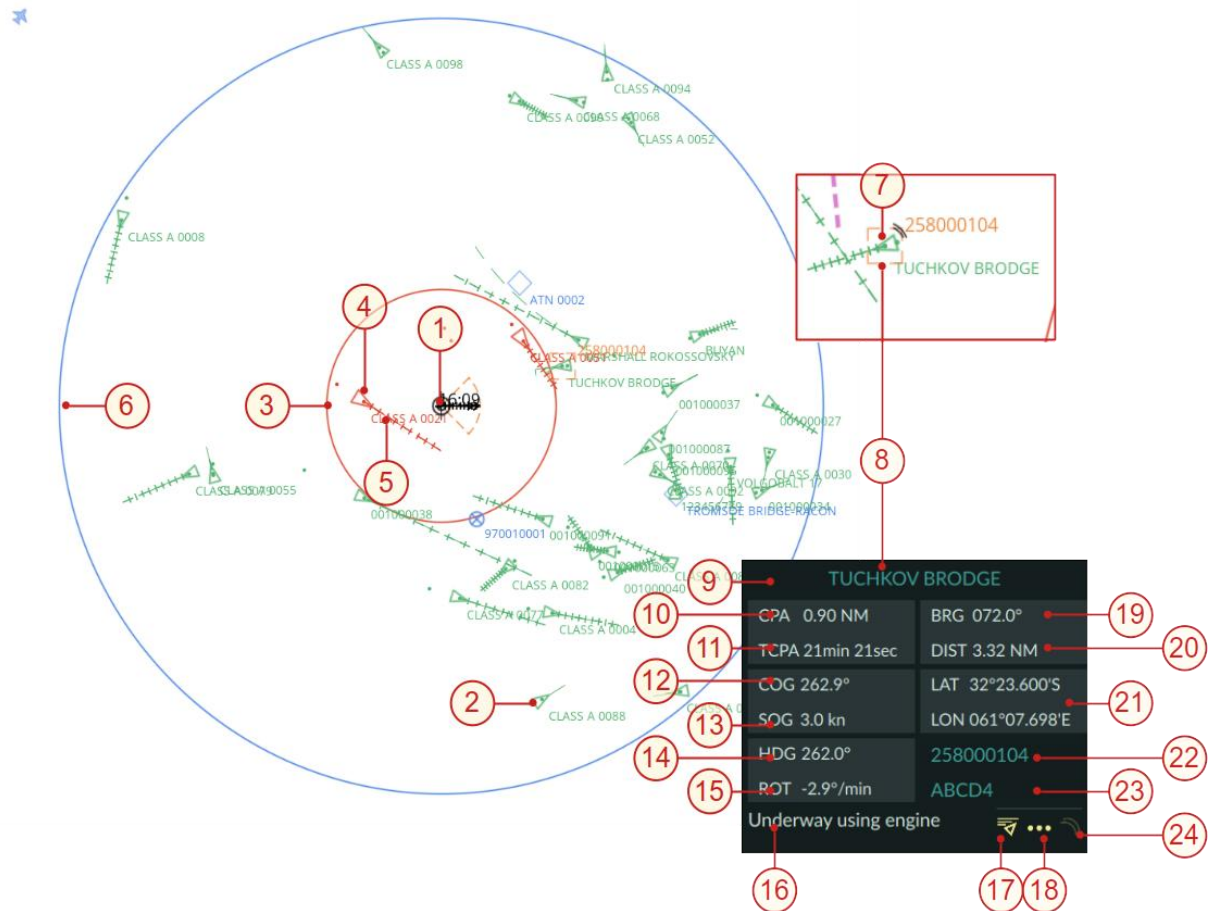
3	Target as Contour: Displays AIS targets as outlines on the chart if their dimensions are included in the transmitted message. Also applies to AtoN.
4	Auto Activation: Automatically activates AIS targets when specific conditions are met.
5	Auto Activation Range Circle: Defines the radius around the ship within which AIS targets are automatically activated upon entry
6	Show Sleeping Targets: Displays sleeping targets within the visibility range based on selected filtering parameters, such as Class A, Class B, CPA, and TCPA. The chosen parameters are shown in the permanent display area.
7	Visibility Range Circle: Sets the maximum range within which AIS targets are visible on the chart.
8	Class A: Enables or disables the display of sleeping targets classified as Class A
9	Class B: Enables or disables the display of sleeping targets classified as Class B
10	CPA (Closest Point of Approach): Enables or disables the display of targets whose closest approach distance is less than or equal to the set value.
11	TCPA (Time to Closest Point of Approach): Enables or disables the display of targets whose time to CPA is less than or equal to the set value (measured in minutes)
12	AIS Base Stations: Enables or disables the display of AIS base stations.
13	Real AtoN: Enables or disables the display of real navigation aids equipped with AIS
14	Virtual AtoN: Enables or disables the display of virtual navigation aids equipped with AIS
15	SART: Enables or disables the display of AIS Search and Rescue Transponder (SART) distress signals.
16	SAR Aircraft: Enables or disables the display of aircraft involved in search and rescue operations.
17	Show Associated Targets as AIS: Adds an association symbol to targets linked with AIS data.
18	Show Associated Targets as AIS: Adds an association symbol to targets linked with AIS data. See the ATS section for details
19	ASM Selection List: Provides a list of selectable ASM messages.

When the AIS layer is enabled, all AIS targets within the visibility radius are displayed on the chart.

• **NOTE**

The ECDIS system can process up to **256 AIS targets** simultaneously. If this limit is exceeded, the system analyzes targets by range and processes only the 256 closest targets to the ship. An alert is generated when this limit is reached.

To prevent system overload, it is recommended to reduce the visibility range and/or enable target filtering when the number of targets is too high.



1	Own Vessel: Represents the vessel currently in use
2	Sleeping Target: A target that is inactive or in sleep mode
3	Guard Zone: A zone in which a target becomes classified as dangerous upon entry.
4	Dangerous Target: A target considered a risk to the vessel's safety.
5	Name of the Dangerous Target: The identifier or name of the target deemed dangerous
6	Auto-activation Zone: An area where AIS targets are automatically activated.
7	Activated Target: A target with an active status.

8	Selected Target Symbol: A symbol representing the selected target. The target's details are displayed in the AIS Panel.
9	AIS Panel in the Multifunctional Window Area: Displays information about the currently selected target
10	CPA (Closest Point of Approach): The closest point the vessel will approach the target
11	TCPA (Time to Closest Point of Approach): The time until the vessel reaches the CPA of the target
12	COG: The course over ground (COG) of the selected target.
13	SOG: The speed over ground (SOG) of the selected target.
14	HDG: The heading of the selected target.
15	ROT: The rate of turn (ROT) of the selected target
16	Status - Target Navigational Status: The current navigation status of the target
17	Targets Table: Opens the table listing all tracked targets.
18	Details: Opens a detailed information table about the selected target
19	BRG on Target: The bearing of the target relative to the vessel
20	Distance (DIST) to Target: The distance from the vessel to the target
21	Target Coordinates: The geographical coordinates of the target.
22	Target MMSI: The Maritime Mobile Service Identity (MMSI) number of the target.
23	Target's Call Sign: The radio call sign of the target.
24	Messages: Opens the incoming messages table. When new messages are received from the target, a new message icon appears to the right of the button.

AIS targets are displayed based on the set filtering and activation settings. The coordinates, vectors, and trajectories of AIS targets are shown on the chart according to the latest message received, in line with the ECDIS settings.

Activation and Deactivation of Targets

Targets can be activated or deactivated automatically or manually.

Automatic Activation:

A target is activated when it enters the auto-activation radius or becomes dangerous.

A target is deactivated when it leaves the auto-activation area or its dangerous status is cleared.

Manual Activation:

Place the cursor over the target.

Right-click (or hold your finger down) to open the menu.

Select **Activate**.

The target will be activated.



Manual Deactivation:

Place the cursor over the target.

Right-click (or hold your finger down) to open the menu.

Select **Deactivate**.

The target will be deactivated.



14.2.3 Target information

The AIS window shows information about the selected target.

To view target information:

Click on the target with the left mouse button (or tap with your finger).

The target will be highlighted with a frame.

The AIS window will display details about the selected target.

.

TUCHKOV BRODGE	
CPA 0.90 NM	BRG 072.0°
TCPA 21min 21sec	DIST 3.32 NM
COG 262.9°	LAT 32°23.600'S
SOG 3.0 kn	LON 061°07.698'E
HDG 262.0°	258000104
ROT -2.9°/min	ABCD4
Underway using engine	

14.2.4 Guard zone

Navigation:



The Guard Zone is used to generate alarms for AIS and ARPA targets.



Guard Zone: Enables monitoring of targets entering the guard zone.

Guard Zone Size: Sets the radius of the guard zone.

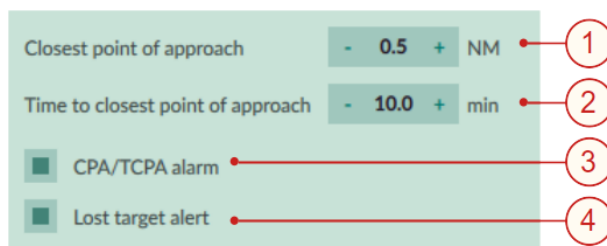
When the Guard Zone is enabled, a red circle is drawn on the chart with the vessel's position at the center. Targets entering the Guard Zone are automatically activated, marked as dangerous, and trigger an alarm on the ECDIS.

14.2.5 CPA/TCPA

The CPA/TCPA function monitors targets based on the closest point of approach (CPA) and time to closest point of approach (TCPA) .

Navigation:



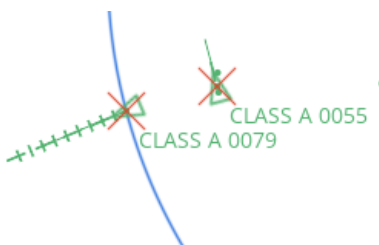


1	CPA/TCPA Alarm: Enables target monitoring for CPA and TCPA.
2	Closest Point of Approach: Sets the minimum safe approach distance
3	Time to Closest Point of Approach: Sets the minimum safe time to CPA.
4	Lost Target Alert: Activates monitoring for lost target

If the CPA or TCPA value of a target is less than the set threshold, the target is automatically activated, marked as dangerous, and an alarm is generated on the ECDIS.

14.2.6 Lost targets

When **Lost target alert** is enabled, targets that do not receive data within a certain timeout will be marked as **lost**. Lost targets are removed from the chart and a Lost Target Alert is generated.



Alerts are generated only for active targets.

If data for a dangerous target is no longer available, the target is marked as lost but remains on the chart. ECDIS generates a **Target Loss Warning**. Once acknowledged, the target is removed from the chart.

14.2.7 Own ship's AIS

You can view data from your own ship's AIS in ECDIS.

Navigation:



Targets



AIS



Own ship

AIS > Ownship

Send data to AIS device 3

Callsign	CALLSIGN
Name	NAME
MMSI	999999999
IMO	
POB	54
Check AIS device	No data
Destination	No data
ETA (UTC)	Underway using engine
Nav status	Pleasure Craft
Vessel type	6.0 m
Maximum present static draught	No data
Dimensions:	30.0 m
CCRP from bow	117.4 m
CCRP from stern	6.5 m
CCRP from port	6.5 m
CCRP from starboard	No data
Navigational data:	No data
Source	32°24.628'S
LAT	061°04.631'E
LON	090.3°
COG	6.0 kn
SOG	090.3°
HDG	No data
ROT	No data

Dimensions form AIS device

B: N/D m A: N/D m C: N/D m

D: N/D m

	AIS transmits 1	System data 2
CALLSIGN	CALLSIGN	CALLSIGN
NAME	NAME	NAME
999999999	999999999	999999999
54	54	54
No data	No data	No data
No data	No data	No data
Underway using engine	Underway using engine	Underway using engine
Pleasure Craft	Pleasure Craft	Pleasure Craft
6.0 m	6.0 m	6.0 m
No data	No data	No data
30.0 m	30.0 m	30.0 m
117.4 m	117.4 m	117.4 m
6.5 m	6.5 m	6.5 m
6.5 m	6.5 m	6.5 m
No data	No data	No data
No data	No data	No data
32°24.628'S	32°24.628'S	32°24.628'S
061°04.631'E	061°04.631'E	061°04.631'E
090.3°	090.3°	090.3°
6.0 kn	6.0 kn	6.0 kn
090.3°	090.3°	090.3°
No data	No data	No data
No data	No data	No data

System dimensions

B: 117.4 m A: 30 m C: 6.5 m

D: 6.5 m

1	AIS Transmits: Data broadcast by the AIS sensor.
2	System Data: Current data configured in the ECDIS settings to be sent to the AIS.
3	Send Data to AIS Device: Manually send your ship's data to the AIS device

14.2.8 Data transmission to the AIS transponder

Vessel data from ECDIS can be transferred to the AIS transponder.

Data entry is configured in the **Registration Settings**.

Data is automatically transmitted every 5 minutes.

Navigation:

→ Targets → AIS → Own ship → Send data to AIS device

Data is transmitted as VSD and SSD sentences and includes the following:

- Cargo category (Message 5).
- Navigation status (Messages 1, 2, 3).
- Draft (maximum actual static) (Message 5).
- Destination port (Message 5).
- Expected date and time of arrival (UTC) (Message 5).

14.2.9 Targets table

Navigation:

The **Targets Table** can be accessed via the **TARGETS TABLE** button in the AIS, ARPA, or USW Target tabs of the multifunction window. It includes AIS and ARPA targets, even those not displayed on the chart.

N°	NAME	CALL SIGN	DIST	BRG	CPA	TCPA	COG	SOG	HDG	LAT	LOX	SOURCE			
10	ARPA T10	No data	114.2NM	183.5°	111.5 NM	-246min 2...	184.3°	1.0 kn	N/D	34°18.648'S	060°56.439'E	ARPA			
2	ARPA T2	No data	N/D	N/D	N/D	N/D	N/D	N/D	N/D	nan°nan'S	nan°nan'W	ARPA			
3	ARPA T3	No data	1940.2NM	147.6°	N/D	N/D	141.6°	18.0 kn	N/D	59°42.326'S	086°04.003'E	ARPA			
4	ARPA T4	No data	1395.6NM	332.7°	489.0 NM	-4931min ...	334.7°	12.0 kn	N/D	11°44.710'S	049°33.583'E	ARPA			
5	ARPA T5	No data	686.5NM	007.3°	520.7 NM	-3360min ...	006.7°	6.0 kn	N/D	21°03.637'S	062°42.314'E	ARPA			
6	ARPA T6	No data	1064.8NM	062.5°	N/D	N/D	061.4°	9.0 kn	N/D	24°12.900'S	078°57.453'E	ARPA			
7	ARPA T7	No data	1337.3NM	258.1°	100.1 NM	-4592min ...	258.8°	12.0 kn	N/D	37°00.475'S	034°32.931'E	ARPA			
8	ARPA T8	No data	1323.3NM	255.7°	107.6 NM	-4579min ...	255.8°	12.0 kn	N/D	37°52.199'S	034°56.817'E	ARPA			
9	ARPA T9	No data	2685.3NM	264.6°	N/D	N/D	265.6°	24.0 kn	N/D	36°38.756'S	006°59.829'E	ARPA			
6000001	ATN 0001	No data	18.7NM	214.8°	N/D	N/D	N/D	N/D	N/D	32°40.010'S	060°51.998'E	AIS			
6000002	ATN 0002	No data	3.5NM	024.0°	N/D	N/D	N/D	N/D	N/D	32°21.451'S	061°06.374'E	AIS			

1	Target List: Displays the list of all targets.
2	Update: Manually updates target data.
3	Automatic Updates: By default, the table updates when opened or when using the Update button. For continuous updates, select an interval from the dropdown menu: 1s, 3s, 5s, 15s, or 30s.
4	Time Updated: Shows the time elapsed since the last data update..

5	Source: Indicates the source of target data (AIS or ARPA)
6	Full Target Data: Opens a detailed table with the target's information
7	Move to Target Position: Centers the chart on the target's position. If the AIS layer is off, the chart centers on the position, but the target is not visible.
8	Sorting: Allows sorting by column values (ascending or descending). By default, sorting is based on Distance
9	Selected Only: Displays only selected target
10	Address Message: Opens the address message sending window (AIS only)
11	Message Transmission Indicator: Displays when a message is received from the target.

Table 10: Program messages from AIS

TEXT	CATEGORY	CONDITION
AIS sensor malfunction: <sensor name>	Alarm	When the sensor data ceases to be received by a configurable timeout.
AIS data integrity has been violated: <sensor name>	Warning	If the parcel fails the CRC check.
Target lost <ID of target>	Warning	The time to wait for a message from the target has exceeded the set limit.
CPA/TCPA <target ID>	Alarm	The target does not fulfil the criteria for safe divergence. The calculated CPA/TCPA of the AIS target is simultaneously less than or equal to the set values. The distance and closest approach time values are set in the CPA/TCPA settings section.
Dangerous target <ID of target>	Alarm	The target has entered the guard zone. The guard zone radius is set in the Guard Zones section of the settings.
95% of max. possible AIS targets	Warning	The number of processed targets reached 95% of the maximum of 256.

Max. Possible number of AIS targets	Warning	The number of targets to be processed reached 256.
-------------------------------------	---------	--

14.2.10 AIS Messages

During operation, the AIS system sends and receives service, text, and information messages.

Text Messages: Used for information exchange between subscribers (ships, AtoN base stations).

Addressed Messages: Sent to a specific subscriber.

Broadcast Messages: Sent to all users within the signal reception area.

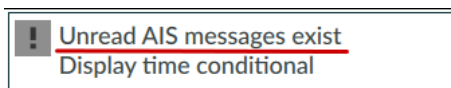
The ECDIS system processes incoming messages from the onboard AIS and handles outgoing message transmissions.

• NOTE

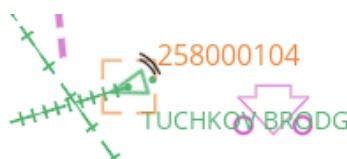
The ability to receive incoming messages and send outgoing messages is only available if the AIS is connected and correctly configured in the ECDIS

14.2.11 Incoming messages

When a new message (addressed or broadcast) is received, ECDIS displays a notification.



A **new message** symbol appears above the transmitting target's symbol on the chart .

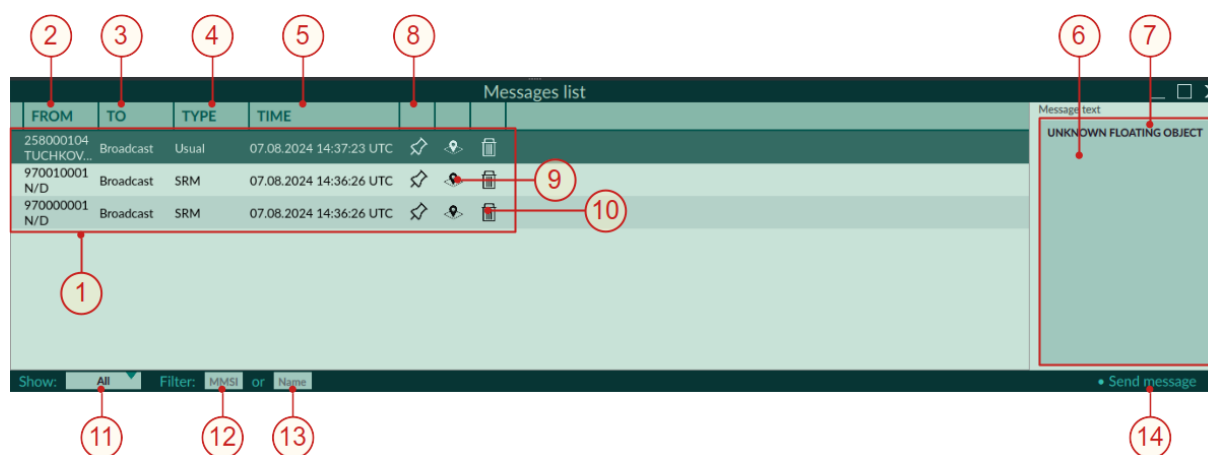


In the **Target Table**, the message icon is displayed in the row corresponding to the transmitting target

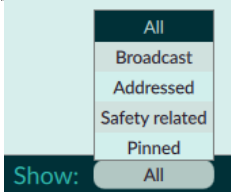
In the **Multifunction Window** (AIS tab), the **Messages** button will show the received message icon..



To view incoming messages, open the Message List:



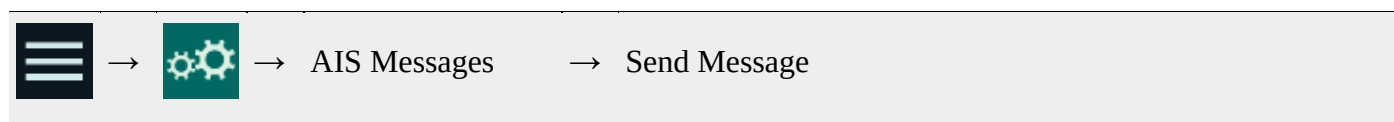
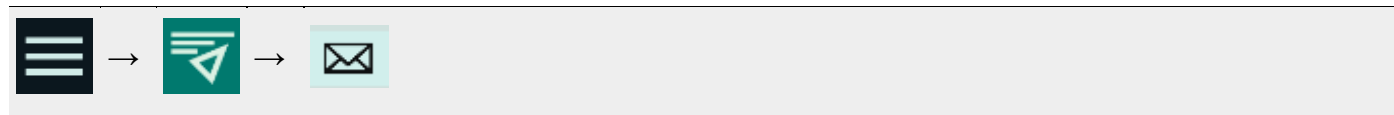
1	Inbox List: Displays all received messages.
2	FROM: Shows the sender's name. If the sender's ship name is unavailable, the MMSI is displayed.
3	TO: Indicates the recipient. Displays "Broadcast" for broadcast messages or the ship's MMSI for addressed messages
4	TYPE: Specifies the message type: Regular or SRM (Safety Related Message).
5	Date and Time: Displays the message receipt time (UTC).
6	Message Text Display Field: Shows the content of the message
7	Message Text: The full text of the message
8	Pin Message: Pins the message to keep it visible in the list, regardless of filters (11, 12, or 13).
9	Center on Sender's Position: Positions the ENC to the sender's location
10	Delete Message: Deletes the message permanently. Deleted messages cannot be restored.
11	Show: Filters message types. Options:..

	 • All: Displays all incoming messages. • Broadcast: Displays only broadcast messages. • Addressed: Displays only addressed messages. • Safety Related: Displays only SRM messages. • Pinned: Displays only pinned messages.
12	Filter by MMSI: Filters messages by the MMSI number
13	Filter by Sender Name: Filters messages by the sender's name
14	Send Message: Opens the Send Message window.

14.2.12 Sending messages (Outgoing messages)

To send a message, open the **Send Message** window:

Broadcast Message:

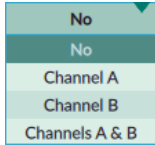


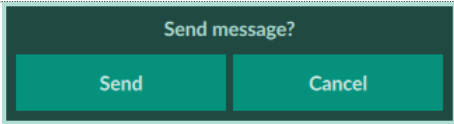
Addressed Message:



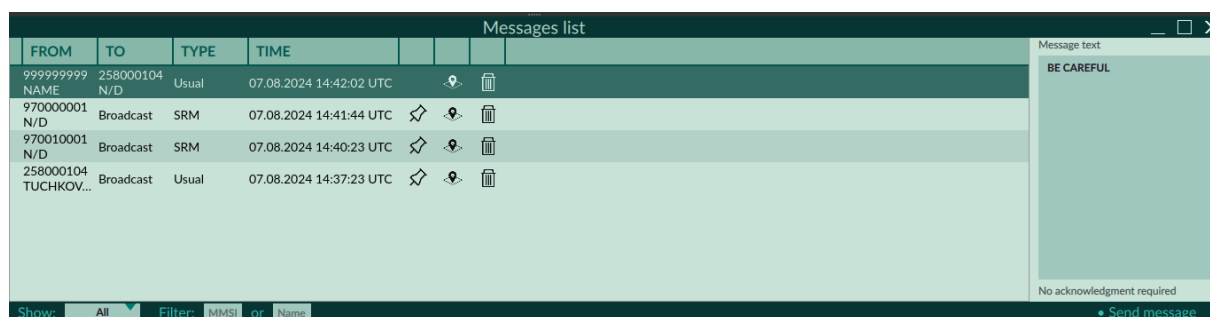
The Send Message window includes the following elements:



1	Message Text Field: Enter the message content
2	Addressed/Broadcast Selector: On: Sends an addressed message. The recipient must be selected in the Target Table beforehand. Off: Sends a broadcast message.
3	SRM (Safety Related Message): Enables assigning the message SRM status
4	Acknowledgement Required: Requests the recipient to acknowledge receipt of the message
5	Output Channel: Selects the AIS recipient type for broadcast messages only. 
6	Message Type: Broadcast: Sends to all recipients within range. Addressed: Sends to the MMSI of the recipient selected in the Target Table
7	Send: Sends the message.

	
8	Clear Text: Deletes the text in the message field.
9	Message List: Opens the list of messages
10	Targets Table: Opens the Targets Table
11	Character Counter: Displays the number of characters entered (maximum 150 characters)
12	Message Text: The content of the message being sent

The sent message will be displayed in the message list.



FROM	TO	TYPE	TIME			
999999999 NAME	258000104 N/D	Usual	07.08.2024 14:42:02 UTC			
970000001 N/D	Broadcast	SRM	07.08.2024 14:41:44 UTC			
970010001 N/D	Broadcast	SRM	07.08.2024 14:40:23 UTC			
258000104 TUCHKOV...	Broadcast	Usual	07.08.2024 14:37:23 UTC			

Message text
BE CAREFUL

No acknowledgment required

Show: All Filter: MMSI or Name

Send message

14.2.13 ASM (Application Specific Messages)

ECDIS handles the following ASMs:

- Clearance time to enter port (FI, 18)
- Marine traffic signal (FI 19)
- Berthing data (FI 20)
- Weather observation report from ship (FI 21)
- Area notice (FI 22, FI23)
- Environmental (FI 26)
- Route information (FI 27, FI 28)
- Text description (FI 29, FI 30)
- Meteorological and Hydrographic data (FI 31)
- Tidal window (FI 14, FI 32)

14.2.14 Targets table

Navigation



The **Targets Table** can be accessed via the **TARGETS TABLE** button in the **AIS**, **Target**, or **USW Target** tabs of the multifunction window.

It contains information on AIS and ARPA targets, including those not visible on the chart.



The screenshot shows the 'Targets table' window. It contains a table with columns: N#, NAME, CALL SIGN, DIST, BRG, CPA, TCPA, COG, SOG, HDG, LAT, LON, SOURCE. The table lists several AIS vessels. At the bottom, there are controls: an 'Update' button, a 'Manual' button, a status bar showing 'Table updated 9 sec ago', and a 'Selected only' checkbox.

1	Target List: Displays all detected targets
2	Update: Refreshes the data manually
3	Automatic Update: By default, the table updates when opened or refreshed manually. To set automatic updates, select a time interval (1s, 3s, 5s, 15s, 30s) from the drop-down menu
4	Table Updated *** Ago: Shows the time since the last data update.
5	Source: Displays the source of the target data (AIS or ARPA).
6	Full Target Data: Opens the detailed target information table.
7	Move to Target Position: Centers the chart on the target's position. If the AIS layer is off, centering will occur, but the target will not be visible.
8	Column Sorting: Sorts table columns in ascending or descending order. By default, the table is sorted by distance.
9	Selected Only: Filters the table to show only selected (escorted) targets.

14.3 ARPA Target

The ARPA sensor must be connected and configured as described in the **Service Manual**.

Ensure the following:

- Received message processing is correctly configured.
- Header and message processing are enabled.
- Checksum verification is enabled.

ECDIS processes only messages with the **RA** header when an ARPA sensor is present.

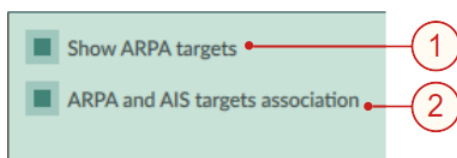
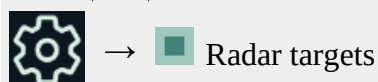
After the ARPA sensor is properly set up, the ARPA target data display mode will be available in the **Multifunction Window**.

14.4 ARPA operation features

Navigation



Or



1	Show ARPA Targets: Enables the chart layer to display ARPA targets
2	ARPA and AIS Target Association: Enables or disables ARPA and AIS targets association.

Once the ARPA layer is enabled and the visibility radius is set, ARPA targets will appear on the chart.

14.4.1 Displaying target data

Selecting ARPA targets is done in the same way as selecting AIS targets. Refer to the relevant section on **AIS Target Selection** for detailed instructions.



14.4.2 Guard Zone

TIP

The Guard Zone treats AIS and ARPA targets identically. Refer to the section on **Guard Zone** for more details.

Note: The Guard Zone area can only be displayed on the chart if the AIS layer is enabled. However, target control does not depend on the visual display of the Guard Zone on the chart. Alarms will still be generated for dangerous targets even when the Guard Zone is not visible.

14.4.3 CPA/TCPA

TIP

CPA/TCPA control applies to both AIS and ARPA targets in the same manner. Configuration is performed as described in the **CPA/TCPA Control for AIS** section

14.4.4 Lost targets

Lost Target Warning

In the CPA/TCPA settings, enable the Lost Targets Warning option. Targets that fail to receive data within the specified delay period will:

- Be marked as lost.

- Trigger a warning.

- Be removed from the chart once the warning is acknowledged or after a set time.

Warning Generation

Warnings are generated for all ARPA targets.

If data becomes unavailable for a dangerous target:

The target is marked as **lost**.

The target remains on the chart until the warning is acknowledged or the target symbol is selected.

14.4.5 ARPA and AIS targets association

Navigation:



AIS and ARPA targets are displayed separately on the chart. ECDIS checks for associated targets to determine if:

- An AIS target and an ARPA target represent the same object.
- Both targets are separate but moving in the same direction.

Motion data transmitted via: **Radar** (TTD/TLB messages), **AIS** (VDM messages).

Note: Association applies only to **active AIS targets**.

These targets must be:

- Within the auto-activation zone, or
- Manually activated.

When target association is enabled:

- The identified target is displayed with the **AIS symbol**, including vessel dimensions.
- Target information in the multifunction window is shown as AIS data.



LIBERIA	
CPA 1.11 NM	BRG 228.2°
TCPA -9min 7sec	DIST 2.55 NM
COG 217.3°	LAT 32°28.445'S
SOG 10.0 kn	LON 061°06.427'E
HDG 217.0°	258000102
ROT 1.1°/min	ASDF
Sail	

Table 11: Program messages from ARPA

TEXT	CATEGORY	CONDITION
ARPA sensor malfunction: <sensor name>	Alarm	When the sensor data ceases to be received by a configurable timeout.
ARPA data integrity has been violated: <sensor name>	Warning	If the parcel fails the CRC check.
Target lost <ID of target>	Warning	The time to wait for a message from the target has exceeded the set limit.
CPA/TCPA <target ID>	Alarm	The target does not meet the criteria for a safe divergence. Calculated CPA/TCPA ARPA-targets are simultaneously less than or equal to the set values. The distance and closest approach time values are set in the CPA/TCPA settings section.
Dangerous target <ID of target>	Alarm	The target has entered the guard zone. The guard zone radius is set in the Guard Zones section of the settings.

15. Alarm Management

When own ship and ECDIS meet some conditions needed to cause the user's attention, the system will provide him with corresponding alarms.

15.1 Alert categories

In the process of NES-3000 operation, there are situations that require the attention of the navigator. In order to attract the attention of the navigator, NES-3000 implements a system of alerts. Depending on the circumstances, NES-3000 generates different types of alerts, in some cases accompanied by sound signaling.

The most critical notifications must be **confirmed by the operator** - acknowledged.

Notices are categorized by **type**:

Alarm

Generated when immediate action is required to avoid a dangerous situation and ensure navigational safety.

Indicate critical conditions related to the system, vessel, or its position relative to navigational hazards or targets, potentially leading to catastrophic consequences.

A three-beep sound is emitted when an alarm is triggered.

Warning

Highlight situations requiring attention to prevent potential danger.

Not immediately hazardous but may escalate if unaddressed.

If unacknowledged, warnings can escalate to alarms.

A two-beep sound is emitted when a warning is triggered.

Caution

Indicate conditions requiring attention under current circumstances.

Information Notices

General notifications not categorized as Alarm, Warning, or Caution.

Typically, system messages about the start or completion of processes.

Do not require acknowledgement.

Persistent messages

Display SSE25, SSE27, and unofficial chart messages.

Appears as rectangular pop-ups in the notification area.

15.1.1 Alert Display

Alarms, Warnings, and Cautions:

Displayed in their respective areas on the navigation screen.

Banners include:

- Type of alert.
- Time elapsed since it was generated (displayed in minutes and seconds).
- ACK (Acknowledge) and Close buttons.



- acknowledge



- close.

15.1.2 Alarm acknowledgement

Click **ACK** on the banner or the corresponding button in the Alerts Log to acknowledge an alert.

Alerts log				
TYPE	ID	ALERT	TIME	ACK
	3015	GNSS Secondary no data: Variation	18:37:17 + 02:57	
	3015	GNSS Secondary no data: Date/Time	18:37:16 + 02:58	
	3015	GNSS Secondary no data: Datum	18:37:06 + 03:08	
	3015	GNSS Secondary no data: COG/SOG	18:40:05 + 09	
	3015	GNSS Secondary no data: LAT/LON	18:40:02 + 12	
	3015	Compass no data: HDG	18:40:00 + 14	
	3015	Compass no data: ROT	18:39:58 + 16	
	3015	STW_1 no data: STW	18:39:57 + 17	

•By default

15.1.3 Alarm and warning statuses

Active-Unacknowledged: The alert is active but has not been acknowledged.

Active-Silenced: The alert is active, not acknowledged, but the sound has been turned off by the navigator.

Active-Acknowledged: The alert is active and has been acknowledged by the navigator.

Responsibility Transferred: The alert is active but has been transferred to the Bridge Alert Management System (BAM).

Rectified-Unacknowledged: The alert condition no longer exists, but the alert has not been acknowledged.

Active: The alert condition is active and ongoing.

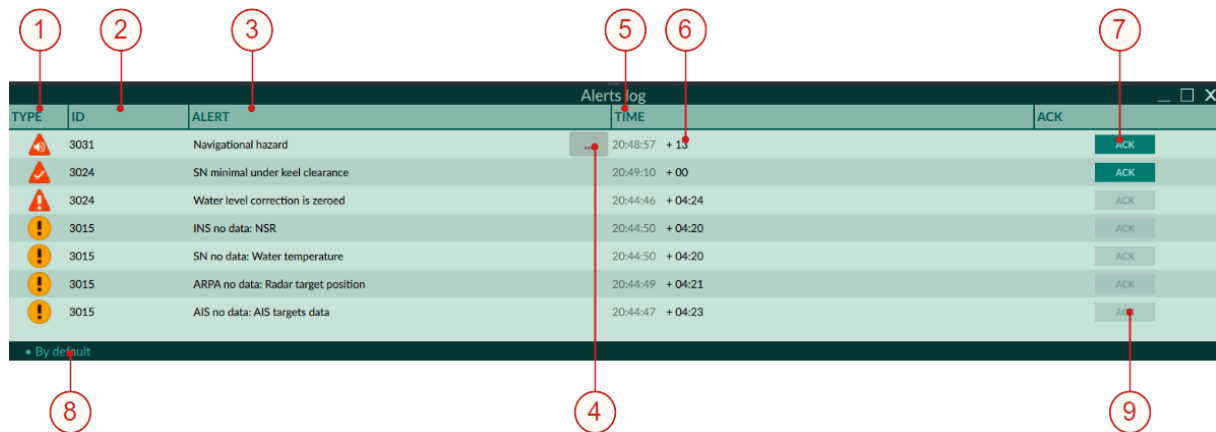
Normal: No alert condition is present.

15.2 Alerts log

Navigation



The alerts log displays all active alarms, warnings, and cautions, except those with the status **Normal** or **Terminated**.



TYPE	ID	ALERT	TIME	ACK
⚠️	3031	Navigational hazard	20:48:57 +13	ACK
⚠️	3024	SN minimal under keel clearance	20:49:10 +00	ACK
⚠️	3024	Water level correction is zeroed	20:44:46 +04:24	ACK
⚠️	3015	INS no data: NSR	20:44:50 +04:20	ACK
⚠️	3015	SN no data: Water temperature	20:44:50 +04:20	ACK
⚠️	3015	ARPA no data: Radar target position	20:44:49 +04:21	ACK
⚠️	3015	AIS no data: AIS targets data	20:44:47 +04:23	ACK

• By default

1	Type: Displays the type of alert: Alarm, Warning, or Caution.
2	Identifier: Shows the identifier for the alert.
3	Description: Provides details about the alert's contents.
4	Detailed View: Opens detailed information about the selected alert.
5	Event Time: Displays the ship's time when the alert occurred.
6	Elapsed Time: Shows the time passed since the alert was triggered.
7	Status: Indicates whether the alert is Not Acknowledged .
8	Filter: To reduce the list of alerts, press the Filter button. Alerts matching the default filter settings will remain visible.
9	Confirmed Status: Displays alerts that have been confirmed by the navigator.

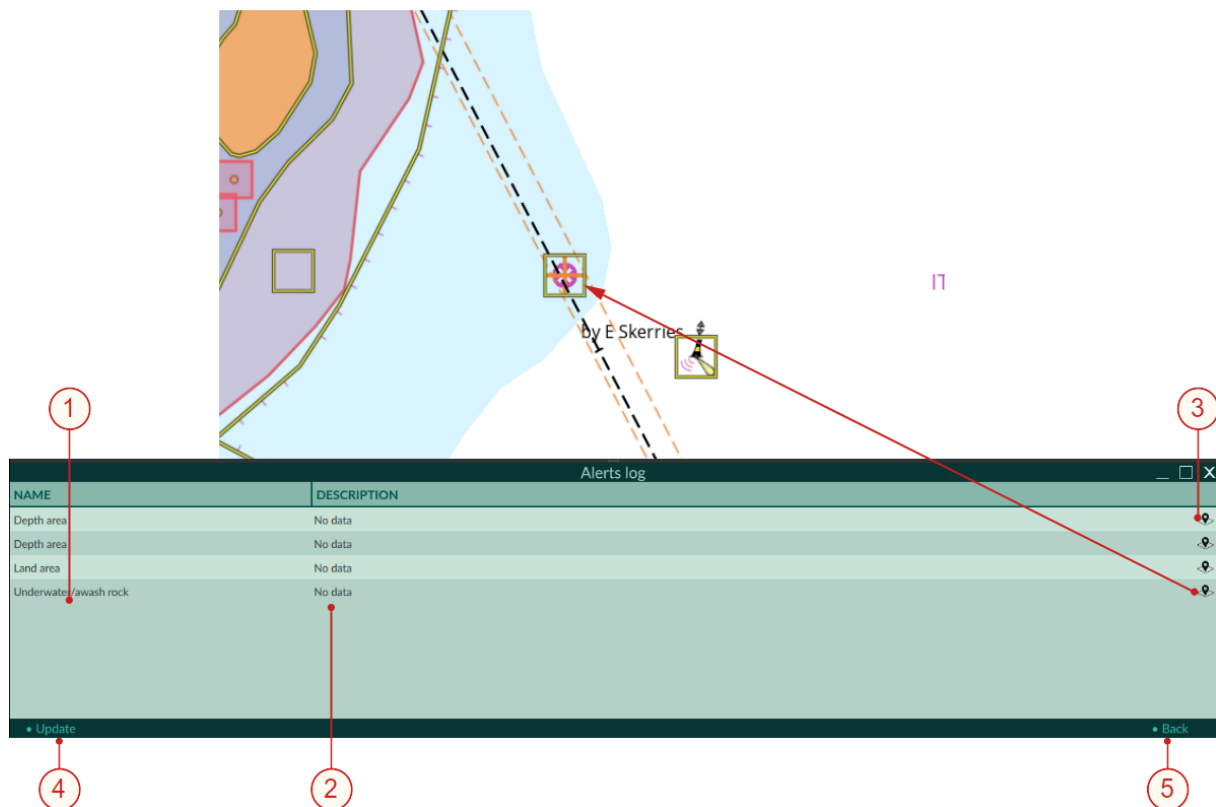
15.2.1 Alerts List Display

Priority and Time: Alerts are sorted by priority. If two alerts have the same priority, the most recent one is displayed first.

Navigational Hazards List:

To view hazardous objects causing an alert, click the ... button in the Navigational Hazard line.

A window opens with a list of hazards in the monitoring lane that triggered the alert.



1	Name: The name of the navigational hazard
2	Description: A brief description of the hazard
3	Positioning: The hazard's location on the chart
4	Update: Refreshes the list of hazards
5	Return: Returns to the main alert list

• **TIP**

If you delete or disable any navigation sensor or radar processor in ECDIS:

- Alerts and warnings generated by these devices will no longer appear in the notification area.
- They will be removed from the alerts log but remain recorded in the navigation log.

16. Logbook

Navigation:

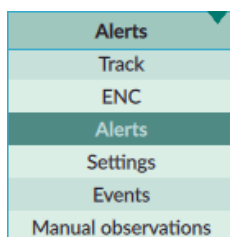


The electronic navigation log automatically documents all key circumstances of the voyage.

Minimum Data Recorded in the Logbook:

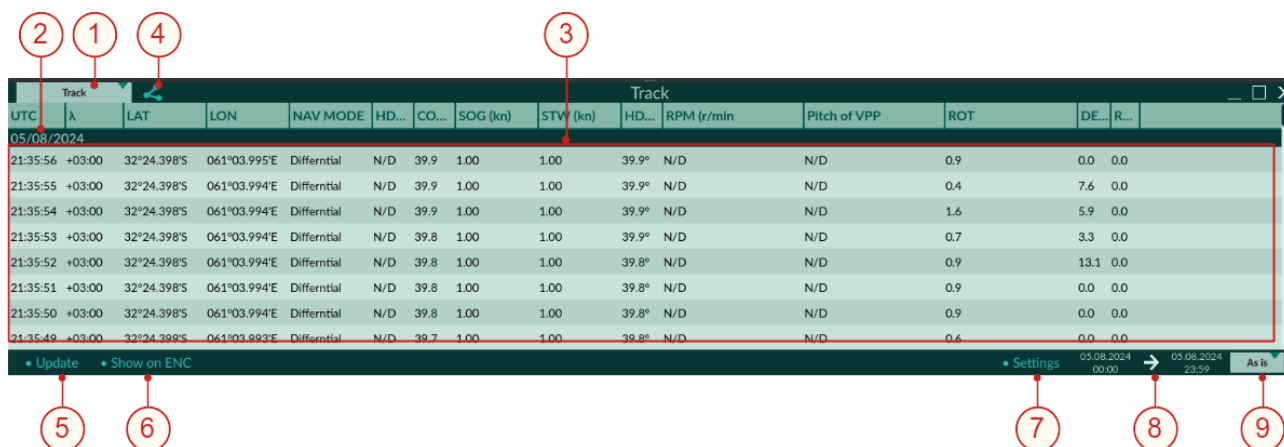
- Track log:** Data related to the vessel's movement parameters.;
- ENC Information:** The name of the ENC used and its update status;
- Alarms:** Details about generated alarms and warning;
- ECDIS Settings:** Basic system settings and any changes made;
- Events:** Event marks added by the navigator;
- Manual Observations.**

Log information is grouped by standard record types. To view a specific type of entry, use the **drop-down list** to select the desired record type.



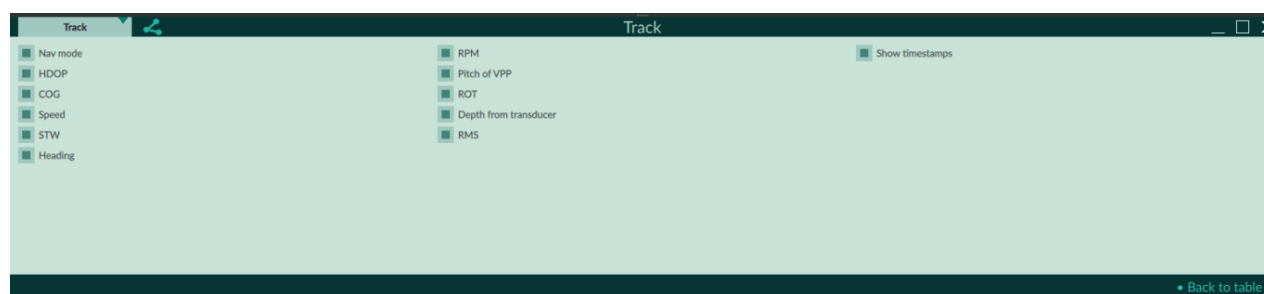
16.1 Track Log

Track Log records are based on the frequency of GNSS data updates.



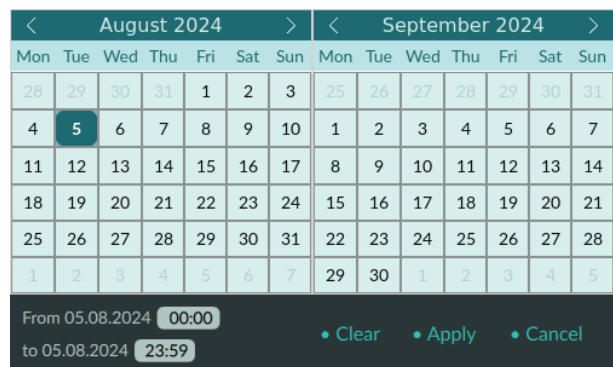
UTC	λ	LAT	LOn	NAV MODE	HD...	CO...	SOG (kn)	STW (kn)	HD...	RPM (r/min)	Pitch of VPP	ROT	DE...	R...
05/08/2024														
21:35:56	+03:00	32°24.398'S	061°03.995'E	Differential	N/D	39.9	1.00	1.00	39.9°	N/D	N/D	0.9	0.0	0.0
21:35:55	+03:00	32°24.398'S	061°03.994'E	Differential	N/D	39.9	1.00	1.00	39.9°	N/D	N/D	0.4	7.6	0.0
21:35:54	+03:00	32°24.398'S	061°03.994'E	Differential	N/D	39.9	1.00	1.00	39.9°	N/D	N/D	1.6	5.9	0.0
21:35:53	+03:00	32°24.398'S	061°03.994'E	Differential	N/D	39.8	1.00	1.00	39.9°	N/D	N/D	0.7	3.3	0.0
21:35:52	+03:00	32°24.398'S	061°03.994'E	Differential	N/D	39.8	1.00	1.00	39.8°	N/D	N/D	0.9	13.1	0.0
21:35:51	+03:00	32°24.398'S	061°03.994'E	Differential	N/D	39.8	1.00	1.00	39.8°	N/D	N/D	0.9	0.0	0.0
21:35:50	+03:00	32°24.398'S	061°03.994'E	Differential	N/D	39.8	1.00	1.00	39.8°	N/D	N/D	0.9	0.0	0.0
21:35:49	+03:00	32°24.398'S	061°03.993'E	Differential	N/D	39.7	1.00	1.00	39.8°	N/D	N/D	0.6	0.0	0.0

- 1 **Record Type Selector:** Use the drop-down list to choose the type of record to display
- 2 **Entry Date:** The date of the log entry
- 3 **Time-Stamped Records:** A list of records made on the selected date (2), displayed in UTC and local time (time zone λ)
- 4 **Export:** Allows the navigator to export Logbook data to an external storage drive.
- 5 **Update:** Refreshes the displayed records
- 6 **Display Mode.** Shows the ship's trajectory on the chart for the interval selected in the **Calendar (8)**. To hide the trajectory, click **Hide**
- 7 **Settings:** Opens the table column display settings window.

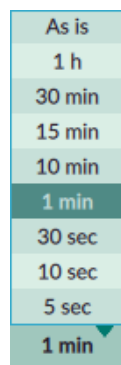


To return to the log table, click **Back to table**.

- 8 **Calendar:** Set a date range for the data to be displayed in the table.



- 9 **Data Discretization:** Choose the frequency of data points displayed in the table.



Adjusting data discretization thins the data in the table, chart display, and exported files. The raw data remains unaffected.

16.2 ENC log

The ENC Log records the list of ENC cells the vessel passes through.

When Records Are Made

When ECDIS is switched on.

When the vessel enters a new ENC cell.

When the chart scale changes, leading to a switch to an ENC of a different scale level.

Switching to an overview chart is not logged.

ENC		ENC log						
UTC	λ	LAT	LON	NAME	ISSUE DATE	Edition No	Update No	Update date
05/08/2024								
20:03:31	+03:00	32°19.000'S	061°20.000'E	GB4X0000	09.04.2001	2	0	09.04.2001
20:03:29	+03:00	00°00.060'N	090°00.060'E	8M100053	26.02.2023	1	0	26.02.2023
20:01:14	+03:00	32°19.000'S	061°20.000'E	GB4X0000	09.04.2001	2	0	09.04.2001
20:00:53	+03:00	00°00.060'N	090°00.060'E	8M100053	26.02.2023	1	0	26.02.2023
17:23:34	+03:00	32°19.000'S	061°20.000'E	GB4X0000	09.04.2001	2	0	09.04.2001
17:15:11	+03:00	00°00.060'N	090°00.060'E	8M100053	26.02.2023	1	0	26.02.2023
15:10:04	+03:00	32°19.000'S	061°20.000'E	GB4X0000	09.04.2001	2	0	09.04.2001
• Update								
							05.08.2024 00:00	05.08.2024 23:59
							As is	

The controls for the ENC Log are identical to those in the Track Log table.

16.3 Alerts log

The Alerts Log records alarms, warnings, and notifications.

Alerts		Alerts log								
UTC	λ	LAT	LON	TYPE	CAT.	ID	ALERT			
05/08/2024										
21:36:01	+03:00	32°24.397'S	061°03.995'E		A	3024	SN minimal under keel clearance			
21:35:00	+03:00	32°24.409'S	061°03.983'E		A	3024	SN minimal under keel clearance			
21:34:05	+03:00	32°24.421'S	061°03.973'E		A	3024	SN minimal under keel clearance			
21:33:02	+03:00	32°24.434'S	061°03.961'E		A	3024	SN minimal under keel clearance			
21:32:01	+03:00	32°24.448'S	061°03.950'E		A	3024	SN minimal under keel clearance			
21:31:00	+03:00	32°24.461'S	061°03.940'E		A	3024	SN minimal under keel clearance			
21:30:01	+03:00	32°24.475'S	061°03.930'E		A	3024	SN minimal under keel clearance			
21:29:01	+03:00	32°24.488'S	061°03.921'E		A	3024	SN minimal under keel clearance			
• Update		• Hide								
							05.08.2024	→	05.08.2024	1 min

Notification types are shown as pictograms above the corresponding point on the chart.

Clicking or tapping on the event pictogram highlights the corresponding record in the table

The controls are identical to those in the **Track Log** and **ENC Log** tables.

16.4 Settings log

The Settings Log records changes made to ECDIS settings during operation.

When Records Are Made:

When ECDIS is switched on.

Daily at 00:00.

Whenever a setting is changed.

Settings	Settings log												
Defined settings	05.08.2024 21:38:57	05.08.2024 21:37:47	05.08.2024 21:37:35	05.08.2024 20:51:27	05.08.2024 20:50:27	05.08.2024 20:49:47	05.08.2024 20:48:41	05.08.2024 20:45:36	05.08.2024 20:44:48	05.08.2024 20:44:23	05.08.2024 20:44:17	05.08.2024 20:37:50	05.08.2024 20:37:50
Reason for recording	Changed	Changed	Changed	Changed	Changed	Changed	Changed	Changed	Changed	Changed	Changed	Changed	Changed
Current draught	6.0 m	6.0 m	6.0 m	6.0 m	6.0 m	6.0 m	6.0 m	6.0 m	6.0 m	6.0 m	6.0 m	6.0 m	6.0 m
Drought by CWL	6.0 m	6.0 m	6.0 m	6.0 m	6.0 m	6.0 m	6.0 m	6.0 m	6.0 m	6.0 m	6.0 m	6.0 m	6.0 m
Under keel allowance	3.0 m	3.0 m	3.0 m	3.0 m	3.0 m	3.0 m	3.0 m	3.0 m	3.0 m	3.0 m	3.0 m	3.0 m	3.0 m
Water level correction	0.0 m	0.0 m	0.0 m	0.0 m	0.0 m	0.0 m	0.0 m	0.0 m	0.0 m	0.0 m	0.0 m	0.0 m	0.0 m
Safety contour	9.0 m	9.0 m	9.0 m	9.0 m	9.0 m	9.0 m	9.0 m	9.0 m	9.0 m	9.0 m	9.0 m	9.0 m	9.0 m
Safety depth	9.0 m	9.0 m	9.0 m	9.0 m	9.0 m	9.0 m	9.0 m	9.0 m	9.0 m	9.0 m	9.0 m	9.0 m	9.0 m
Permissible distance to prohibited areas	--	--	--	--	--	--	--	--	--	--	--	--	--
Hazard Detection Distance	1.0 km	1.0 km	1.0 km	1.0 km	1.0 km	1.0 km	1.0 km	1.0 km	1.0 km	1.0 km	1.0 km	1.0 km	1.0 km
Hazard Detection Time	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min
RADAR and/or AIS target activation distance	18.5 km	18.5 km	18.5 km	18.5 km	18.5 km	18.5 km	18.5 km	18.5 km	18.5 km	18.5 km	18.5 km	18.5 km	18.5 km
List of object display groups excluded from the...	ling_group.26220	ling_group.26220	ling_group.26220	ling_group.26220	ling_group.26220	ling_group.26220	ling_group.26220	ling_group.26220	ling_group.26220	ling_group.26220	ling_group.26220	ling_group.26220	ling_group.26220
List of object display groups added to the "Sta...	ling_group.33021	ling_group.33021	ling_group.33021	ling_group.33021	ling_group.33021	ling_group.33021	ling_group.33021	ling_group.33021	ling_group.33021	ling_group.33021	ling_group.33021	ling_group.33021	ling_group.33021
Scale	2282	53529	293115	48883	13806	6603	65041	65041	65041	27998	18369	92849	92849
Orientation	North	North	North	North	North	North	North	North	North	North	North	North	North
Motion mode	True	True	True	True	True	True	True	True	True	True	True	True	True
Activated route	--	--	--	--	--	--	--	--	--	--	--	--	--
Palette	Day	Day	Day	Day	Day	Day	Day	Day	Day	Day	Day	Day	Day
Sound	On	On	On	On	On	On	On	On	On	On	On	On	On
Radar image	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off
AIS	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off
Conditional time	System	System	System	System	System	System	System	System	System	System	System	System	System
River mode	Sea	Sea	Sea	Sea	Sea	Sea	Sea	Sea	Sea	Sea	Sea	Sea	Sea
Chart generalization using SCAMIN	On	On	On	On	On	On	On	On	On	On	On	On	On
Distance from the CCRP to the bow	30.0 m	30.0 m	30.0 m	30.0 m	30.0 m	30.0 m	30.0 m	30.0 m	30.0 m	30.0 m	30.0 m	30.0 m	30.0 m
Distance from the CCRP to the stern	117.4 m	117.4 m	117.4 m	117.4 m	117.4 m	117.4 m	117.4 m	117.4 m	117.4 m	117.4 m	117.4 m	117.4 m	117.4 m
Distance from the CCRP to port	6.5 m	6.5 m	6.5 m	6.5 m	6.5 m	6.5 m	6.5 m	6.5 m	6.5 m	6.5 m	6.5 m	6.5 m	6.5 m
Distance from the CCRP to STB	6.5 m	6.5 m	6.5 m	6.5 m	6.5 m	6.5 m	6.5 m	6.5 m	6.5 m	6.5 m	6.5 m	6.5 m	6.5 m
Dist. CCRP to GPS1 along Center plane	0.0 m	0.0 m	0.0 m	0.0 m	0.0 m	0.0 m	0.0 m	0.0 m	0.0 m	0.0 m	0.0 m	0.0 m	0.0 m
Dist. CCRP to GPS1 across Center plane	0.0 m	0.0 m	0.0 m	0.0 m	0.0 m	0.0 m	0.0 m	0.0 m	0.0 m	0.0 m	0.0 m	0.0 m	0.0 m
Dist. CCRP to GPS2 along Center plane	0.0 m	0.0 m	0.0 m	0.0 m	0.0 m	0.0 m	0.0 m	0.0 m	0.0 m	0.0 m	0.0 m	0.0 m	0.0 m
Dist. CCRP to GPS2 across Center plane	0.0 m	0.0 m	0.0 m	0.0 m	0.0 m	0.0 m	0.0 m	0.0 m	0.0 m	0.0 m	0.0 m	0.0 m	0.0 m
Dist. CCRP to RADAR1 along Center plane	0.0 m	0.0 m	0.0 m	0.0 m	0.0 m	0.0 m	0.0 m	0.0 m	0.0 m	0.0 m	0.0 m	0.0 m	0.0 m
Dist. CCRP to RADAR1 across Center plane	0.0 m	0.0 m	0.0 m	0.0 m	0.0 m	0.0 m	0.0 m	0.0 m	0.0 m	0.0 m	0.0 m	0.0 m	0.0 m
Dist. CCRP to RADAR2 along Center plane	--	--	--	--	--	--	--	--	--	--	--	--	--
Dist. CCRP to RADAR2 across Center plane	--	--	--	--	--	--	--	--	--	--	--	--	--
Dist. CCRP to transducer along Center plane	0.0 m	0.0 m	0.0 m	0.0 m	0.0 m	0.0 m	0.0 m	0.0 m	0.0 m	0.0 m	0.0 m	0.0 m	0.0 m
Dist. CCRP to transducer across Center plane	0.0 m	0.0 m	0.0 m	0.0 m	0.0 m	0.0 m	0.0 m	0.0 m	0.0 m	0.0 m	0.0 m	0.0 m	0.0 m
Offset of the transducer relative to the CWL	0.0 m	0.0 m	0.0 m	0.0 m	0.0 m	0.0 m	0.0 m	0.0 m	0.0 m	0.0 m	0.0 m	0.0 m	0.0 m
Vertical dimension relative to the CWL	27.0 m	27.0 m	27.0 m	27.0 m	27.0 m	27.0 m	27.0 m	27.0 m	27.0 m	27.0 m	27.0 m	27.0 m	27.0 m
RMS Input mode	Manual	Manual	Manual	Manual	Manual	Manual	Manual	Manual	Manual	Manual	Manual	Manual	Manual
CATZOC Input Mode	Auto	Auto	Auto	Auto	Auto	Auto	Auto	Auto	Auto	Auto	Auto	Auto	Auto
CATZOC	50.0 m	50.0 m	50.0 m	50.0 m	50.0 m	50.0 m	50.0 m	20.0 m	50.0 m	50.0 m	50.0 m	50.0 m	20.0 m

Log Structure

Defined Settings Column:

Lists the settings being monitored.

Right Columns:

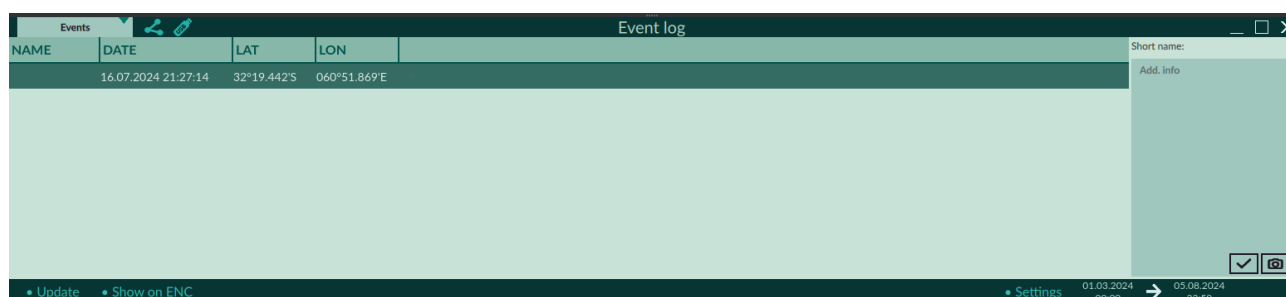
Show the setting values, along with the date, time, and the condition that triggered the record.

New entries are added to the right-hand column.

Measurement units match those specified in the ECDIS settings.

16.5 Events log

The Events Log displays a table of operational marks (events) recorded during the current and previous sessions.



Each record includes:

Name: The name of the operational mark.

Creation Date: When the mark was set.

Coordinates: The location of the mark.

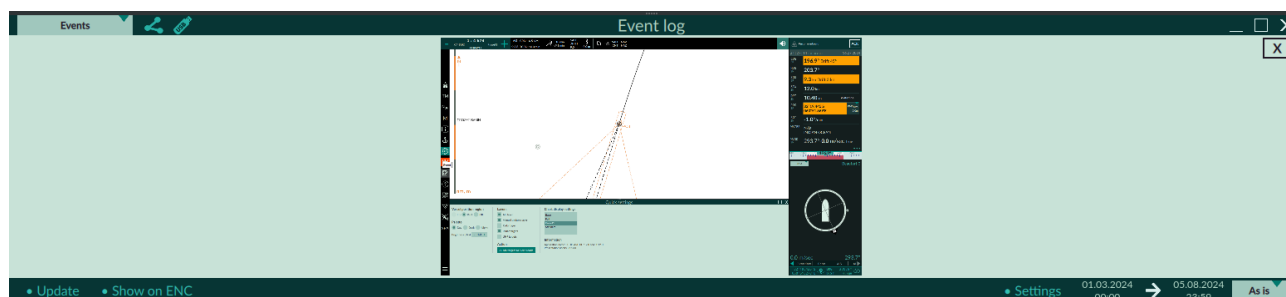
Extended Description: Details entered by the navigator.

ECDIS Screenshot: Captured at the time the mark was created

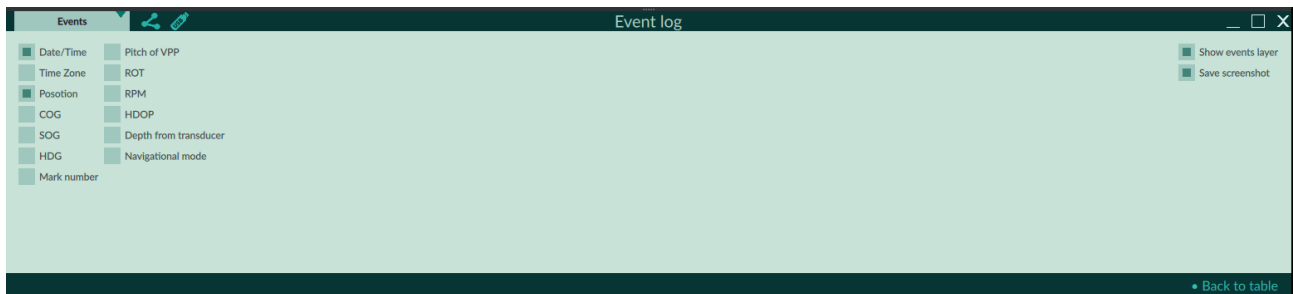
To view the **Extended Description**, select a record with the left mouse button (or tap). Press



to view a screenshot.



Settings: Opens a window for configuring table columns in Event Log mode.



Return to Log Entries: Click **Back to Table** to return to the main log view.

16.6 Manual Observations Log

The Manual Observations Log (Manual Position Fix) contains records of manual observations performed on ECDIS.

Manual observations														
Observations log														
Time	λ	LAT	LON	GNSS mode	HDOP	COG (°)	SOG (kn)	STW (kn)	HDG (°)	ENC	LAT obs.	LON obs.	Misclosure	Status
01/08/2024														
20:10:15	+03:00	32°23.029'S	060°59.836'E	Differential	N/D	153.5	6.0	6.0	153.5	N/D	32°23.039'S	60°59.799'N	253.0 - 253 m	Accepted
20:05:24	+03:00	32°22.622'S	060°59.595'E	Differential	N/D	153.5	6.0	6.0	153.5	N/D	32°22.598'S	60°59.583'N	337.2 - 337 m	Accepted
19:56:53	+03:00	32°21.279'S	060°59.032'E	Differential	N/D	165.1	6.0	6.0	165.1	N/D	32°21.277'S	60°59.042'N	72.8 - 73 m	Not accept...
19:52:20	+03:00	32°20.881'S	060°58.906'E	Differential	N/D	165.0	6.0	6.0	165.0	N/D	32°20.881'S	60°58.870'N	268.4 - 268 m	Not accept...
16/07/2024														
21:19:08	+03:00	32°18.210'S	060°52.517'E	Differential	N/D	218.8	12.0	12.0	218.8	N/D	32°18.315'S	60°52.562'N	160.2 - 160 m	Accepted
Update Hide 01.07.2024 00:00 → 05.08.2024 23:59 As is														

The table includes:

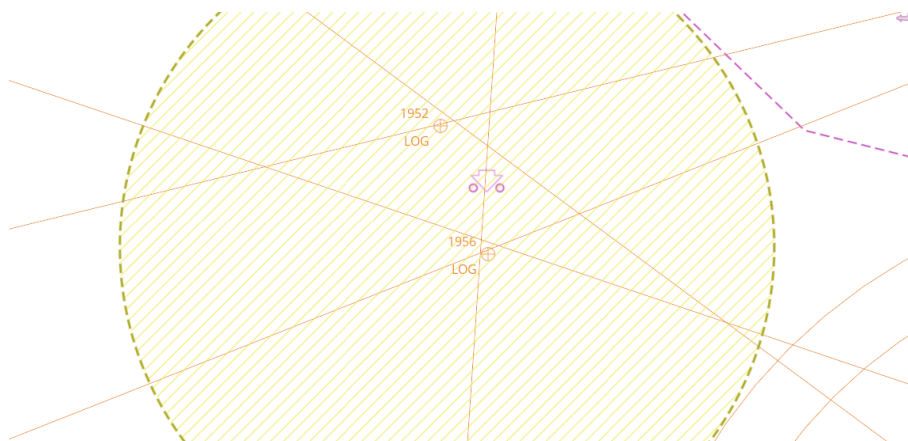
Observation type.

Calculated and observed coordinates.

Discrepancy between calculated and observed values.

Observation status.

Observations made during the selected period are displayed on the chart:



Double-click a row in the table to view detailed information about the observation.

Manual observations						Observations log				
Date	Sensor	Type	Distance (NM)	Bearing (°)	ENC	Ref. poin...	Ref. point L...	Ref. point L...		
19:55:49 01/08/2...	STB	Bearing	0.00	3.9	GB4X0000,ISSUE:09.04.20	Landmark	32°24.572'S	60°58.750'N		
19:56:25 01/08/2...	STB	Bearing	0.00	108.8	GB4X0000,ISSUE:09.04.20	Landmark	32°20.237'S	60°55.555'N		
19:56:53 01/08/2...	STB	Bearing	0.00	68.5	GB4X0000,ISSUE:09.04.20	Landmark	32°22.238'S	60°56.141'N		

For each position line, the table records:

Date and Time: When the observation was made.

Position Line Type: The type of observation (e.g., bearing, distance).

Value: The measured value.

Landmark Name: The name of the landmark used.

Chart Name: The ENC chart containing the landmark.

Landmark Coordinates: The coordinates of the selected landmark.

16.7 Manual Observations Log Export

Navigation:



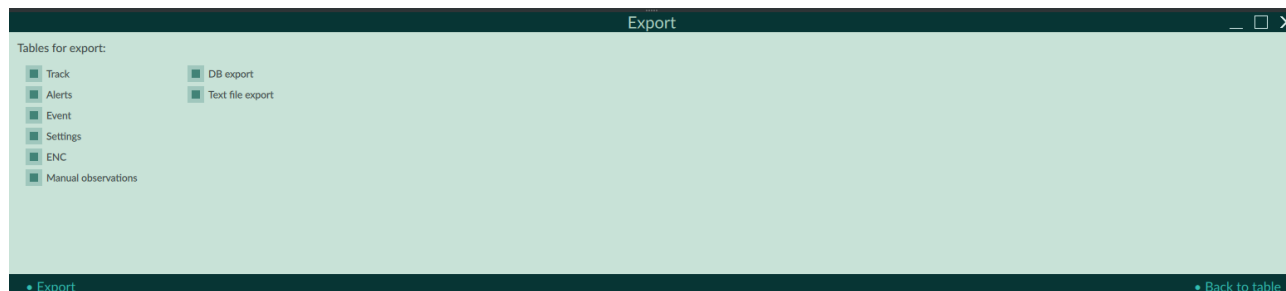
Steps to Export Log

1. Set Export Settings:

Select the type of data to export.

Specify the data range.

Configure data discretization.



2. Select Data to Export:

In the export window, choose the data to be exported.

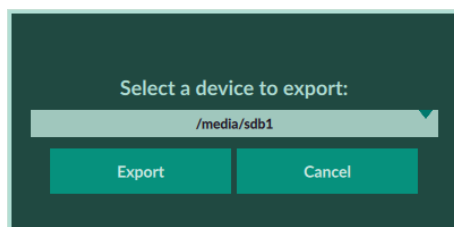
Click Export.

3. Select Export Media:

In the dialog box, choose the storage device for export.

Click **Export** to confirm.

Ensure the removable media meets the requirements specified in section 2.3.2



4. Wait for Completion:

A progress bar will display the export progress.

Exporting a large data set may take a significant amount of time.



17. Ground check

Chart hazard monitoring with their highlighting on the chart and development of warnings is carried out within the lane with a width including the specified distance to hazards, current positioning error, as well as in the sectors on the fore and aft course angles.

The hazard detection distance is set by navigator, or calculated automatically according to the ship's speed and the set hazard detection time.

When hazards are detected within the vessel's lane, taking into account drift, vessel position accuracy, and chart accuracy, an audible signal is sounded. In general, the distance to hazards set by navigator should be greater than the automatically calculated width of the ship's lane.

Hazards detected in the sector at the forward heading angles are displayed on the out-of-scale danger Course Indicator (see 4.14).

Hazards found in the sector on aft course angles are highlighted on the chart to control the safety of turning the ship in a narrowness or when moving with a large drift.

17.1 Ground check settings

• NOTE

Used to set the parameters of navigation hazard highlighting on the ENC, the width of the monitoring sector and the navigation hazard monitoring band.

Monitoring of navigational hazards, hazardous isobath in the ship's lane and their display on the out-of-scale hazard indicator are performed independently of the ENC backlight status.

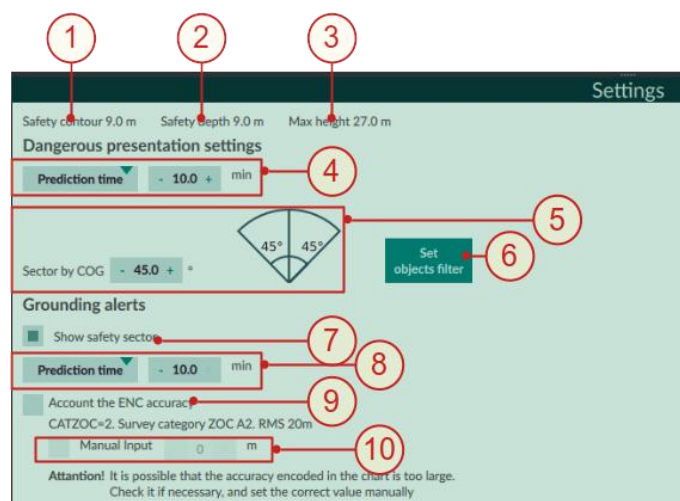
Configure the Ground check parameters in the **Ground check** and **Alarm filter** sections prior to start using ECDIS.



Ground check

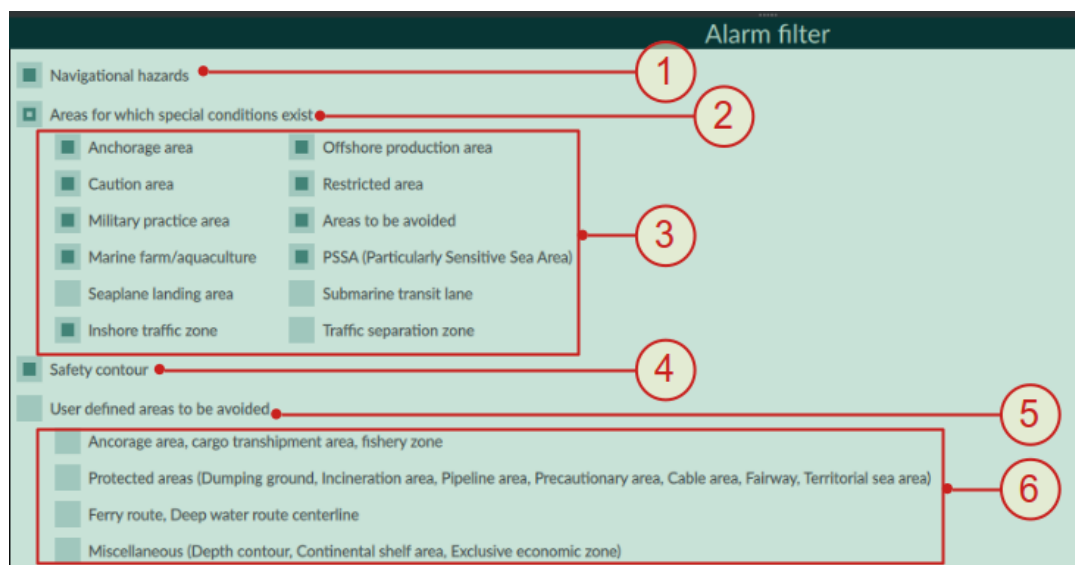
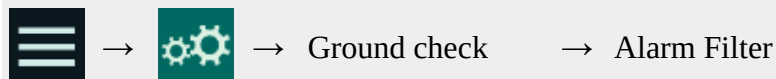


Settings



1	Safety contour shall be selected from the largest scale chart isobaths at the ship's position with a value nearest greater than the dangerous depth
2	Safety depth is calculated based on vessel dimensions and current water level
3	Max height is calculated based on vessel dimensions and current water level
4	Prediction time , is performed either by time (dynamic prediction) or Safety range by set distance (static prediction). Depending on the ship operator's preferences, specify in the numeric field: time in minutes, or distance in km/sea miles. On the basis of the set parameters the radius of the scanning sector of hazards in front of the vessel will be formed.
5	Sector by COG sets the width of the hazard scanning sector
6	Set objects filter opens the Alarm filter window
7	Show safety sector hazards - enables the display of the strip sector on the chart
8	Drop-down list of dynamic strip size . Method of area formation: by Prediction time or Distance . Depending on the choice specify: time in minutes, or distance in km/sea miles. When calculating the strip, the RMS is taken into account. Enter the RMS manually in the Navigation Indicator .
9	Take into account the uncertainty of relief forms position - includes CATZOC accounting
10	Manual input - Manual input of the ZOC value.

Set the highlighting of navigational hazards on the chart in **Alarm Filter**.

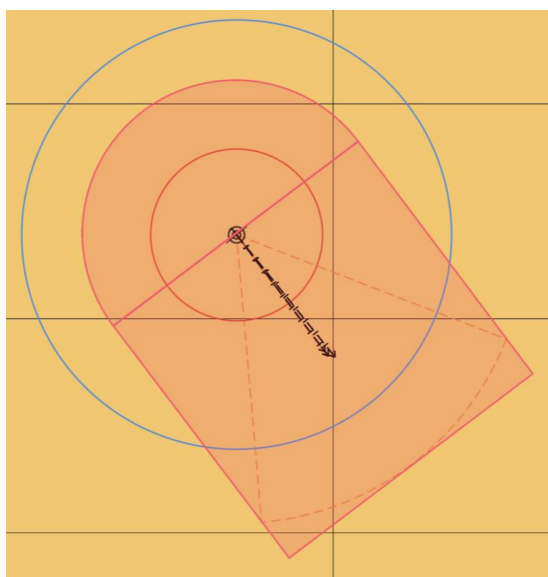


1	Navigational Hazards: Toggles monitoring of point objects marked as navigational hazards.
2	Areas with Special Conditions: Toggles monitoring of objects within this group
3	Group Areas with Special Swimming Conditions...
4	Safety Contour: Toggles monitoring of hazardous isobaths
5	User-Defined Areas with Special Conditions: Toggles monitoring of objects in the custom group
6	Group Custom neighborhoods with special conditions: Information Areas: Includes locations such as Anchor Berths, Cargo Transshipment Areas, and Fishing Grounds. Protected Areas: Includes areas like Dumping Grounds, Incineration Areas, Pipeline Zones, Precautionary Areas, Cable Areas, Fairways, and Territorial Seas. Ship Routing Systems and Ferry Routes: Monitors designated routes and ferry crossings. Miscellaneous Areas: Includes Depth Contours, Continental Shelf Areas, Exclusive Zones, and others.)

17.2 Hazard indication

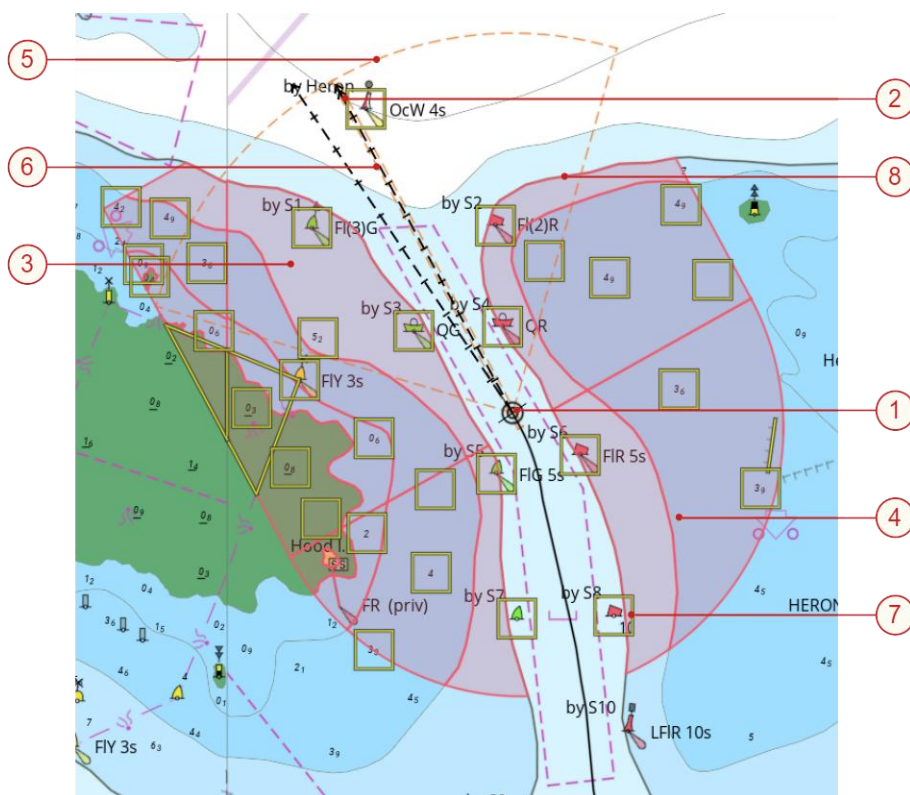
17.2.1 Display on the chart

Based on the selected monitoring parameters, a scanning area is displayed around the vessel symbol, covering both the aft and bow sections.



Objects within this scanning area that belong to the designated monitoring groups will be highlighted on the chart.

Additionally, the scanned area includes a dynamic sector band. Alarms are triggered for any objects detected within this **dynamic scanning band**, regardless of the highlighting settings.



1	Own Ship: Displayed on the chart.
2	Vessel speed vector with prediction for a given time (in the example: 5 minutes)
3	Forward Scanning Area: Defined by the width of the sector-band. Objects in this area are highlighted (if enabled), but no alarms are generated.
4	Aft Scanning Area: Includes objects detected within the aft sector. The aft part of the scanning area includes objects detected within it. The center of this sector is located at the CCRP (Common Reference Point), and the sector spans 180 degrees . The radius of the sector is half the width of the forward scanning band. Objects in this area are highlighted (if enabled), but no alarms are generated.
5	Dynamic Hazard Scanning Sector: Monitors potential hazards within a specified prediction time or safety range. Dynamic hazard scanning sector .
6	Dynamic Hazard Scanning Band: Alarms are triggered for objects detected within this band
7	Point Object Highlighting: Specific point objects are visually emphasized.
8	Area Object Highlighting: Area objects are visually emphasized.

17.2.2 Hazard indication

Navigational hazards. Always displayed on the **Danger Course Indicator** (refer to section 4.14).

17.2.3 Charted hazards

A list of chart hazard alerts is generated for the following **navigational hazards**:

- Coastline
- Safety Contour
- Isolated Underwater Dangers
- Buoys and Beacons
- Obstructions
- Bridges: If the vertical clearance is less than or equal to the value specified in the settings.

18. Anchor Monitoring

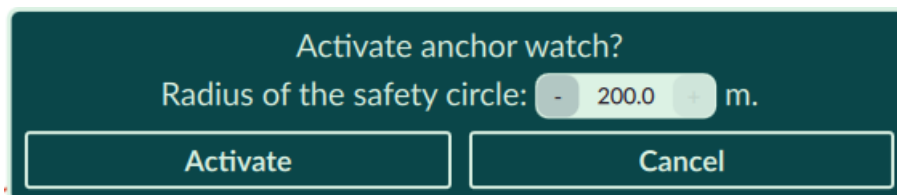
Navigate to:



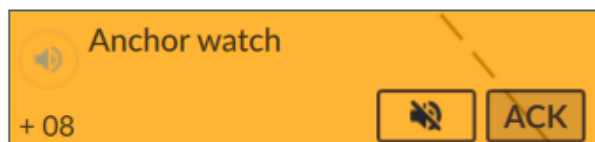
The Anchor Watch monitors the vessel's position at anchor to ensure no drift occurs.

Steps to Activate Anchor monitors:

1. **Activate anchor watch (Activate anchor watch).**
2. Enter the **Radius of safety circle.**

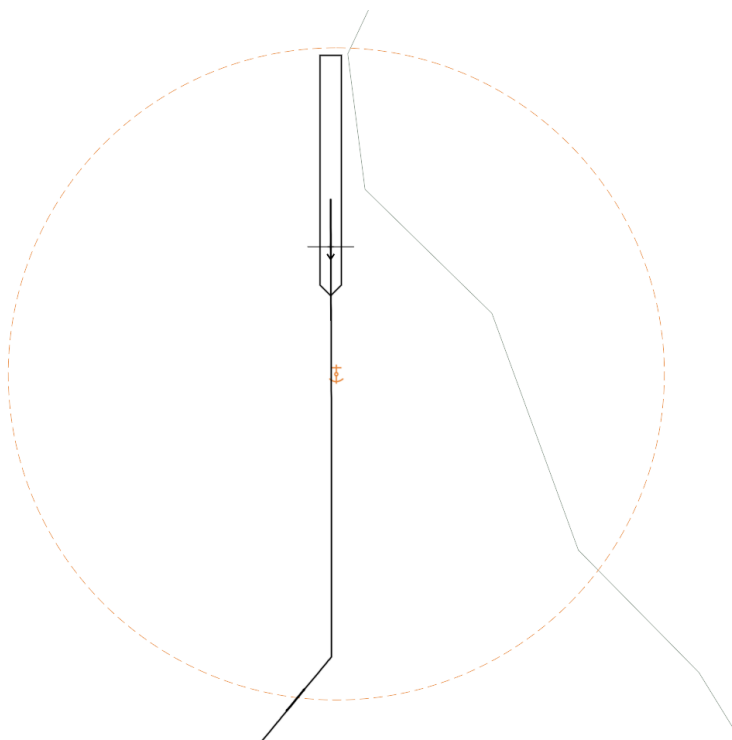


3. Press **Activate** when reaching the point and dropping the anchor.
4. When **anchoring** is activated, the message Anchor watch on will be displayed in the permanent display area.



On the Chart

The safety circle and anchor symbol appear at the drop point. The safety zone is outlined by an orange circle

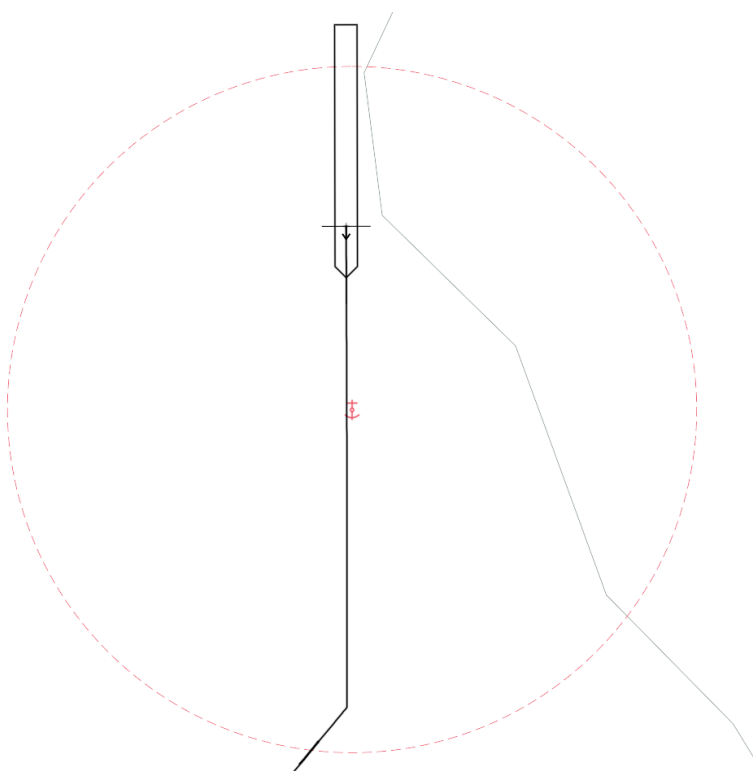


Warnings and Alarms

If the vessel moves outside the safety radius:

The safety circle and anchor symbol turn red.

A warning (Anchor Watch) is issued.





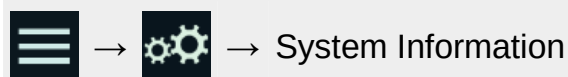
If the warning is not acknowledged within 2 minutes, and the vessel remains outside the safety radius:
The warning escalates to an alarm.



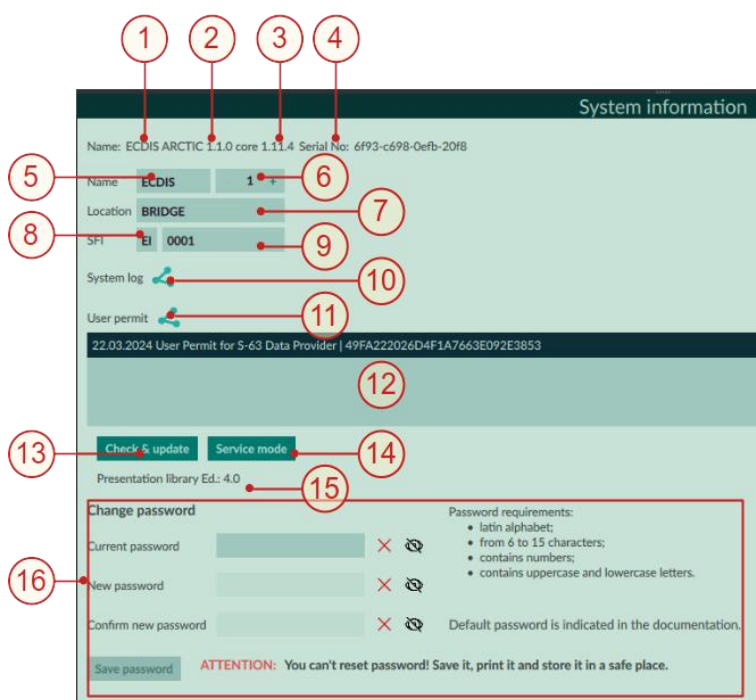
If the vessel re-enters the safety zone:
The warning/alarm becomes irrelevant.
Disabling Anchor Watch clears all warnings and alarms.

19. ECDIS Maintenance and Information

19.1 ECDIS Information



The **System information** section is for viewing application data, exporting system log and user permissions, and updating software.



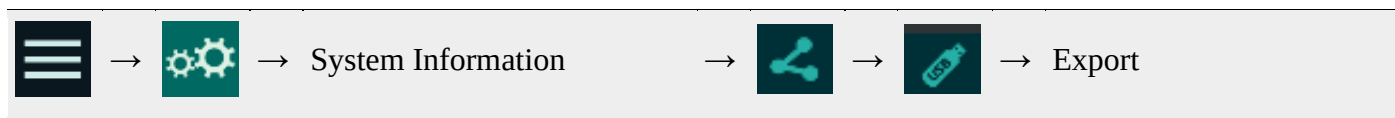
1	ECDIS Name: The name of the ECDIS system.
2	ECDIS Version: Displays the installed version of ECDIS.
3	Software Core Version: Version of the software core.
4	ECDIS Identification Key (Serial No.): Unique serial number of the ECDIS system.
5	ECDIS Name in Network-450 (Name): Required when connected to a VDR.
6	Incremental Name Termination: Additional identifier for ECDIS in Network-450 (required for VDR connection).
7	Location: Specifies the ECDIS location (mandatory for VDR connection).
8	Tolker SFI: Tolker settings for Network-450.

9	ID SFI: Identifier for Network-450.
10	System Log: Access and export system logs.
11	User Permit: Displays User Permit details.
12	User Permit Text: Shows the User Permit agreement.
13	Check & Update: Verifies for updates on the connected flash drive and applies them.
14	Service Mode: A maintenance mode for use by service engineers only. Entry is password-protected.
15	S-52 Presentation Library Version: Displays the version of the S-52 Presentation Library.
16	Change Password: It is mandatory to change the default password after commissioning.

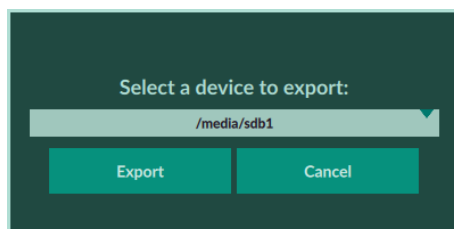
19.1.1 Exporting the system log

1. **Insert USB Drive:** Connect a USB drive to the ECDIS USB port (The removable media must meet the requirements specified in section 2.3.2);

2. Navigate to



3. Begin the export process.



4. Allow the process to finish.

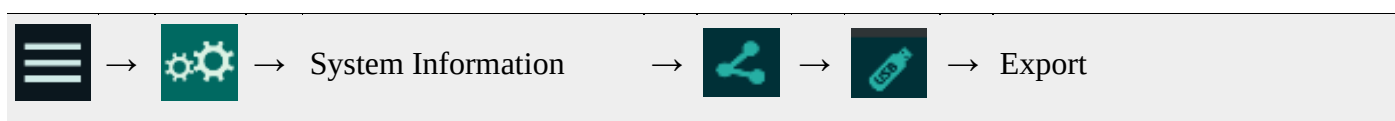
5. A message "**Export succeeded**" will appear at the bottom of the window.

19.1.2 User Permit export

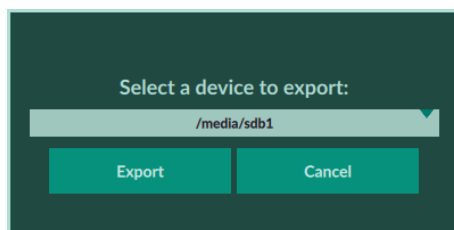
To transfer the User Permit to the ENC data provider (e.g., for ENC ordering via email), save the permit onto removable media.

Connect a USB drive to the ECDIS USB port;

Navigate to



Begin the export process;



Allow the process to finish

A message **"Export succeeded"** will appear at the bottom of the window.

19.2 ECDIS software update

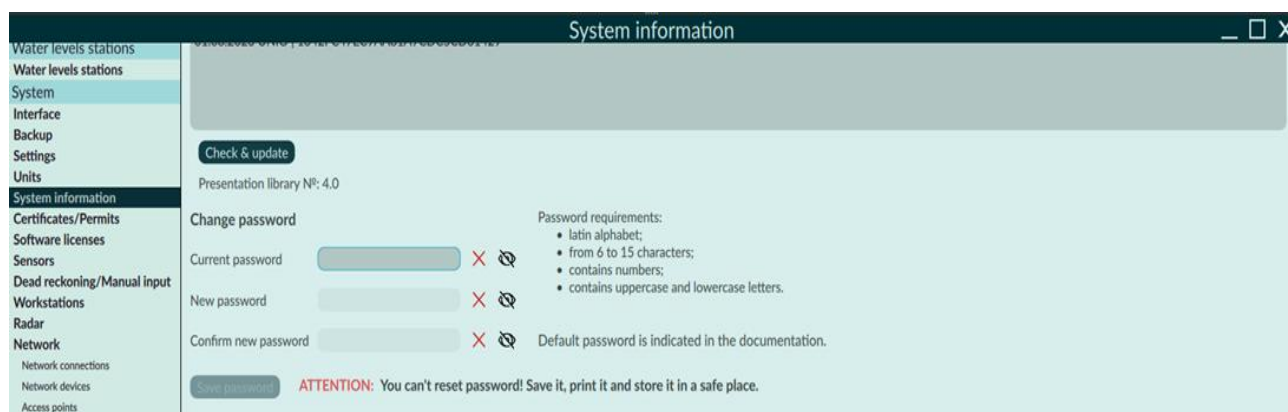
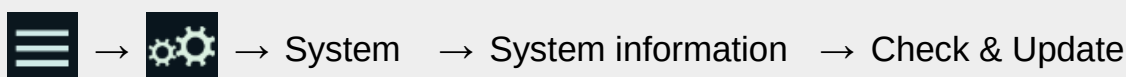
The software is updated using a USB flash drive, which contains an archive of updates released by the software developers.

NOTE

Information on the availability of software updates is available at:
<https://www.nsrmarine.com/listinfo-228-0.html>

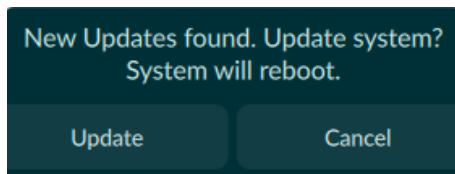
On-board systems software update is performed by authorized dealers of the manufacturer.

Perform an update:

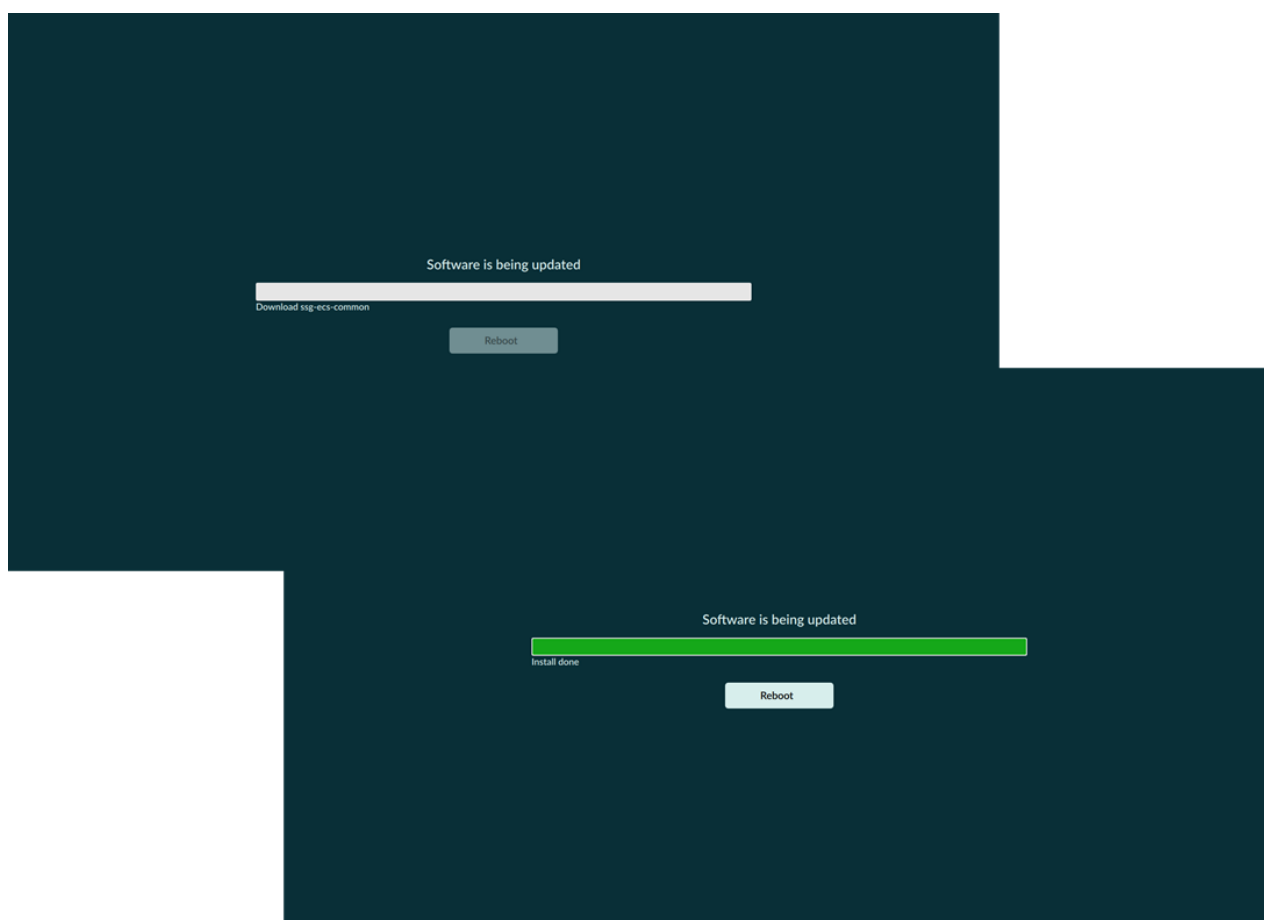


If no updates are available, a notification will appear at the bottom of the window: "No updates detected".

If ECDIS detects updates, confirm the action in the dialog box by clicking Update:



The system update utility will be started.



The update is performed automatically. You need to wait until the update is complete and click the **Reboot** button.

20. Master-Backup Settings

ECDIS software can be installed on multiple workstations within the same subnet. This allows for a bridge configuration, where several ECDIS workstations (nodes) can operate together. In this configuration, one node functions as the **Master** and the others as **Backup**.

20.1 Critical Settings for Each Node

To ensure proper operation of the ECDIS, it's essential to check and configure the following settings on every node:

1. USB-dongle and License
2. DPI Settings and Graphical Interface Settings
3. Registration and Vessel Data Settings
4. Own Ship and Vessel Dimension Settings
5. System Information Settings (ensure these settings are unique for each node)
6. Network Settings
7. Sensors Settings
8. Firewall Settings

• NOTE

When the system starts for the first time, no node is designated as the **Master**. To assign a node as the Master, click the **Master/Backup** button on the single action buttons panel and select **Master status** on the preferred node.

20.2 Navigational Sensor Data Across the Bridge

The **Master node** serves as the source for all navigational data (Position, Speed, Heading, etc.) across the bridge network. This means that **primary sensors** must be set up on the Master node, while all Backup nodes receive this data from the Master.

20.3 Backup Sensors Connection

20.3.1 Ethernet Sensors Connection

For navigation sensors, we recommend using an **Ethernet connection** via Moxa NPort series or a similar device. This allows you to use **identical sensor settings** on each node, with the following

advantages

- When transferring Master status from one node to another, navigational data will not be lost.
- If the Master node is out of order, you can easily transfer the Master status to another node.

20.3.2 Serial Port Sensors Connection

In this configuration, you need to set up the **primary navigation sensors** set on the Master node. On one or more Backup nodes, you must add a backup **Position sensor (EPFS)**, as required by the IEC 61174 standard. However, this approach has limitations:

- When transferring Master status, there is a risk of losing navigational data unless you transfer the status to a node with connected sensors.
- If the Master node fails, Master status must be transferred to a node with connected sensors.

20.4 Backup node limitations

Backup nodes are restricted from performing the following actions:

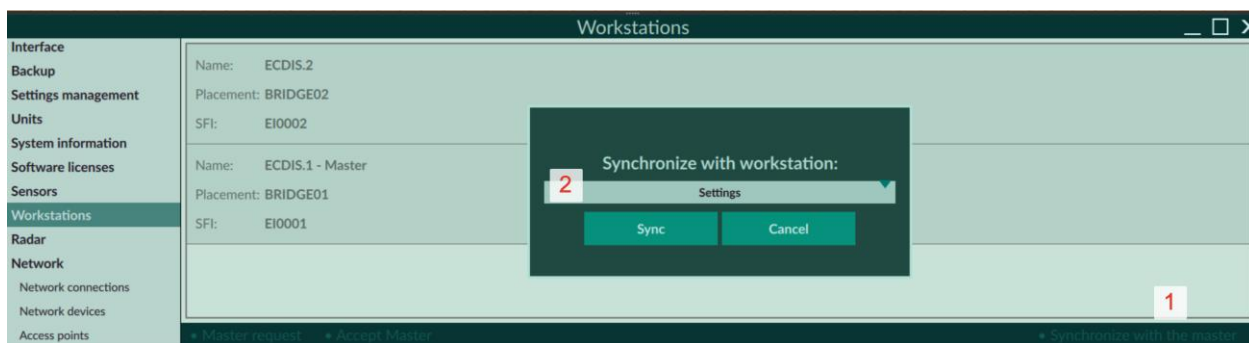
- Enabling/disabling dead reckoning mode
- Performing manual observations
- Correcting coordinates, course, and speed
- Installing ENC's and applying corrections to them
- Performing manual corrections to ENC's
- Dead reckoning with total drift accounted for

20.5 Master Backup Synchronization

To simplify bridge configuration, the ECDIS includes a **Master-Backup synchronization function**. We recommend setting up the following settings on the Master node and then synchronizing them with the Backup nodes:

1. **Registration and Vessel Data Settings**
2. **Own Ship and Vessel Dimension Settings**
3. **Sensors Settings**

Once these settings are configured, they can be synchronized from the Master node to the Backup nodes for seamless integration.



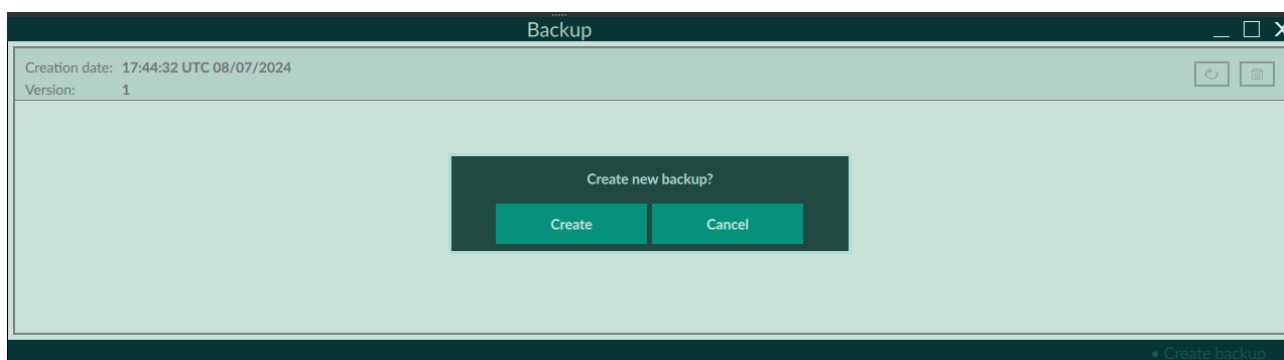
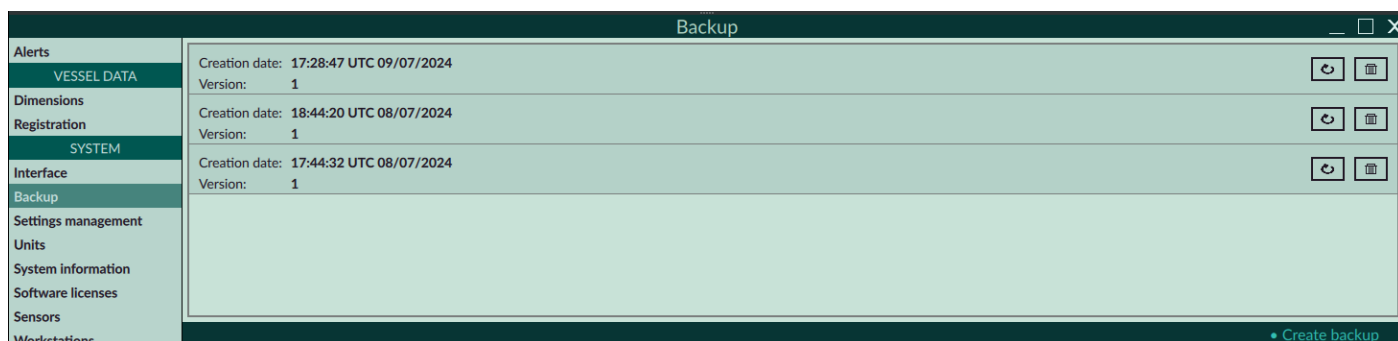
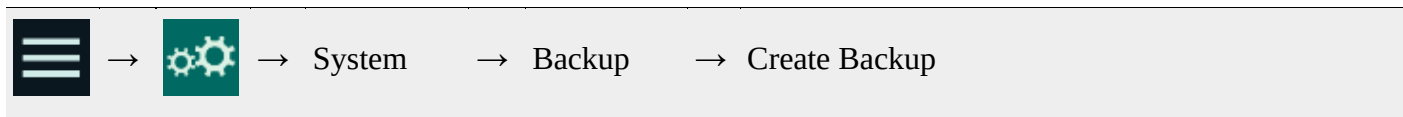
21. BackUp and Restoration

ECDIS provides the backup for the following data:

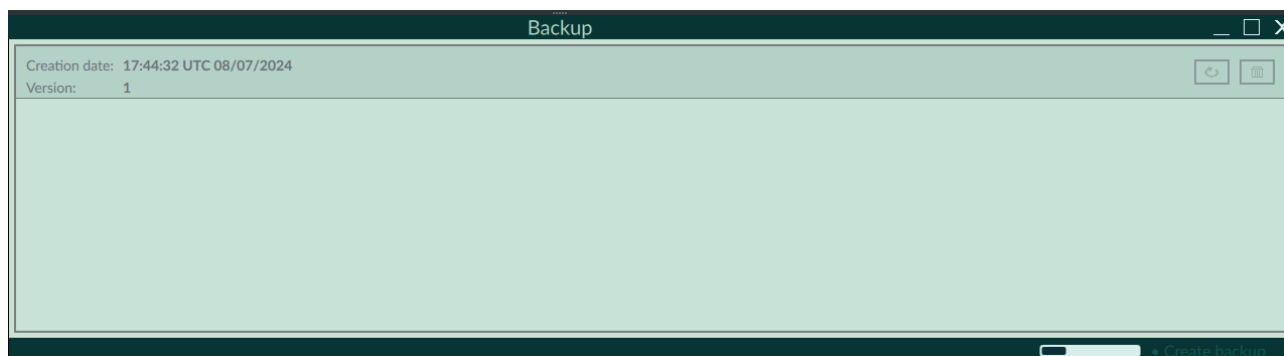
- SENC, certificates, ENC permits;
- ECDIS settings;
- Routes;
- Manual chart updates and user objects.

21.1 Backup

Navigation:



The backup process is accompanied with a progress bar.

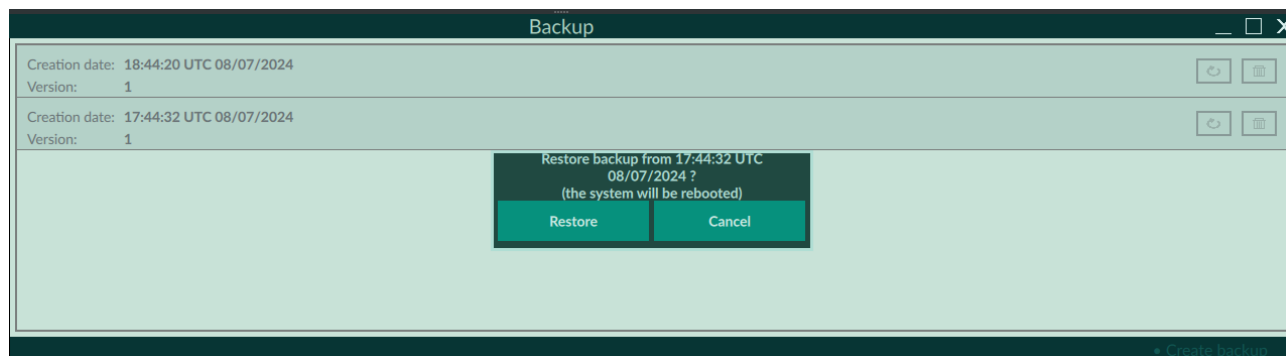
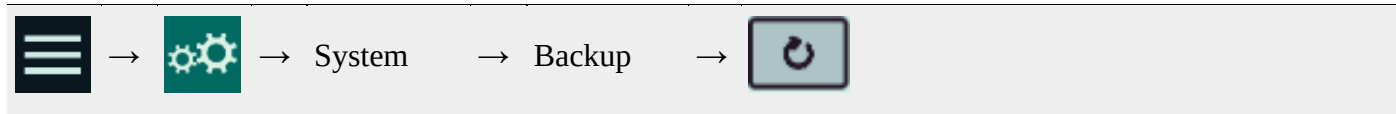


• **NOTE**

The backup duration depends on the size of the ENC database, the route database, manual updates data and the user chart.

The backup process is performed in the background mode and does not restrict the user from activities related to ECDIS operation.

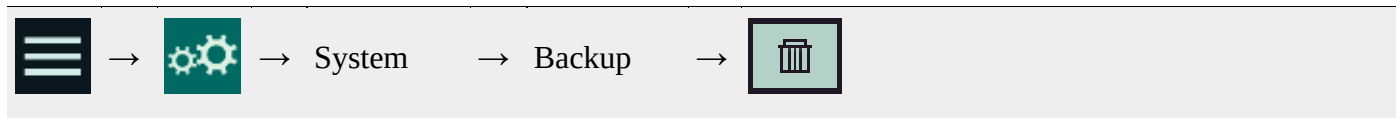
21.2 Restore from backup



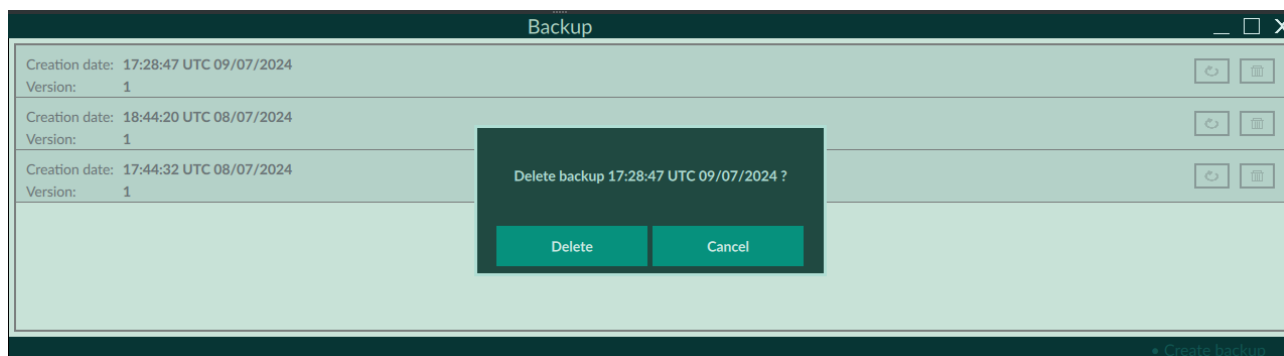
• **NOTE**

When restoring, all previously installed charts, certificates, routes, settings, manual updates and user objects will be replaced with the data from the backup.

21.3 delete a backup



It is recommended to force removal of the old backups containing obsolete data.



22. Radar Overlay (Optional)

In ECDIS is realized the function of overlaying the RLI from radar processors, and/or network radars on the map.

When overlaying the RLI, the RLI is converted from azimuthal projection to map projection, and the RLI scale is brought to the current map scale.

• NOTE

The Radar Overlay license is required for the RLI display option to work.

22.1 Creating an RLI source



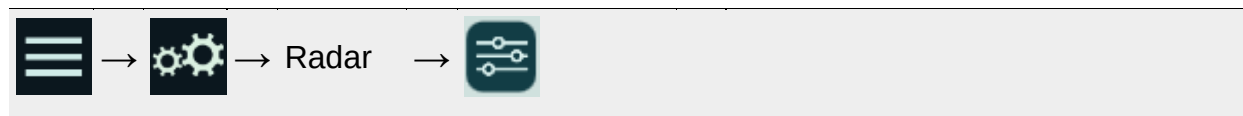
In the list of connected sources, the added source will appear;



22.2 Setting up the RLI source

The steps described below for setting up the radar source are general in nature. As an example, the RPU-1.3 model radar processor is used. For correct operation of the radar source, the setup should be performed by a technician with the appropriate technical knowledge and skills.

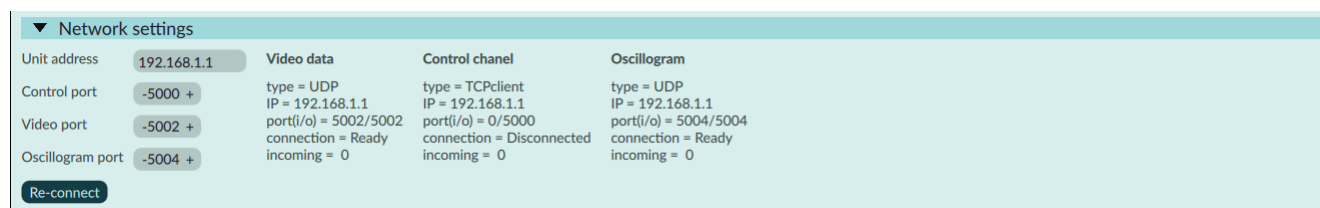
Source Setup:



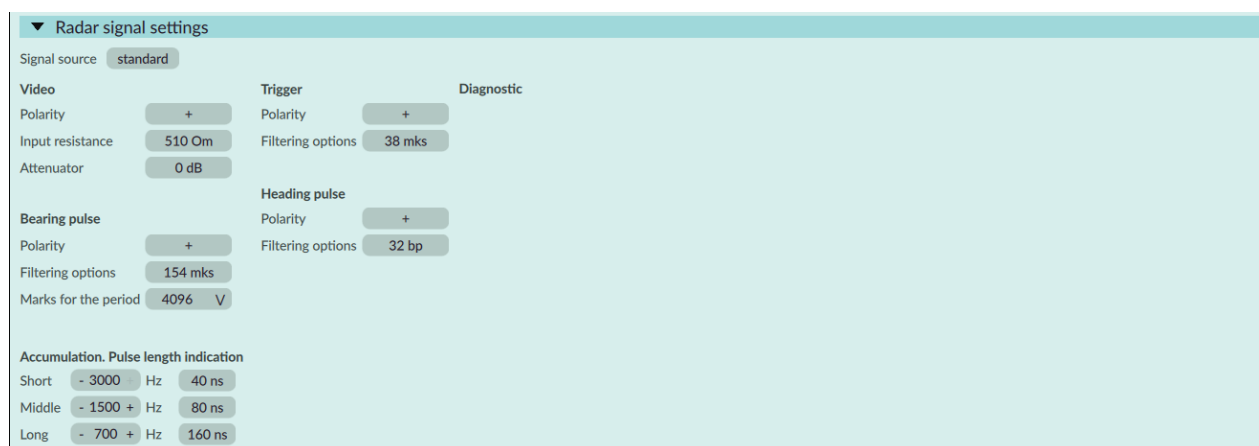
1. settings are grouped into sections. To expand/collapse the selected section - click (tap) on the corresponding heading;



2. **Network settings:** set the IP address of the RLI source device, set the data/control ports according to the documentation. Press **Reconnect** and if the settings are correct, the connection statuses will be changed and the data packet counters will be updated in the information group (4);

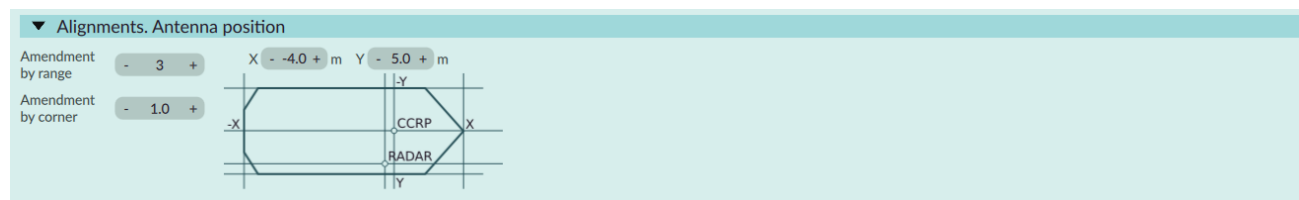


3. **Radar signals settings:** Set the mode in the **Signal source** drop-down list. By default, this parameter is set to standard (RPU-1.3). If all parameters are set correctly and the RLI layer is enabled in **Quick settings**, the RLI will appear on the screen and the **Diagnostic** group with information about the status of the selected device will appear in the settings window;



4. **Alignments. Antenna position (Alignments. Antenna position):** set the coordinates of the radar

antenna relative to the DOT. If there is a discrepancy between the radar and map information, enter distance and angle corrections. It is recommended to perform these settings regularly;



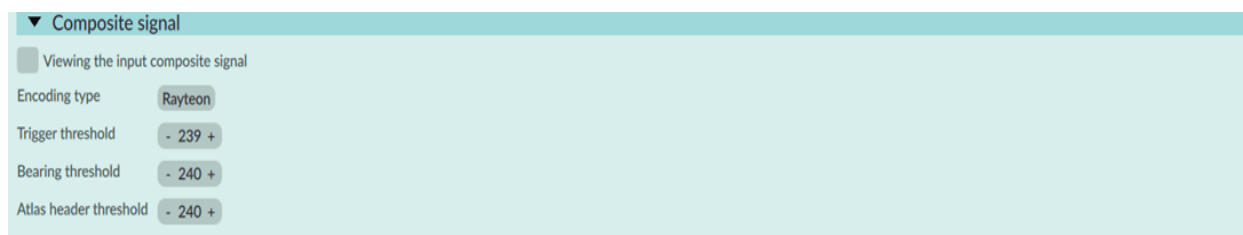
5. **Primary settings:** enter the source name (1), set the desired **range scale**. Using **adjustments** and parameters **Gain, Sea, Rain** adjust the signal detection thresholds. If necessary, use the **AUTO** switches to enable automatic VMP interference suppression. Depending on the display model, adjust the **display** parameters so that the RLI is clearly visible on the screen



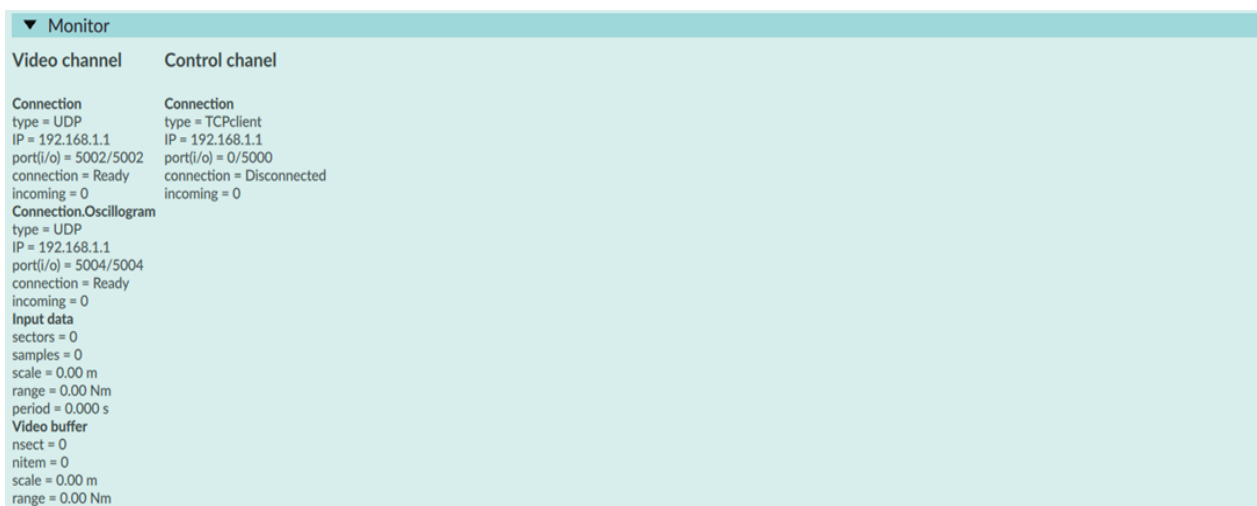
6. **Filtering:** make the **Noise interference** suppression settings, set the parameters of **AUTO Gain** and **AUTO Sea** modes if they are enabled (see above);



7. **Composite signal:** must be set when using a radar that transmits on this type of channel.

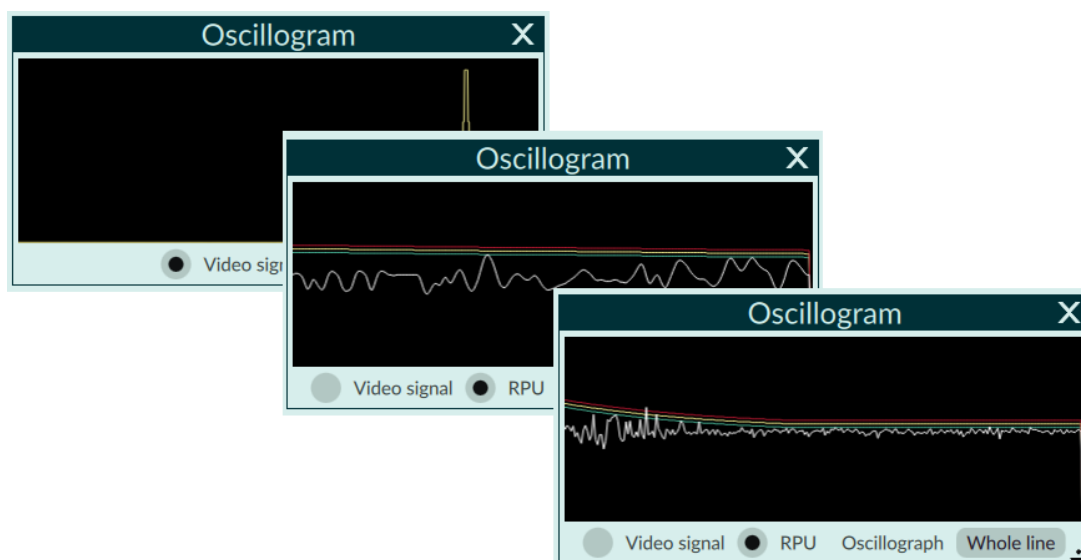


8. Monitor - diagnostics of output parameters and device status during operation setup



After successful connection and setup, diagnostic information is displayed in the Monitor.

Oscillogramm window, which is opened/closed by pressing the button of the same name in the **Radar** settings section.



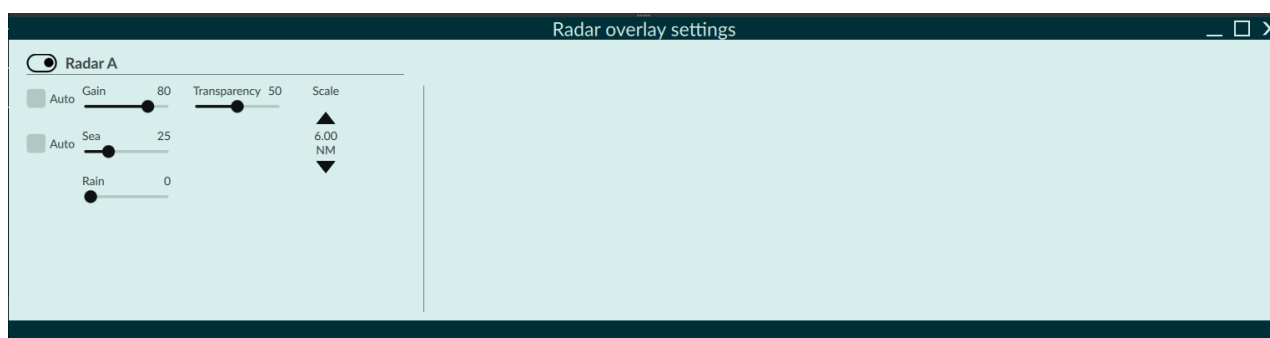
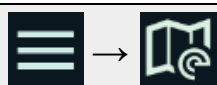
22.3 Radar overlay

Radar image overlay is enabled in **Operational Settings**.

• NOTE

A course from the Cursor is required for the RLI to overlay correctly.

ECDIS has implemented quick access to **Radar overlay settings**:

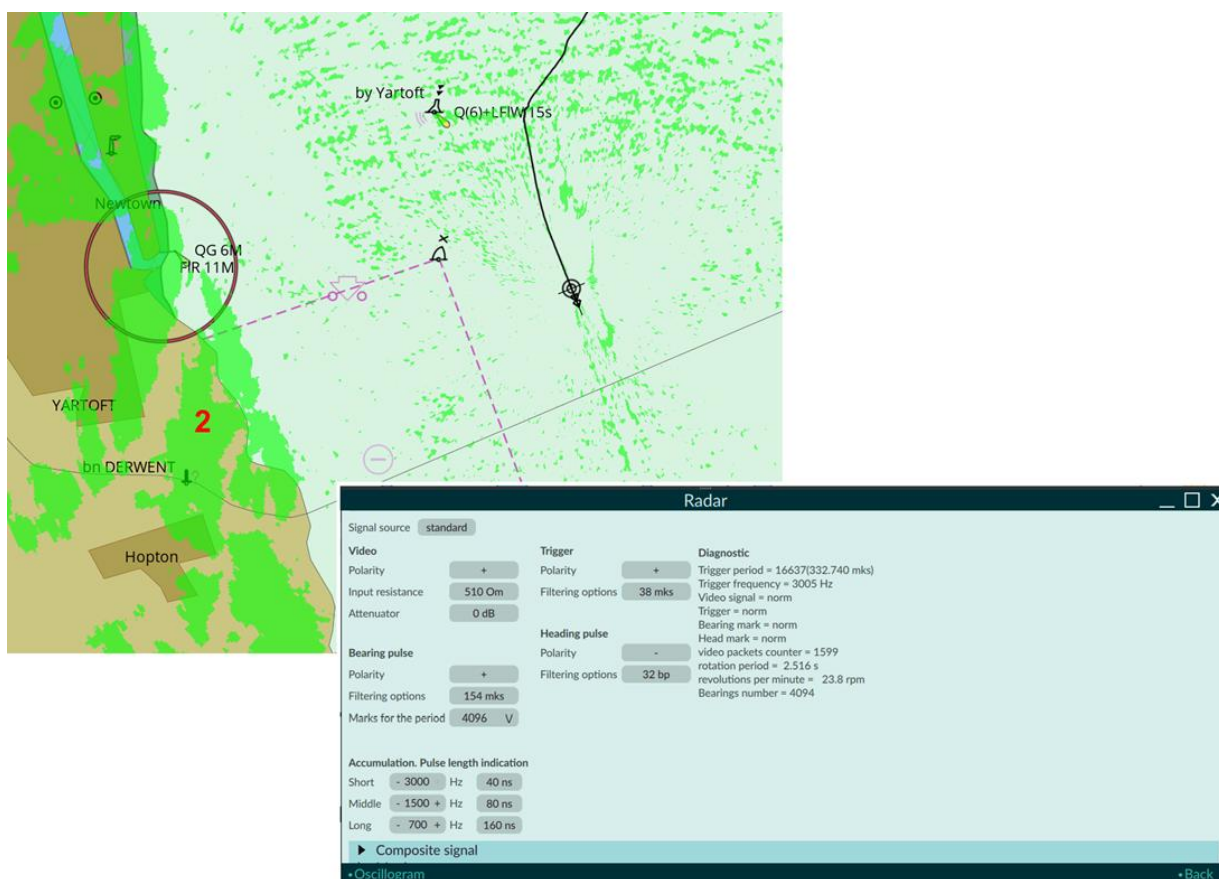


Radar overlay settings contain controls for all connected radar sources, which are grouped into sections. Above each section is the name of the source and a switch to turn the source on/off.

• TIP

Only one RLI source can be used at a time in ECDIS.

When the RLI source is turned on, if another source is turned on, a dialog will be displayed to confirm the action to turn off the running RLI source.



For RLI sources, a set of program messages is provided.

Table 12: Program messages from the RLI source

TEXT	CATEGORY	CONDITION
No RLI signal: <source name>	Warning	When radar video data is no longer being received
No PII signal: <source name>	Warning	When the data is no longer being received by the PII signal (Indicator Trigger Pulse, Trigger)
No OK signal: <source name>	Warning	When the OK (Course Marking, Heading) signal is no longer being received
No AMC signal: <source name>	Warning	When data on the presence of the CUa (Antenna heading angle, Bearing) signal is no longer available

No link to RP: <source name>.	Warning	No communication with the radar processor
----------------------------------	---------	---

22.4 Removing an RLI source

Remove the RLI source from ECDIS:



1. After the actions have been performed, the RLI source will be marked for deletion (gray background) and will be unavailable for use;
2. Complete removal of the source from the system occurs only when ECDIS is rebooted. If necessary, reboot the ECDIS.

• TIP

Shutdown of ECDIS, when rebooting, with RLI sources marked for deletion, may take longer than usual. This is due to the correct termination of all running processes. If you encounter this behavior, simply wait for ECDIS to shut down and reboot.

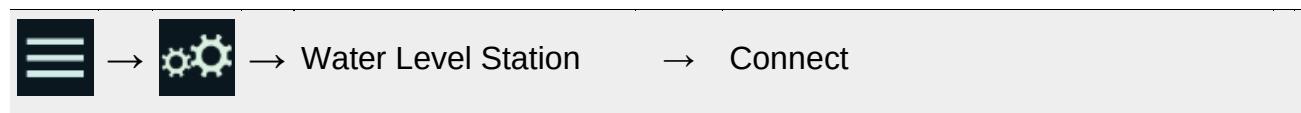
23. Water level stations (Optional)

ECDIS has the ability to receive, in automatic mode, data from water gauging stations. The data are received by authorized users of the service via the Internet from the hydrological data provider.

• NOTE

The service works only if you have access to the Internet.

23.1 Connection



Echo	Address	https://asup.moris.tech
Echo settings	Login	lottia
Depth alarms	Password	••••••••
Vessel data	Disconnect	
Dimensions		
Registration		
Water levels stations		
Water levels stations		
System		

Fill in the fields: **Address**, **Login** and **Password** provided by the service provider. Click **Connect**.

• NOTE

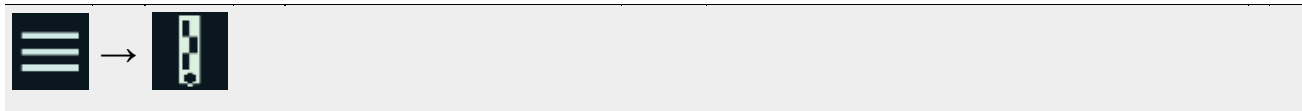
Connection to external data sources is a potential cyber threat to the bridge's internal secure network and to ECDIS. Only connections to trusted external data sources are allowed.

If the connection is successful, the button will change its name to Disconnect. If the settings are incorrect, a notice will be displayed at the bottom of the screen: "Water meter posts: incorrect connection parameters".

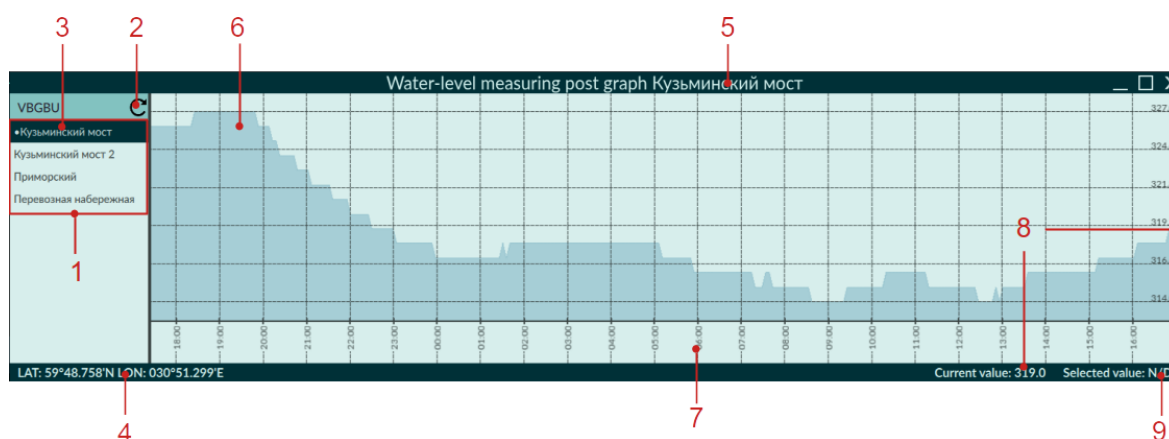
In the absence of Internet access, the connection button will be locked.

23.2 Graph of water level fluctuations

Graph Viewing:



Or click on the WL line in the Navigation Indicator.

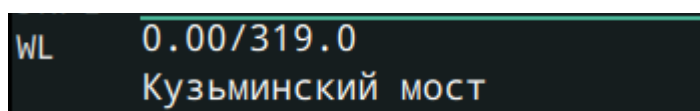


The opened window contains the list of available water gauging stations and data received from them, represented by the graph.

1	list of available water gauging stations;
2	Update - forcibly updates information on water gauging stations (list and data); the discreteness of water gauging stations data update is determined by the service provider and is not configurable in ECDIS. The update is performed upon receipt of new data.
3	selected water-metering post. Single left mouse click (touch) on the selected post changes the graph. Double left mouse click (double tap) - the post will be selected for permanent indication of current values on the Navigational panel . The post selected for permanent indication is marked with a dot in the list.
4	coordinates of the selected post;
5	the title of the selected post;

6	graph plotted according to the data received from the selected water gauging station for the last 24 hours; depending on the implementation of data transmission by the service provider, historical data on water level fluctuations can be transmitted either "immediately" or not at all, in which case ECDIS will accumulate data for plotting the graph.
7	timeline - timestamps and date;
8	the last received data from the selected post with indication on the column and in the Current value field;
9	values at the specified point in time (Selected value). To view the values, it is necessary to point the cursor and click the left mouse button (tap on the touch screen) on the graph. An indicator line will be set at the specified position and the value for the specified time will be displayed in the Selected value Selected value field.

If you have selected a post for permanent display (see point 3 above), the latest data received from it will be displayed on the **Navigational panel**.



The first value in the water gauging station data is the height of the station zero above the zero depth set in the area. The second value is the height of the current water level above the station zero.

IMPORTANT

ECDIS does not automatically take into account the received sea level fluctuation values during navigation monitoring.

IMPORTANT

It is the responsibility of the shipmaster to ensure that the transmitted sea level values are referenced to the zero depth set in the navigation area.

If it is impossible to receive data from the selected post, the name of this post in the Navigation Indicator will be highlighted in yellow color.

IMPORTANT

The names of water gauging stations can be transmitted in the national language. ECDIS displays names of gauging stations "as they are", without transliteration.

IMPORTANT

ECDIS does not take into account the operating area of the station. Therefore, the ship operator must perform such control himself. For example, using Mariner Editors

24. Bridge(Optional)

24.1 Purpose

ECDIS operates independently or as part of a navigation bridge.

As part of a navigation bridge, ECDIS connects to the bridge's internal network to exchange information between nodes.

ECDIS functions as a network node. To manage responsibilities across multiple ECDIS nodes, each node is assigned a specific role: Master or Backup.

Master:

Has no functional limitations.

Acts as the source of navigation data for Backup ECDIS.

Backup:

Limitations include:

- Cannot customize sensors.
- Cannot enable/disable calculation modes.
- Cannot perform manual observations.
- Cannot update position, heading, or speed.
- Cannot install ENC or updates.
- Cannot perform manual ENC updates.
- Cannot perform dead-reckoning (e.g., total drift calculations).

NOTE

Bridge mode is available ONLY when integrating ECDIS units from the same manufacturer.

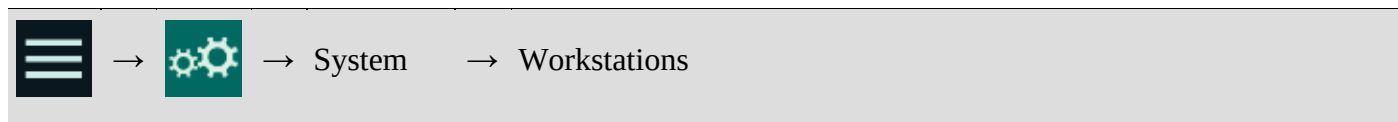
24.2 ECDIS connection to the Navigation Bridge and setup

ECDIS connection to the navigation bridge and setup must be performed by specialists qualified as information network administrators. These tasks should follow the technological documentation of

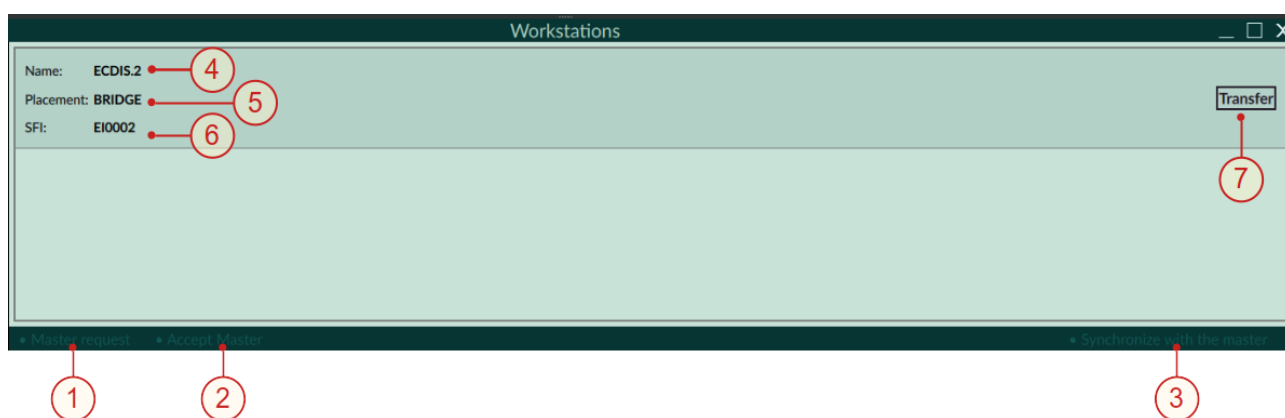
shipboard networks and the recommendations provided by the ECDIS manufacturer.

If the network and firewall are properly configured, further ECDIS configuration and synchronization will occur automatically..

Navigation:



or

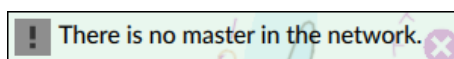


1	Master Request: The Master role request button allows a Backup ECDIS to send a request to the current Master ECDIS to transfer the Master role to the Backup.
2	Master accept: The accept Master role button on the Master ECDIS allows acceptance of the Master role when it is being transferred from another ECDIS.
3	Synchronize with Master: A function to synchronize databases on a Backup ECDIS with the Master ECDIS to ensure data consistency, making operational transitions seamless.
4	Name: Each ECDIS is identified by a specific name within the navigation bridge to distinguish among the connected systems.
5	Placement: Indicates the physical location of the ECDIS on the ship, aiding in proper identification and operation based on its position in the navigation bridge setup.
6	SFI (Unique 450-Network ID): A unique identifier for the ECDIS within the internal bridge

	network, ensuring accurate communication and database synchronization between nodes.
7	Transfer: The Transfer Master role button allows the Master ECDIS to transfer its primary role to a selected Backup ECDIS. This feature is available only on Master ECDIS and is critical for operational redundancy and role management.

24.3 ECDIS role management

When the navigation bridge is powered on, all ECDIS units on the network initialize, but initially, **there is no Master ECDIS** assigned. In this case, a notification will appear in the notification area, alerting the user to the absence of a Master ECDIS in the network

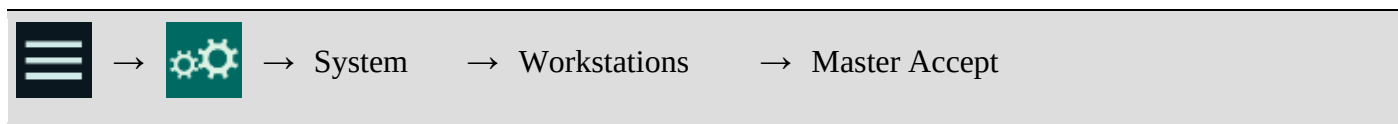


At this stage, the navigator has the authority to manually assign the Master role to any convenient ECDIS unit connected to the network.

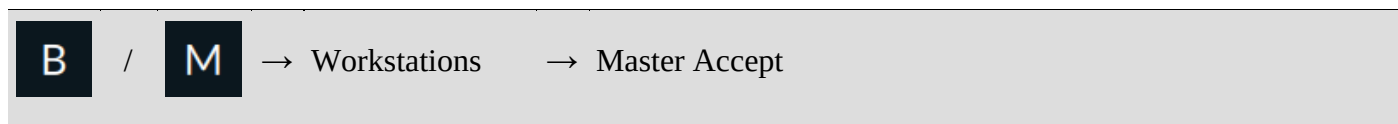
The Master role can be transferred to any other ECDIS as needed. A Backup ECDIS can request the Master role from the current Master.

24.3.1 Assigning a Master role

Navigation:

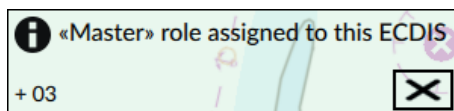


or



ECDIS will send a notification to the network indicating that this workstation has accepted the **Master** role.

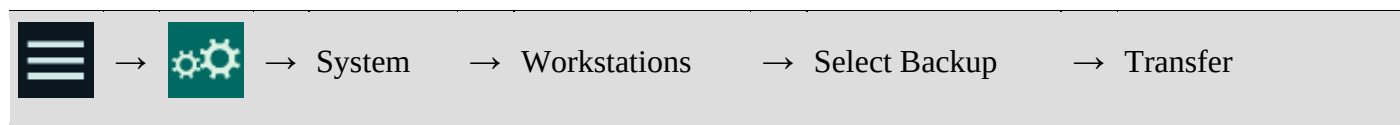
A message will appear in the notification area:



The indicator button will show the status of the  **Master** role.

24.3.2 Transfer Master role to Backup

To transfer **Master** role to the selected workstation:



or



The **Master** role will be transferred to the selected workstation.

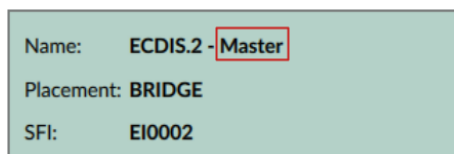
On the ECDIS where the **Master** role was transferred from, the **Master** role status in the permanent indication zone will change to **Backup** .

In the list of workstations, the status of the workstation to which the **Master** role was transferred will be updated.

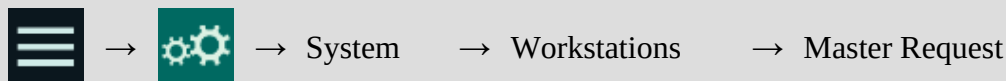
On the ECDIS where the **Master** role was transferred to, the **Master** role status will change to **Master**.



24.3.3 Request for Master role



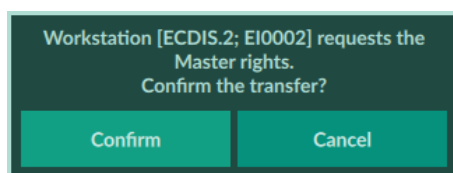
The Backup ECDIS can request to take the Master role if needed:



or



The Master ECDIS will receive the request from the Backup.



To transfer the role to the Backup, confirm the transfer by pressing the Confirm button.

The Master role will then be transferred to the Backup ECDIS.

24.4 Synchronization

To avoid discrepancies in the bridge network, the information from the Master ECDIS is prioritized.

Any Backup ECDIS in the bridge network can synchronize data with the Master:

- ENC
- Settings
- User settings: settings presets, ENC presets.

24.5 ENC Synchronization

ENC synchronization is only possible with the Clone option, when several Bridge ECDIS units have hardware ID keys with the same HW_ID installed.

NOTE

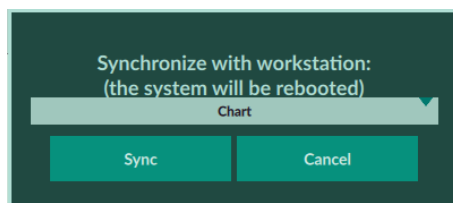
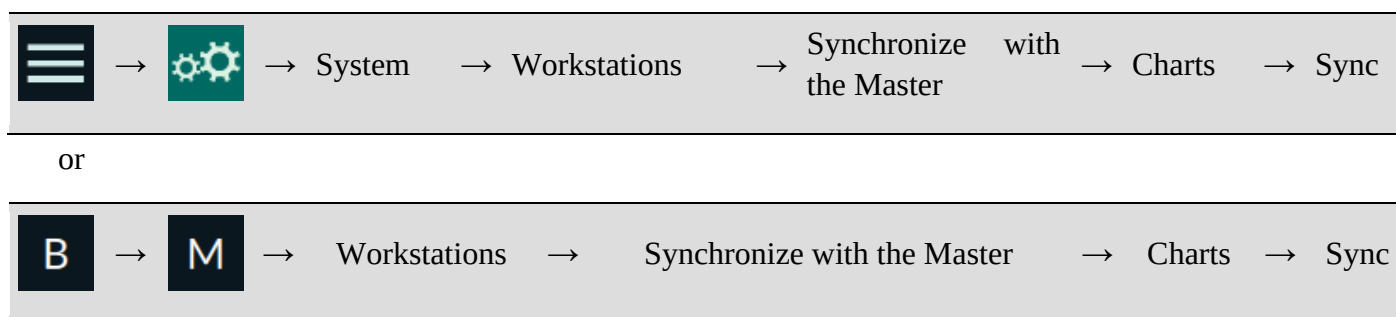
ECDIS supports operation with up to 5 stations using a single HW_ID.

This means that one dataset can be installed on 5 stations with a single set of ENC permits (Cell Permits).

In the absence of the **Clone** option, only **User Charts** are synchronized. **ENCs** are synchronized in the following cases:

- Installing new ENCs in the collection;
- Obtaining and applying an update to an ENC;
- Adding new Cell Permits;
- Adding, deleting, modifying certificates;
- Performing a manual update;
- Applying or deleting new Mariner's Objects.

Synchronize ENCs to Backup ECDIS



Once the ENC is synchronized, the workstation will automatically reboot.

NOTE

The time for synchronization of chart databases depends on their size on the ECDIS. All databases are synchronized, including those whose licenses have expired.

24.5.1 Synchronize Settings:

Settings should be synchronized in the following cases::

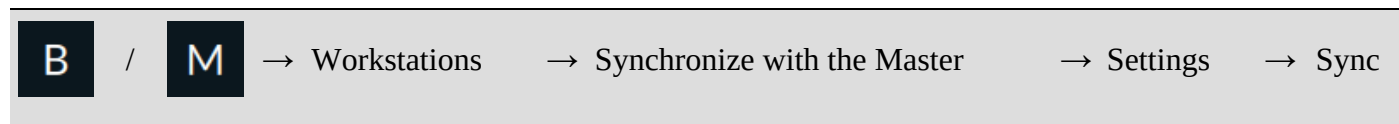
- changes in vessel dimensions (e.g. towing);
- changes in registration data;

- changes in sensors (setup, binding, connection parameters, changes in proposal filters).

Synchronize Settings to Backup ECDIS:



or



25. System Logs

NOTE

ECDIS does not provide network monitoring function as described in 8.2 IEC 61162-460. ECDIS also does not provide syslog recording function. It can only be connected to a network which another equipment provides network monitoring and syslog recording function.

25.1 Device management activities log

ECDIS logs the following activities:

1. Configuration Changes:

- IP address, port number, and other network settings.
- The number of active network interfaces.
- Changes to outbound TCP and UDP connections (additions, deletions, or modifications).

2. Software Management:

- Updates or upgrades to the system.

3. Device Connections:

- Interface setup for external devices (e.g., input interface for gyro heading, output interface for GPS position).
- The list of all outbound TCP and UDP connections, including their assigned maximum traffic rate.
- The list of all outbound TCP and UDP connections assigned to each network interface.

4. IEC 61162-450 errors. (4.3.3),

25.1.1 Log File Location

```
/var/log/ssg-node460audit/message.log
```

25.1.2 Logging Service

The system uses a dedicated service for logging: ssg-node460audit.

The configuration for this service is located at:

```
/opt/ssgnavigation/locius/share/modules/node450/settings.json
```

25.1.3 Service Configuration Details

```
{
  "debug": 0,
  "excluded_endpoints": [
    "239.255.0.1:49000",
    "239.255.0.1:49001"
  ],
  "iface_timeout": 0.5,
  "logrotate": 7,
  "logsize": 100,
  "settings_timeout": 1800.0,
  "syslog_endpoints": []
}
```

Parameter Descriptions

1. debug:

- Value: 0
- Description: Currently unused. Intended for enabling/disabling debug information.

2. excluded_endpoints:

- Value: [239.255.0.1:49000-49001]
- Description: A list of excluded IP addresses and ports in the format [000.000.000.000:*|port].

3. iface_timeout:

- Value: 0.5 (seconds)
- Description: The frequency of updating the list of network interfaces.
- Note: Values below 0.2 seconds may increase CPU load. Default is 0.5 seconds. It is recommended not to change this.

4. logrotate:

- Value: 7
- Description: The number of daily log files to keep. Default is 7.

5. logsize:

- Value: 100 (MB)
- Description: The maximum total size of all stored log files. Default is 100 MB.

1. settings_timeout:

- Value: 1800 (seconds, or 30 minutes)
- Description: The frequency of updating network settings. Default is 30 minutes.

2. syslog_endpoints:

- Value: [] (empty by default)
- Description: A list of syslog servers in the format [udp|tcp:000.000.000.000:port].
- Example: ["udp:192.168.1.216:514"]

Additional Notes

1. Default Exclusions:

- By default, certain endpoints (e.g., 239.255.0.1:49000-49002) are excluded from logging to prevent excessive or unnecessary entries.

2. Post-Setup Adjustments:

- After setup and testing, additional exclusions may be added to the excluded_endpoints list based on operational requirements.
- Consideration: To avoid excessive syslog messages, ephemeral source ports can be represented by a "wildcard".

25.1.4 Managing the ssg-node460audit Service

Check Service Status

```
systemctl status ssg-node460audit
```

Restart the Service

```
systemctl restart ssg-node460audit
```

Stop the Service

```
systemctl stop ssg-node460audit
```

Start the Service

```
systemctl start ssg-node460audit
```

View Logs in Real-Time

```
journalctl -f -u ssg-node460audit
```

25.1.5 Software update log

Software updates are logged in the **system syslog**, not in the audit service log (ssg-node460audit). This ensures that all update-related activities are recorded separately and can be reviewed independently.

To view software update logs in the system syslog, use the following command:

```
sudo grep SYS-UPD /var/log/syslog
```

25.2 Remote Syslog Server Connection

25.2.1 Sending Audit Service Logs

The ssg-node460audit service can send logs to a remote syslog server by configuring the syslog endpoints parameter in its JSON configuration file, like described above.

Open the configuration file for editing:

```
sudo nano /opt/ssgnavigation/locius/share/modules/node450/settings.json
```

Add the remote syslog server details to the syslog_endpoints parameter. Use the following format:

```
"syslog_endpoints": ["udp:<remote_server_ip>:514"]
```

- Replace <remote_server_ip> with the IP address of your remote syslog server.
- Use tcp instead of udp if the remote server requires TCP (e.g., "tcp:<remote_server_ip>:514").

Restart the Audit Service

25.2.2 Sending System Syslog Logs to a Remote Syslog Server

To send system logs (including software updates) to a remote syslog server:

1. Open the Rsyslog Configuration File:

Edit the main configuration file or create a new one in /etc/rsyslog.d/ (e.g., remote-syslog.conf):

```
sudo nano /etc/rsyslog.d/remote-syslog.conf
```

2. Add Rules for Sending Logs:

Add the following line to send all system logs to the remote server:

```
*.* @<remote_server_ip>:514
```

Replace <remote_server_ip> with the IP address of your remote syslog server.

Use @@ for TCP (e.g. *.* @@<remote_server_ip>:514).

3. Optional: Filter Logs

To send only specific logs (e.g., kernel or application logs), use filters:

Kernel logs:

```
kern.* @<remote_server_ip>:514
```

Application logs:

```
local7.* @<remote_server_ip>:514
```

Optional: Filter Logs for Software Updates

To send only logs related to software updates (e.g., messages containing SYS-UPD), use the following rule:

```
if $msg contains 'SYS-UPD' then @<remote_server_ip>:514
& stop
```

1. Restart Rsyslog:

Apply the changes by restarting the rsyslog service:

```
sudo systemctl restart rsyslog
```

25.2.3 Configure the Firewall

Don't forget update. Add the following rules to the file:

```
allow 514/udp
allow 514/tcp
```

25.3 Configuring the Remote Syslog Server (if applicable)

If you manage the remote syslog server, ensure it is configured to receive logs:

1. Open the Rsyslog Configuration File:

Edit /etc/rsyslog.conf on the remote server.

2. Enable Log Reception:

For UDP:

```
module(load="imudp")
input(type="imudp" port="514")
```

For TCP:

```
module(load="imtcp")
input(type="imtcp" port="514")
```

3. Restart Rsyslog:

Apply the changes by restarting the rsyslog service:

```
sudo systemctl restart rsyslog
```

4. Configure the Firewall:

Update the firewall rules to allow incoming connections on port 514:

```
sudo ufw allow 514/udp
sudo ufw allow 514/tcp
```

Ensure the rules are added to the firewall configuration file.

25.3.1 Syslog configuration example

This configuration example enables the syslog server to receive and process logs from remote ECDIS. It supports both UDP and TCP protocols, filters specific log messages, and stores them in a custom format. This setup is essential for centralized logging, monitoring, and auditing of system activities, particularly for applications like the ECDIS audit service.

```
# Provides UDP syslog reception
module(load="imudp")
input(type="imudp" port="514")

# Provides TCP syslog reception
module(load="imtcp")
input(type="imtcp" port="514")

# Define a custom log format for syslog messages
$template SyslogProtocol_rfc5424_net, "<%PRI%>1 %TIMESTAMP:::date-rfc3339% %FROMHOST-IP% %APP-NAME% %PROCID% %msg%\n"

# Filter and log messages with the "450-" tag to a specific file
:syslogtag, startswith, "450-" /var/log/ssg_audit/message.log ; SyslogProtocol_rfc5424_net

# Disable repeated message reduction
$RepeatedMsgReduction off

# Stop further processing for matched messages
& stop
```

1. UDP and TCP Log Reception:

The `imudp` and `imtcp` modules enable the syslog server to receive logs over UDP and TCP, respectively, on port 514.

2. Custom Log Format:

The `$template` directive defines a custom format for syslog messages, following the RFC 5424 standard.

The format includes:

- Priority (`%PRI%`)
- Timestamp in RFC 3339 format (`%TIMESTAMP:::date-rfc3339%`)
- Source IP address (`%FROMHOST-IP%`)
- Application name (`%APP-NAME%`)

- Process ID (%PROCID%)
- Log message (%msg%)

3.Filtering and Logging:

The :syslogtag, startswith, "450-" rule filters messages with the 450- tag.

These messages are logged to /var/log/ssg_audit/message.log using the custom format defined earlier.

4.Repeated Message Reduction:

The \$RepeatedMsgReduction off directive disables the reduction of repeated log messages, ensuring all messages are logged.

5. Stop Further Processing:

The & stop directive ensures that messages matching the filter are not processed further by other rules.

Applying the Configuration

1. Save the configuration file (e.g., /etc/rsyslog.d/remote-syslog.conf).
2. Restart the rsyslog service to apply the changes:

```
sudo systemctl restart rsyslog
```

25.4 Reference Documentation

For more details on configuring rsyslog, refer to the official documentation:

- [Rsyslog Documentation](#)

26. Remote Assistant Function

ECDIS has Remote Desktop Function for technical support. To use this feature, the support workstation must be properly set up.

26.1 Implementation Overview

| ECDIS | - - - | Router A | - - - < Internet > - - - | Router B | - - - | Support PC |

Assumptions:

1. ECDIS has internet access through **Router A**.
2. **Router B** has a white **static IP** (e.g., 84.52.109.215).
3. **Router B** is configured to **forward ports** to the local network.
4. The connection port is assigned on the support side, e.g., **1234**.
5. The support workstation (Support PC) has a local IP **192.168.1.100** and a user **assistant**.

26.2 Remote Desktop Connection Process

26.2.1 ECDIS Side Settings

Navigate to: **Menu -> Settings -> Remote assistance** to set up connection settings

NOTE

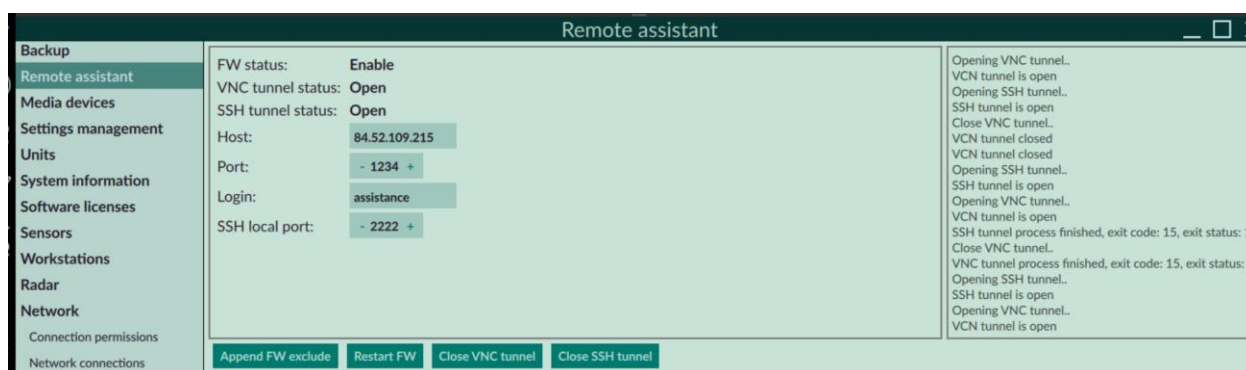
To configure these settings, you must be in Service Privilege Mode. The default password is: **Nsr#66733733**.

To configure remote support, enter the following connection parameters in the ECDIS system:

- **Host:** 84.52.109.205
- **Port:** 1234
- **Login:** assistant
- **SSH Local Port:** Use an available port on the Support PC (e.g., 2222).

After entering the details, click the **Open VNC** or **Open SSH** button.

If the connection is successful, a secure channel (VNC tunnel/SSH tunnel) will be established between the **ECDIS** and the **support workstation**. The status will show: **VNC Tunnel Status: Open** or **SSH Tunnel Status: Open**.



After completing the work, go to the **Remote Support** section. Click the **Close SSH/VNC** button. This will close the SSH/VNC tunnel.

Firewall Configuration

You may need to allow external connections on the ECDIS workstation. This can be done by configuring firewall rules or adding a temporary exception for the **support workstation**.

To add a temporary exception:

- Click the "Append FW Exclude" button.

This will create a temporary rule allowing all traffic from the **Host** address.

- The rule will be removed after restarting the ECDIS workstation or the firewall.

To restart the firewall:

- Use the "**Restart FW**" button.

26.2.2 Support PC Side Setup

1. Install *nlvnc-remote* on the Support PC

To enable remote desktop functionality, you need to install the *nlvnc-remote* package on the Support PC.

Follow these steps:

- Contact the ECDIS developer or support team to get the *nlvnc-remote* package.
- Before installation, verify the package's integrity by checking its checksum. This ensures the file has not been corrupted or tampered with.

- Run the following command to install the package:

```
sudo dpkg -i nlvnc-remote.deb
```

- After installation, resolve any missing dependencies by running:

```
sudo apt -f install
```

This command will automatically fix broken dependencies and complete the installation.

NOTE

This package work for Ubuntu 22.04 ONLY.

The package must be installed by the user assistant (not as root).

```
sudo apt -f install
```

2. Configure Port Forwarding on Router B

Set up **Router B** to forward port **1234** to **port 22** of the Support PC (192.168.1.100).

3. Ensure the Support PC is Running

- The Support PC must be turned on and ready to accept connections.
- Once the setup is complete, ECDIS can establish a remote desktop connection with the support workstation.

Establish Connection

Remote Desktop (VNC)

Use an RDP client with VNC protocol support (e.g., Remmina Remote Desktop Client).

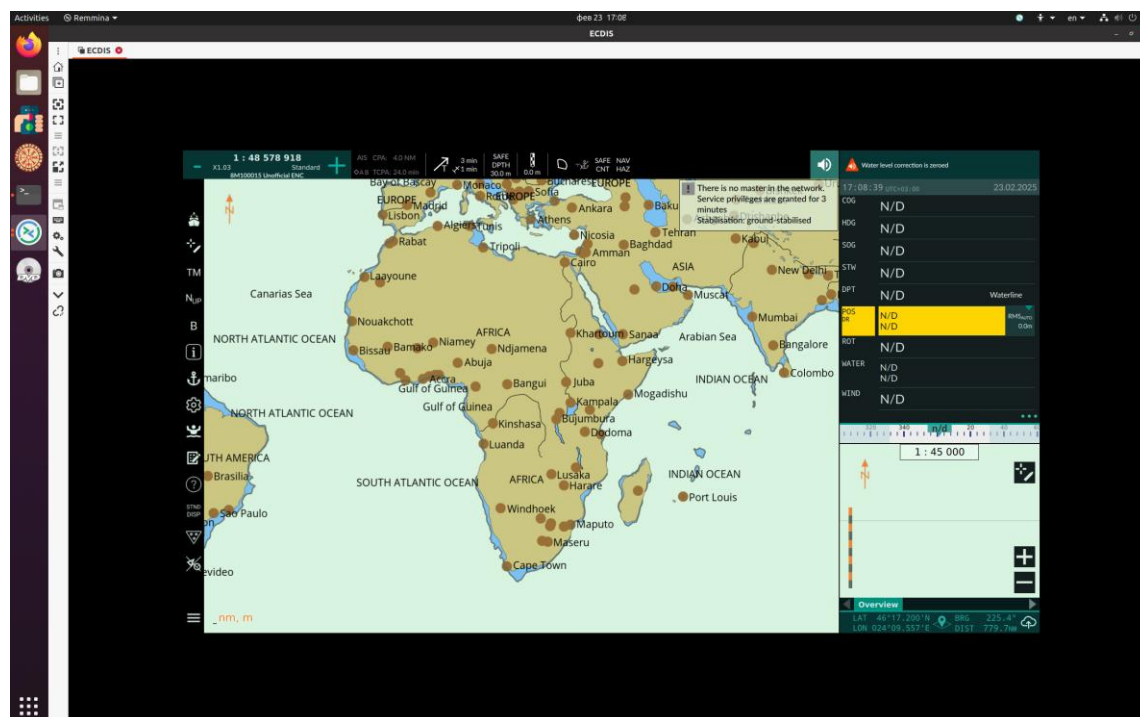
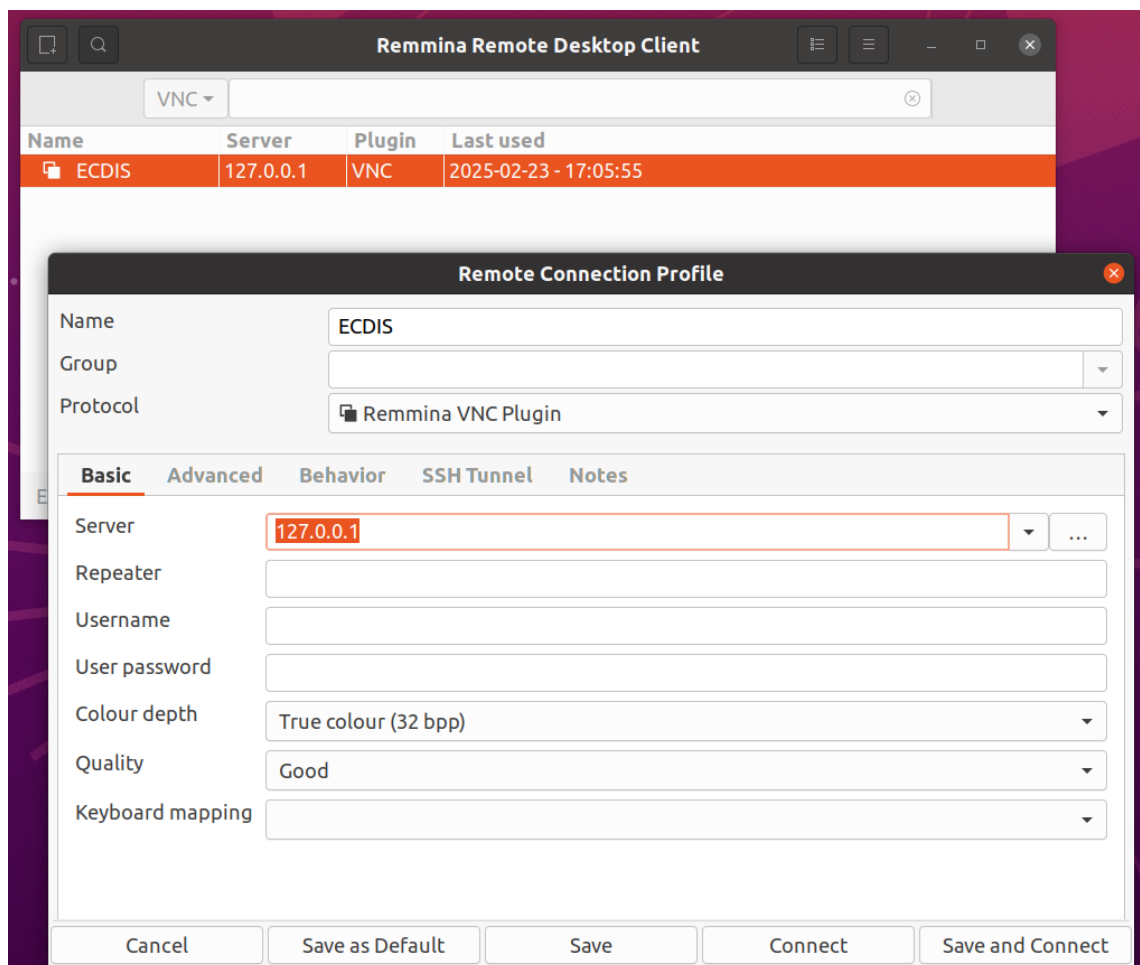
Create a connection with the following settings:

Protocol: Remmina VNC Plugin

Server: 127.0.1

Click the Connect **button.**

If the settings are correct, you will see the remote ECDIS desktop.

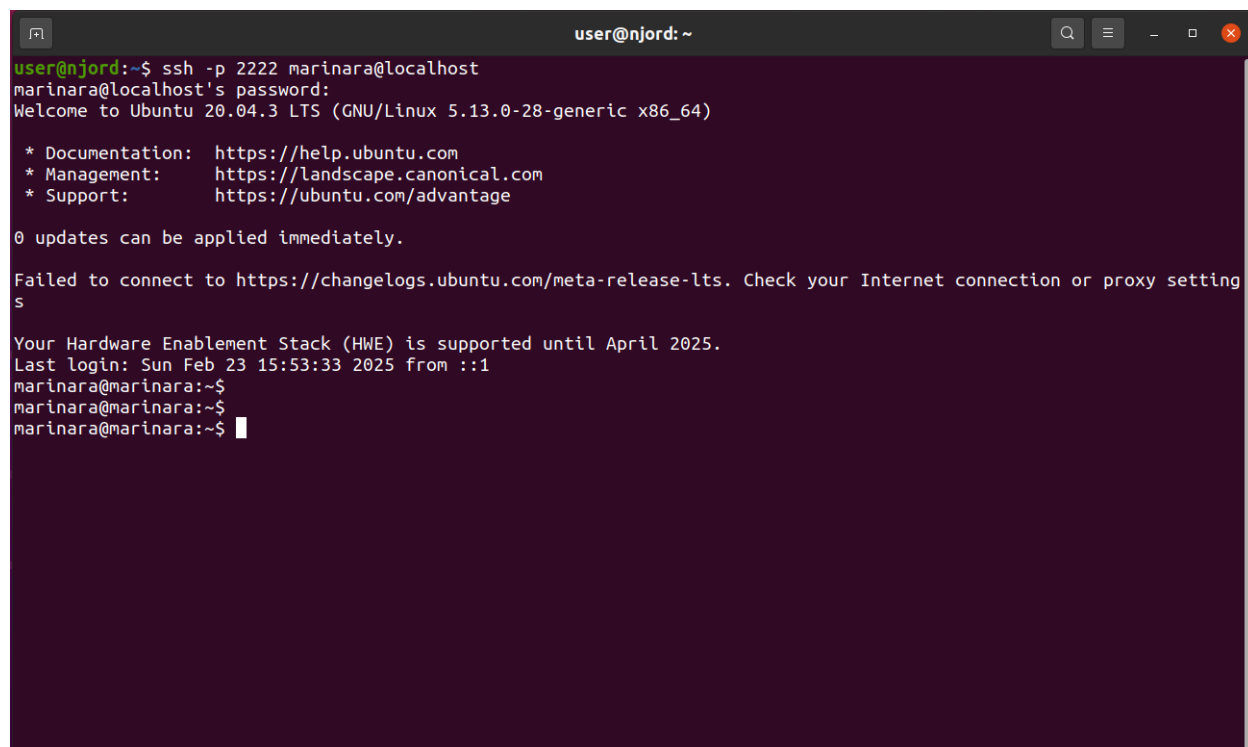


SSH tunnel

In some cases, it may be useful to use SSH connections to the remote ECDIS.

- Open a terminal on the Support PC.
- Use the following command:

```
ssh -p 2222 marinara@localhost
```



```

user@njord: ~
user@njord:~$ ssh -p 2222 marinara@localhost
marinara@localhost's password:
Welcome to Ubuntu 20.04.3 LTS (GNU/Linux 5.13.0-28-generic x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:    https://landscape.canonical.com
 * Support:       https://ubuntu.com/advantage

0 updates can be applied immediately.

Failed to connect to https://changelogs.ubuntu.com/meta-release-lts. Check your Internet connection or proxy settings

Your Hardware Enablement Stack (HWE) is supported until April 2025.
Last login: Sun Feb 23 15:53:33 2025 from ::1
marinara@marinara:~$
marinara@marinara:~$
marinara@marinara:~$

```

27. Annex

27.1 Appendix A. List of Abbreviations

Table 13: List of Abbreviations

No.	Abbreviations	English full name
Navigation information abbreviations		
1.	HDG	Heading
2.	STW	Speed through the water
3.	COG	Course over the ground
4.	SOG	Speed over the ground
5.	SET	Set
6.	DRIFT	Drift
7.	LAT	Latitude
8.	LON	Longitude
Equipment abbreviations		
1.	GYRO	Gyro
2.	EPFS	Electronic Position Fixing System
3.	LOG	Log
4.	VDR	Voyage Data Recorder
5.	BNWAS	Bridge navigational watch alarm system
6.	BAM	Bridge Alert Management
7.	SFI	system function ID
Route monitoring information abbreviations		
1.	BTW	Bearing to Waypoint
2.	DTW	Distance to Waypoint

3.	BWW	Bearing Waypoint to waypoint
4.	TTW	Time of Waypoint to Waypoint
5.	ETA	Estimated Time of Arrival
6.	RAD	Radius
7.	XTD	Cross Track Distance
8.	Off CRS	Off Course
Target information abbreviations		
1.	AIS	Automatic Identification System
2.	MMSI	Maritime Mobile Service Identity
3.	AtoN	Aids to Navigation
4.	SAR	Search and Rescue
5.	SART	Search and Rescue Transponder
6.	GNSS	Globla navigation satellite system
7.	ARPA	Automatic Radar Plotting Aid
8.	CPA	Closest Point of Approach
9.	TCPA	Time to CPA
Information on Time abbreviations		
1.	UTC	Universal Time Coordinated
2.	LOC	Local
3.	JAN	January
4.	FEB	February
5.	MAR	March
6.	APR	April
7.	MAY	May
8.	JUN	June

9.	JUL	July
10.	AUG	August
11.	SEPT	September
12.	OCT	October
13.	NOV	November
14.	DEC	December
Other information abbreviations		
1.	ENC	Electronic Navigational Chart
2.	ARCS	Admiralty Raster Chart Service
3.	ECDIS	Electronic Chart Display and Information System
4.	ERBL	Electronic Range and Bearing Line
5.	EP	Estimated Position
6.	DR	Dead Reckoning, Dead Reckoned Position
7.	PORT	Port
8.	STBD	Starboard
9.	ROT	Rate of Turn
10.	BCR	Bow Crossing Range
11.	BCT	Bow Crossing Time
12.	TSS	Traffic Separation Scheme
13.	ODAS	Ocean-Data-Acquisition-System
14.	LANBY	Large Automatic Navigational Buoy
15.	SA	Scheme Administrator

27.2 Appendix B. ECDIS standard settings

Table 14: ECDIS standard settings

Function	Setting
Display category	ECDIS Standard display
Chart related selector: Accuracy	Off
Chart related selector: Date dependent objects	current date
Chart related selector: Highlight datedependent	Off
Chart related selector: Full light lines	Off
Chart related selector: Highlight info	Off
Chart related selector: Highlight document	Off
Chart related selector: Unknown	On
Chart related selector: Scale min	Off
Chart related selector: Shallow pattern	Off
Chart related selector: Shallow water dangers	On
Chart related selector: Contour labels, if provided	Off
Chart related selector: Four shades, if provided	Off
Chart related selector: National language, if provided	Remain unchanged
Chart related selector: Paper chart / Simplified symbols	Paper chart
Chart related selector: Plain / Symbolized boundaries	Plain
Chart related selector: Text group layer	Important text
Selected sea area	Around own ship with appropriate off-set
Range	3 NM
Orientation	True motion, north-up
True motion reset	10 % from display edge
Geodetic datum, if selectable	WGS84

Function	Setting
<i>Manual updates</i>	If applied i.e. displayed if available
<i>Mariner's notes</i>	If applied i.e. displayed if available
<i>Selected route</i>	Last selected route, including route parameters
<i>Past track</i>	On
<i>Past track length, if selectable</i>	12 h
<i>Past track time-labels</i>	On, 30 min
<i>Look-ahead time</i>	6 min
<i>Any edit window (for example route plan)</i>	Exit
<i>Position data source</i>	<i>Remain unchanged</i>
<i>Safety contour</i>	<i>Remain unchanged</i>
<i>Safety depth</i>	<i>Remain unchanged</i>
<i>Cross track limit</i>	<i>Remain unchanged</i>
<i>Graphical indication of crossing safety contour during route planning, if selection provided</i>	On
<i>Graphical indication of prohibited areas, areas with special conditions and navigational hazards during route planning, if selection provided</i>	On
<i>Distance to prohibited areas, areas with special conditions and navigational hazards</i>	remain unchanged
<i>Graphical indication of crossing safety contour during route monitoring, if selection provided</i>	On
<i>Graphical indication of prohibited areas and areas with special conditions during route monitoring, if selection provided</i>	On
<i>Graphical indication of navigational hazards during route monitoring, if selection provided</i>	On
<i>Object highlight, selected object, track display from log</i>	Cleared from display

Function	Setting
<i>Cursor pick</i>	Closed
<i>Any additional window (dual view, 3d, tides, etc.)</i>	Closed
<i>Any additional information layer, proprietary layer (weather, tides, AML, etc.)</i>	Cleared from display
<i>Chart update, Chart information exchange</i>	Aborted
<i>Colour differentiation test diagrams</i>	Closed
<i>Update review</i>	Off
<i>Chart 1 Symbol Table (Chart 1)</i>	Closed
<i>Units</i>	m, NM, kn
<i>Crossing a navigational hazard in route monitoring mode</i>	Caution
<i>Vector time (length)</i>	6 min
<i>Vector mode</i>	True
<i>Vector stabilization</i>	Ground
<i>Symbol for target association, if provided</i>	AIS
<i>Collision warnings, if provided</i>	ON (limits, CPA = 2 NM TCPA = 12 min)
<i>Radar and AIS target association, if provided</i>	ON
<i>AIS target filtering, if provided</i>	Target range = 6 NM Target CPA = 4 NM Target TCPA = 24 min Target display = Off Sleeping target display = Off AtoN display = On SART display = On Repeated target display = Off
<i>AIS true target outline</i>	Off

Function	Setting
<i>Display of Radar image overlay, if provided</i>	Off
<i>Display of Radar tracked targets, if provided</i>	Off
<i>Display of AIS reported targets, if provided</i>	Off
<i>Target past positions, if provided</i>	Off
<i>Target trails, if provided</i>	Off
<i>Lost target warning, if provided</i>	Off
<i>Lost target warning range, if provided</i>	12 NM
<i>AIS interrogation, if provided</i>	Off
<i>Own ship true outline)</i>	Off
<i>LOP source indication</i>	Off
<i>User selected time for warning escalation</i>	60 s
<i>Suppression of indication of user selected MSI messages based on first character of NAVTEX code field, if provided)</i>	Remain unchanged
<i>Suppression of indication of user selected messages based on time and distance from own ship, monitored route or planned route (4.12.6 c)</i>	No
<i>Brightness and contrast controls, if software controlled</i>	Calibrated setting

27.3 Appendix C. Errors in applying underwater landforms to ENC

ZOC Category	Coordinate error	Depth measurement accuracy	
A1	± 5 m. + 5% from depth	$\pm 0.50 + 1\%$ from depth	
		Depth (m.)	Measurement error (m.)
		10	± 0.6
		30	± 0.8
		100	± 1.5
		1000	± 10.5
A2	± 20 m.	$\pm 1.00 + 2\%$ from depth	
		Depth (m.)	Measurement error (m.)
		10	± 1.2
		30	± 1.6
		100	± 3.0
		1000	± 21.0
B	± 50 m.	$\pm 1.00 + 2\%$ from depth	
		Depth (m.)	Measurement error (m.)
		10	± 1.2
		30	± 1.6
		100	± 3.0
		1000	± 21.0
C	± 500 m.	$\pm 2.00 + 5\%$ from depth	
		Depth (m.)	Measurement error (m.)
		10	± 2.5
		30	± 3.5

		100	± 7.0
		1000	± 52.0
D	More than ZOC C	More than ZOC C	
U	Unassessed - bathymetric data quality not assessed		

27.4 Appendix D. Alert Mark Description Table:

Mark	Priority	State
	ALARM	ACTIVE-UNACKNOWLEDGED
		ACTIVE-SILENCED
		ACTIVE-ACKNOWLEDGED
		ACTIVE-RESPONSIBILITY TRANSFERRED
		RECTIFIED-UNACKNOWLEDGED
	WARNING	ACTIVE-UNACKNOWLEDGED
		ACTIVE-SILENCED
		ACTIVE-ACKNOWLEDGED
		ACTIVE-RESPONSIBILITY TRANSFERRED
		RECTIFIED-UNACKNOWLEDGED
	CAUTION	ACTIVE

27.5 Appendix E. Alert and Indication List

ID	Category	Priority	Escalation	Transfer	Alert Title	Alert Description
3035	A	Warning	Warning	No	Nav. hazard	Navigational hazard
3036	A	Caution	\	\	Nav. hazard	Navigational hazard
3032	A	Warning	Alarm	No	Anchor watch	Anchor watch
3031	A	Alarm	\	No	Anchor watch	Anchor watch
3026	A	Caution	\	\	XTD Limit	XTD Limit: % min.
3024	A	Alarm	\	No	XTD Limit Err.	XTD Limit error
3028	B	Warning	Warning	Yes	Event point	Event point: {name}
3026	A	Caution	\	\	Route above 85	Route above 85 lat
3097	B	Alarm	\	Yes	POB	Person over board
3026	B	Caution	\	\	Unct. connection	Connected to uncontrolled network, rule: {rule}
3139	B	Caution	\	\	EP mode activated	The DR mode with drift calculation is activated
3139	B	Caution	\	\	DR mode activated	The DR mode without drift calculation is activated
3025	B	Warning	Warning	Yes	Lvl corr. OOD	Water level correction out of date
3024	B	Alarm	\	No	Lvl corr. 0	Water level correction set to zero
3002	B	Warning	Warning	\	Lost VDR	Lost VDR
3056	B	Caution	\	No	HDOP exceeded	HDOP exceeded
3005	A	Warning	Warning	No	Invalid datum	{Sensor name} different geodetic datum

3052	B	Warning	Warning	\	Lost target	Lost target {MMSI}
3015	B	Warning	Warning	No	{Sensor name} sensor failure	{Sensor name} sensor failure
3014	B	Alarm	\	Yes	{Sensor name} sensor failure	{Sensor name} sensor failure

27.6 Appendix F. IEC 61162 interfaces

Table 15: Messages received by ECDIS

Message	Source	Content
ACN ^a	BAM	APS commands
DTM ⁶	EPFS	coordinate system
GLL ⁶ GGA ⁶ GNS ⁶ RMC ⁶ (*)	EPFS	Geographical coordinates
HBT ⁶	BAM, INS	Monotone signal
THS ⁶ HDT ⁶ (*)	Course sensor, INS	Course
RRT	ECDIS backup	Route transfer report
VBW ⁶ VHW ⁶ (*)	SDME, INS	Lag
VTG ⁶	EPFS, INS	Speed and heading from the positioning system
RSD ^a	Radar	Radar data
TLB ^a TTD ^a TTM ^a (*)	Radar	Target tracking data
VDM ^a VDO ^a	AIS	AIS targets and information on own ship
NSR ^a	INS	Coordinate, COG/SOG, heading, velocity statuses (see 29.)
DPT, DBT	Echo, INS	Depth
Note: Suggestions used for backward compatibility(*).		
a) IEC 61924-2.		

b) IEC 61162-1.

Table 16: Messages transmitted by ECDIS

Message	Source	Content
ALC ^a	VDR, BAM, INS	Cyclic alarm list
ALF ^a	VDR, BAM, INS	Warning
ARC ^a	BAM, INS	Rejecting an APS command
EVE ⁶	BNWAS	The capacity of a ship driver
HBT ⁶	BAM, INS	Monotone signal
RRT	ECDIS backup	Route transfer report
VSD ^a	AIS	Cargo category, navigational status, vessel draft (maximum current static), destination, estimated time of arrival (date, time), flag state
Note: Suggestions used for backward compatibility(*).		
^a IEC 61924-2.		
⁶ IEC 61162-1.		

27.7 Appendix G. Brief Guide to UFW

UFW (Uncomplicated Firewall) is a user-friendly interface for managing iptables firewall rules. It simplifies the process of configuring a firewall in Linux.

Reset all current settings and allow all connections:

```
ufw --force reset
```

Enable/Disable the firewall:

```
fw --force enable / disable
```

View a numbered list of rules:

```
ufw status numbered
```

Delete the rule with number 2:

```
ufw delete 2
```

Logging events:

```
ufw logging on/off/low/medium/high/full
```

Block/Allow all incoming and outgoing connections:

```
ufw default deny incoming
```

```
ufw default deny outgoing
```

Allow all incoming connections from a range of addresses using a subnet mask:

```
fw allow from xxx.xxx.xxx.xxx/xx
```

- Example: Allow all incoming connections from addresses 192.168.0.1 to 192.168.255.255:

```
ufw allow from 192.168.0.0/16
```

Allow all outgoing connections to a range of addresses using a subnet mask:

```
ufw allow out to xxx.xxx.xxx.xxx/xx
```

- Example: Allow all outgoing connections to addresses 192.168.0.1 to 192.168.255.255:

```
ufw allow out to 192.168.0.0/16
```

Allow all connections using transport protocol P from address 192.168.1.2:

ufw allow from 192.168.1.2 proto P

- P: This can be either tcp or udp.

Allow all connections using transport protocol P on the range of ports X:Y:

ufw allow X:Y/P

- P: This can be either tcp or udp.

Allow all incoming connections from address A using transport protocol P to the range of ports X:Y:

ufw allow from A proto P to any port X:Y

- P: This can be either tcp or udp.

Allow all connections using application protocol P:

ufw allow [from / out to] 192.168.1.2 proto P

- P: This can be protocols like http, https, ssh, ftp.

27.8 Appendix H. Destination multicast addresses and port numbers

Transmission group	Category	Multicast address	Destination port
MISC	SF not explicitly listed below	239.192.0.1	60001
TGTD	Target data (AIS), tracked target messages (Radar)	239.192.0.2	60002
SATD	High update rate, for example ship heading, attitude data.	239.192.0.3	60003
NAVD	Navigational output other than that of TGTD and SATD groups	239.192.0.4	60004
VORD	Data required for the VDR according to IEC 61996-1	239.192.0.5	60005
RCOM	Radio communication equipment	239.192.0.6	60006
TIME	Time transmitting equipment	239.192.0.7	60007
PROP	Proprietary and user specified SFs	239.192.0.8	60008
UsR1	User defined transmission group 1	239.192.0.9	60009
USR2	User defined transmission group 2	239.192.0.10	60010
USR3	User defined transmission group 3	239.192.0.11	60011
USR4	User defined transmission group 4	239.192.0.12	60012
USR5	User defined transmission group 5	239.192.0.13	60013
USR6	User defined transmission group 6	239.192.0.14	60014
USR7	User defined transmission group 7	239.192.0.15	60015
USR8	User defined transmission group 8	239.192.0.16	60016
BAM1	BAM compliant alert source reporting to CAM group 1	239.192.0.17	60017

Category	Multicast address	Destination port
Non re-transmittable binary file transfer group 1 ^a	239.192.0.21	60021
Non re-transmittable binary file transfer group 2 ^a	239.192.0.22	60022
Non re-transmittable binary file transfer group 3 ^a	239.192.0.23	60023
Non re-transmittable binary file transfer group 4 ^a	239.192.0.24	60024
Non re-transmittable binary file transfer group 5 ^a	239.192.0.25	60025
Re-transmittable binary file transfer group 1 ^b	239.192.0.26	60026
Re-transmittable binary file transfer group 2 ^b	239.192.0.27	60027
Re-transmittable binary file transfer group 3 ^b	239.192.0.28	60028
Re-transmittable binary file transfer group 4 ^b	239.192.0.29	60029
Re-transmittable binary file transfer group 5 ^b	239.192.0.30	60030
^a Address 239.192.0.25, port 60025 is the default for ECDIS route transfer (see IEC 61174). ^b Address 239.192.0.26, port 60026 is the default for VDR image transfer (see IEC 61996-1). Address 239.192.0.30, port 60030 is the default for ECDIS re-transmittable data blocks for route transfer (see IEC 61174),		

Category	Multicast address	Destination port
Syslog	239.192.0.254	514
Sending to syslog can use multicast or UDP unicast Some switches can support only UDP unicast.		

27.9 Appendix I. Display Description

DISPLAY SPECIFICATIONS			
ITEM	NDU-190	NDU-240	NDU-260
Display	19-inch color LCD	24-inch color LCD	26-inch color LCD
Effective Area	374.8 (H) x 299.8 (V) mm	527.0 (H) x 295.4 (V) mm	597.8 (H) x 336.3 (V) mm
Resolution	SXGA (1280 x 1024)	HD (1920 x 1080)	HD (1920 x 1080)
Brightness	400 nits	600 nits	350 nits
Contrast	700:1		
View Angle	178(H)*178(V)		
Interface	RGB Analog x 1, DVI-D x 1, HDMI x 1, USB x 3, Audio Signal x 1, M/B x 1 (for restart)		
Power Supply	100-230VAC/0.5A, 30W 24VDC/1.5A, 30W	100-230VAC/0.6A, 40W 24VDC/2A, 45W	100-230VAC/0.5A, 30W \ 24VDC/1.5A, 30W
Weight (without Bracket)	8.25kg	9.8kg	12.5kg
Environmental Conditions	Operating Temperature: -20°C ~ +70°C Storage Temperature: -25°C ~ +70°C Humidity: ≥90% RH (38°C)		

27.10 Appendix J. List of Device Type

Table 17: Equipment Unit List

STANDARD		
Main Unit	NES-3000P	1 pc
Display Unit (19/24/26 inch)	NDU-190, NDU-240, NDU-260	1 pc
Trackball	NTB-200	1 pc
Keyboard	NKB-200	1 pc
Recover USB Disk		1 pc
Install Materials		1 set
OPTIONS		
UPS	UPS-2KVA	1 set

Table 18: Specifications List

OPERATION UNIT	
Operation Method:	Trackball
	Keyboard
S/W	
ENC Update:	USB
MAIN UNIT	
H/W:	Intel Core i5
	8G DDR4 RAM
	128G SSD

	NMEA×8, RS232×2, VGA×1 USB×4, LAN×2, HDMI×1
Power Supply:	AC110 V/220 V
IP Grade:	IP22

27.11 Appendix K. Bug Report

Collection of information on incorrect operation of ECDIS

If errors, inconsistencies, software freezes, incorrect display, or other malfunctions are detected during the operation of the ECDIS, it is necessary to create and send a Bug Report to the manufacturer.

The more complete and accurate the Bug Report, the faster the ECDIS developer can address the issue

SW name:	<i>ECDIS</i>		SW version:	
User Permit:		Serial №		
Repeatability:				
Short description:				
Detailed description:				
Steps to reproduce:				
#	<u>Step Description</u>	<u>Expected result</u>	<u>Actual result</u>	
1.				
2.				
3.				
...				
<i>n</i>				
Additional info:				

Data:		Executor:	
Tel		E-Mail	

Filling in Bug Report

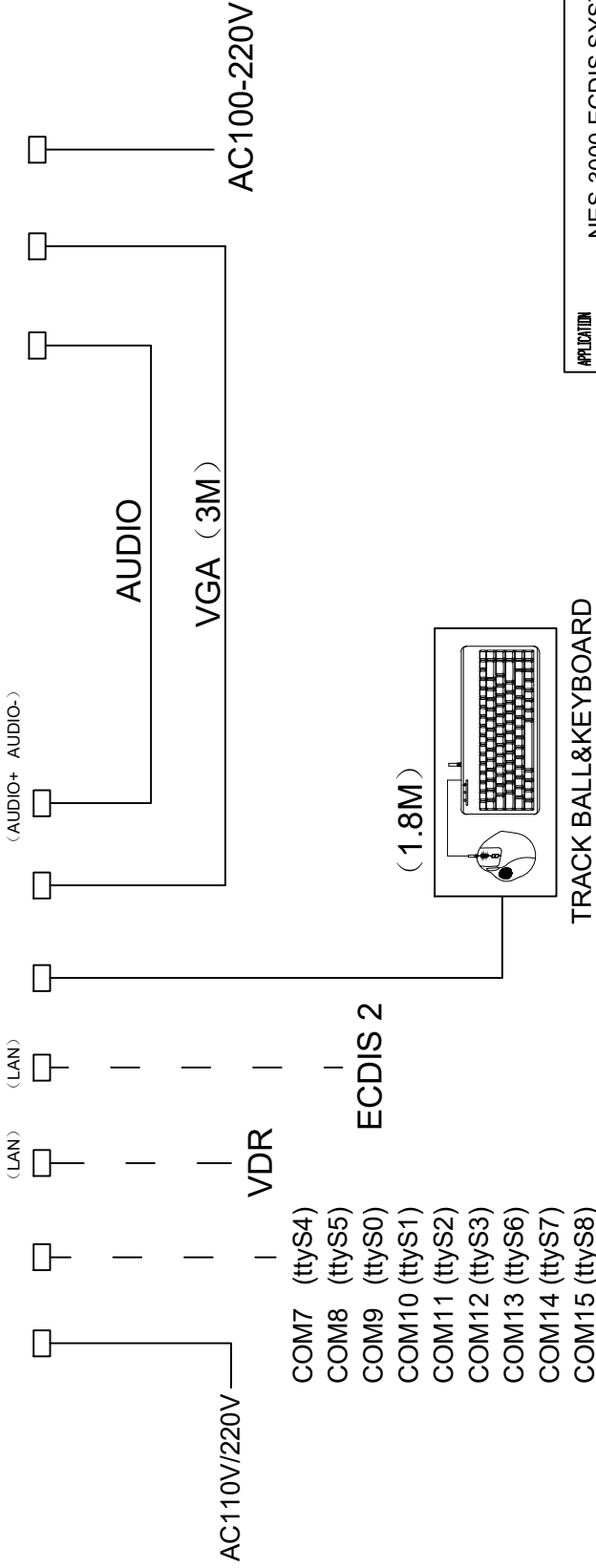
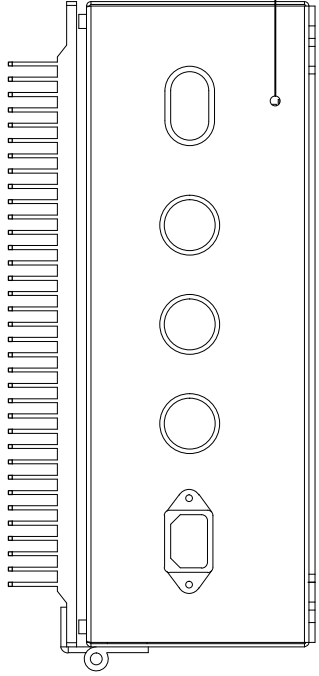
To submit a Bug Report, include the following information

- **Software version:** Specify the version of the ECDIS software.
- **User Permit:** Indicate if the problem is related to ENC (Electronic Navigational Chart).
- **Serial Number:** Provide the serial number of the ECDIS.
- **Repeatability:** Describe how often the defect occurs (e.g., always, sometimes, never).
- **Short description:** Provide a brief overview of the defect.
- **Detailed description:** Offer a more thorough description of the defect.
- **Steps to reproduce:** List in detail the actions that lead to the defect occurring.
- **Additional information:**
 - Screenshots/videos:** If there is a discrepancy between the expected and actual results, include screenshots or videos. Name the files according to the step number (e.g., 1-1.png, 1-2.png for multiple images corresponding to one step).
 - Data used:** Include ENC, tracks, import/export files, navigation data records, etc.
 - Logs of operation/drop:** Attach logs, if available.
- **Date:** Indicate the date of report completion.
- **Executor:** Specify the person who filled out the report.
- **Tel:** Include the contact phone number of the report author (optional).

NO.		DATE	REVISION & DESCRIPTION		REVIEWED	CHECKED
					SIGNATURE	



NES-3000P MAIN UNIT



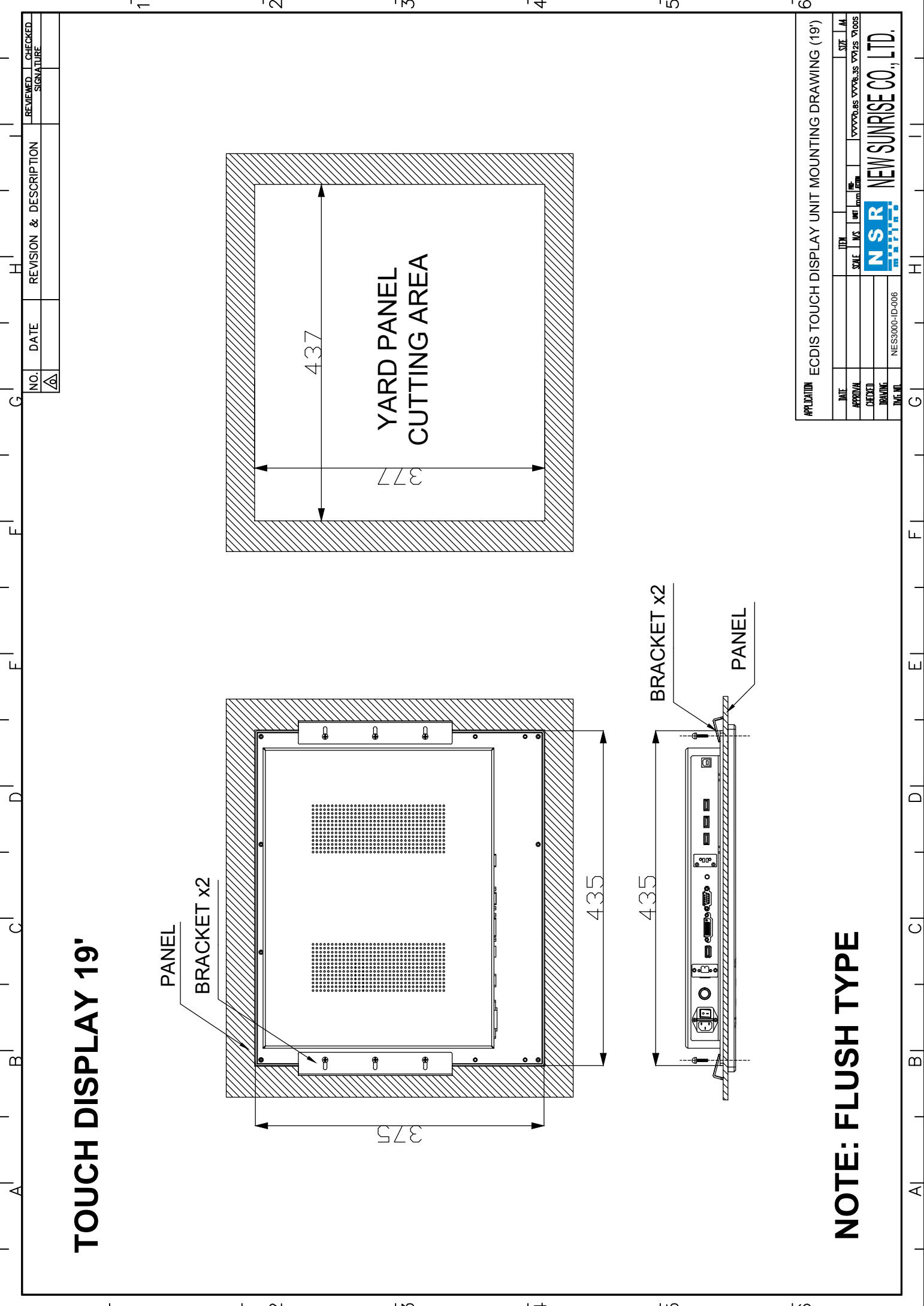
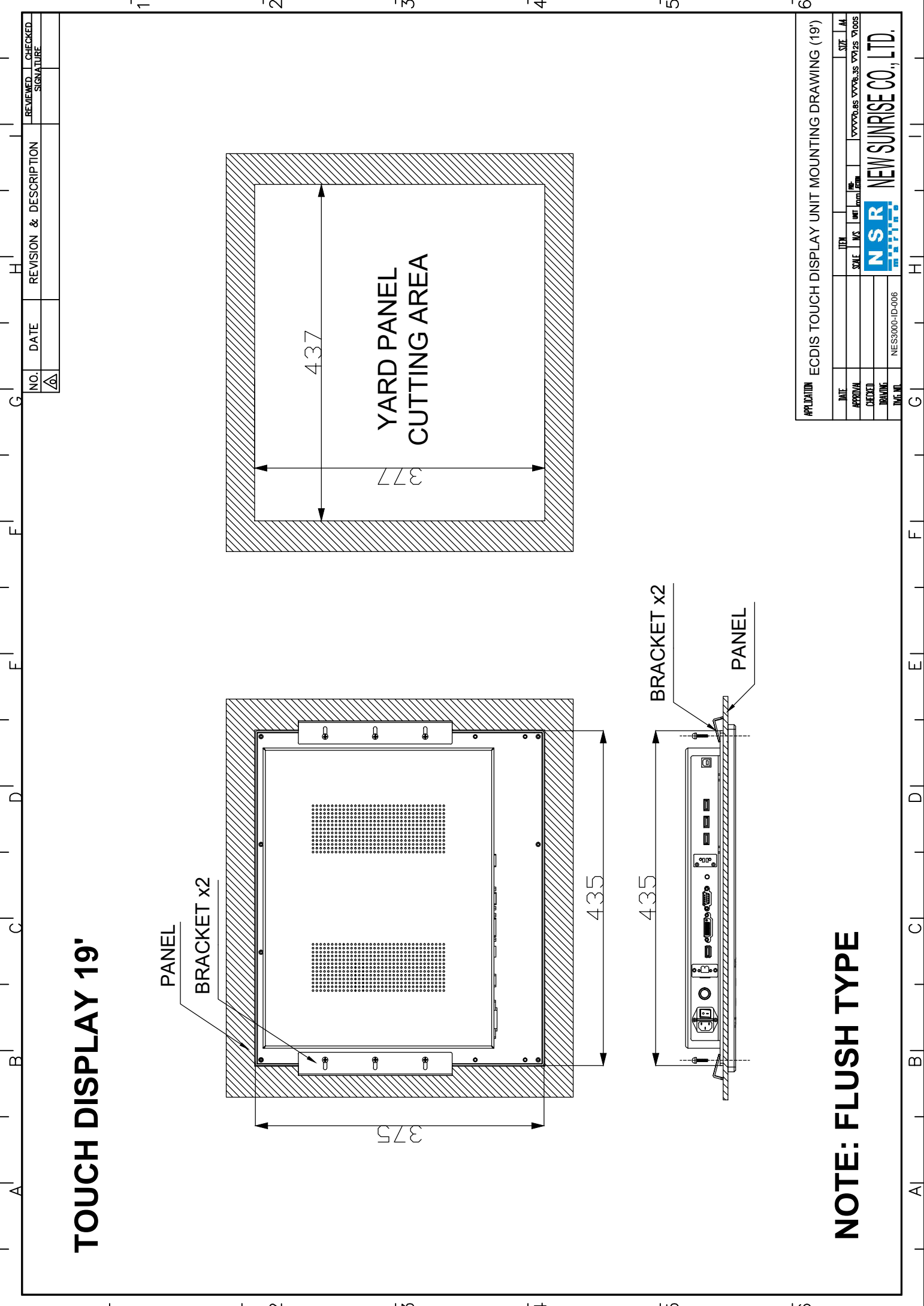
APPLICATION						
NES-3000 ECDIS SYSTEM DIAGRAM						
DATE	SCALE	UNIT	ITEM	REV.	DATE	REV.
1/1/11	1/1	1/1	1/1	1/1	1/1/11	1/1
APPROVAL	CHECKED	DRAWING	DATE	REV.	DATE	REV.
NES3000-ID-001						
NSR NEW SUNRISE CO., LTD.						

BNWAS — RESET_OUTPUT
ALARM SYSTEM — PWR_FAIL

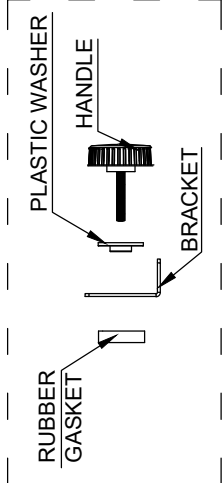
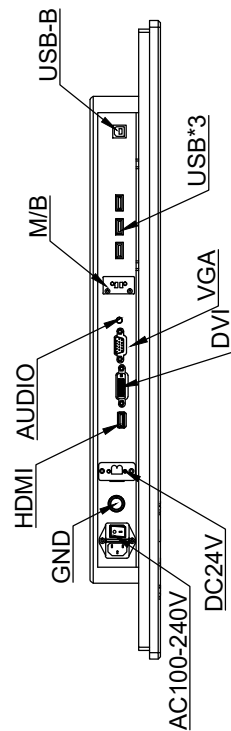
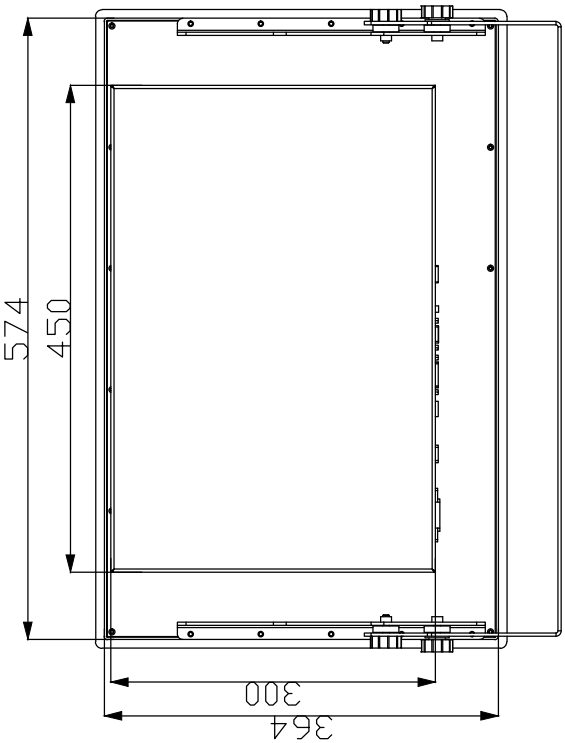
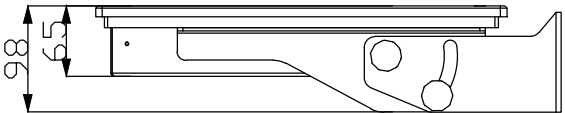
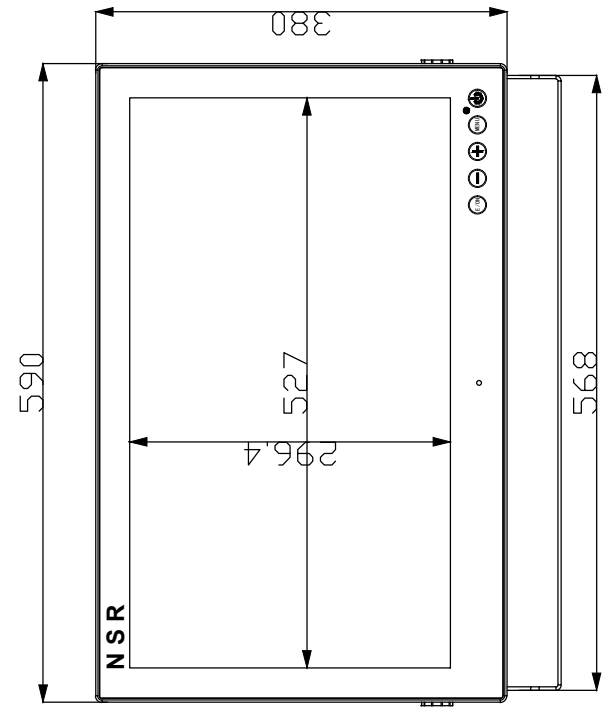
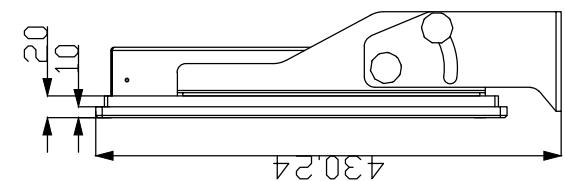
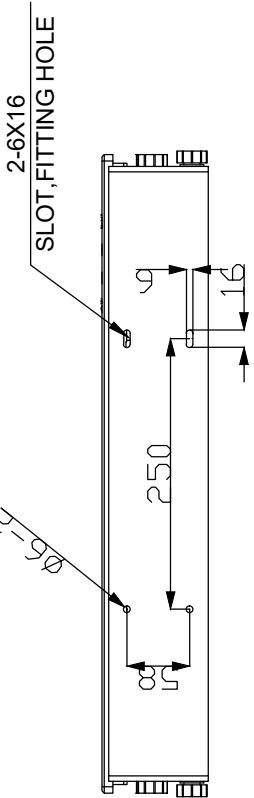
1	2	3	4	5	6
---	---	---	---	---	---



10

[illegible][illegible][illegible]

TOUCH DISPLAY 24'

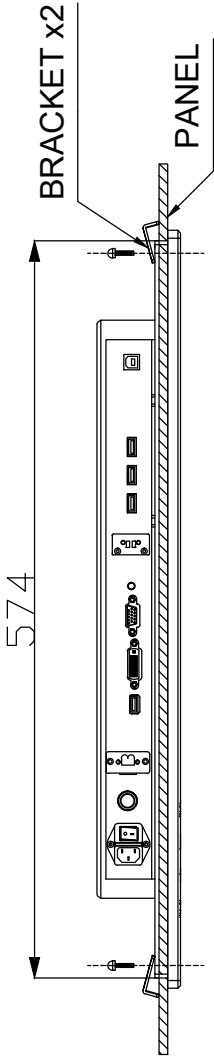
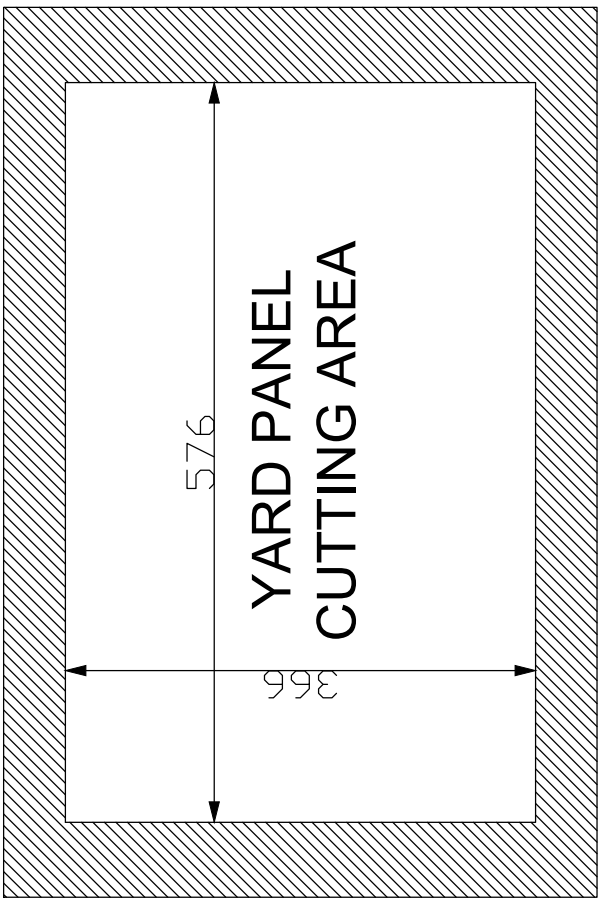
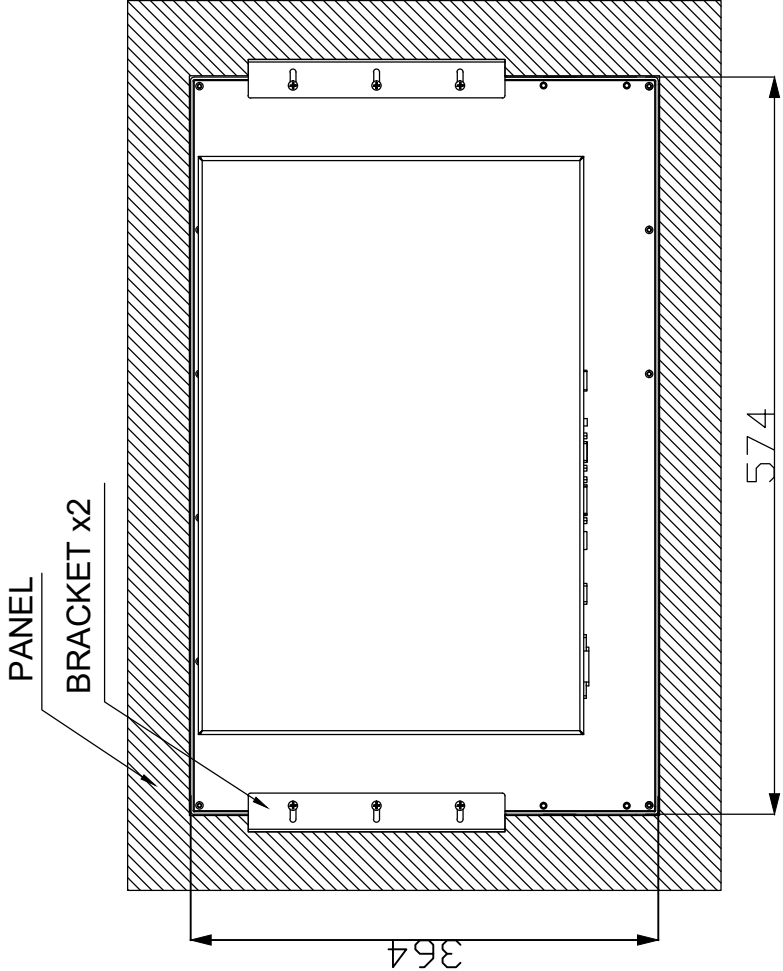


NOTE: TABLE TYPE

APPLICATION		ECDIS TOUCH DISPLAY UNIT SIZE DRAWING (24')									
DATE	ITEM	SCALE	UNIT	UNIT	UNIT	UNIT	UNIT	UNIT	UNIT	UNIT	UNIT
APPROVAL	DATE	DATE	DATE	DATE	DATE	DATE	DATE	DATE	DATE	DATE	DATE
CHECKED	DATE	DATE	DATE	DATE	DATE	DATE	DATE	DATE	DATE	DATE	DATE
DRAWING	DATE	DATE	DATE	DATE	DATE	DATE	DATE	DATE	DATE	DATE	DATE
DATE	DATE	DATE	DATE	DATE	DATE	DATE	DATE	DATE	DATE	DATE	DATE



TOUCH DISPLAY 24"

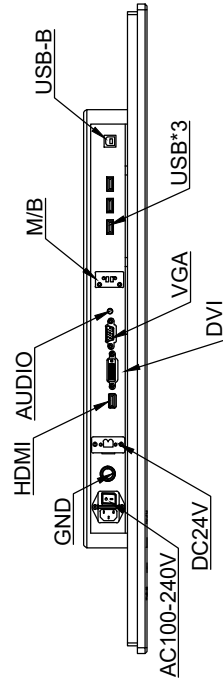
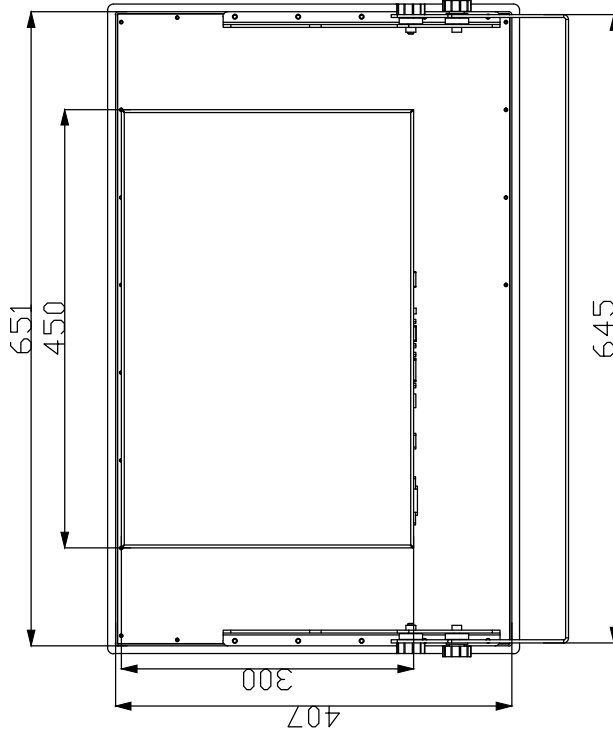
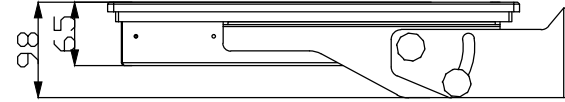
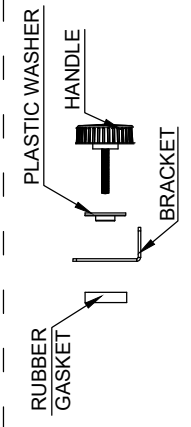


NOTE: FLUSH TYPE

NO.	DATE	REVISION & DESCRIPTION	REVIEWED	CHECKED
1				

APPLICATION ECDIS TOUCH DISPLAY UNIT MOUNTING DRAWING (24")									
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APPROVAL	SCALE	UNIT	UNIT	UNIT	UNIT	UNIT	UNIT	UNIT	UNIT
CHECKED	UNIT	UNIT	UNIT	UNIT	UNIT	UNIT	UNIT	UNIT	UNIT
DRAWING	UNIT	UNIT	UNIT	UNIT	UNIT	UNIT	UNIT	UNIT	UNIT
DATE	UNIT	UNIT	UNIT	UNIT	UNIT	UNIT	UNIT	UNIT	UNIT
NES3000-ID-008									
NEW SUNRISE CO., LTD.									

NO.	DATE	REVISION & DESCRIPTION	REVIEWED	CHECKED
			SIGNATURE	
①				



APPLICATION		ECDIS TOUCH DISPLAY UNIT SIZE DRAWING (26')									
DATE	APPROVAL	SCALE	1/4" = 1' 0"	UNIT	mm	mm	mm	mm	mm	mm	mm
CHECKED	CHECKED										
DATE	DATE										
DESIGN NO.	NEW SUNRISE CO., LTD.										

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