Danelec
Value from maritime data

User Manual for

Danelec Marine ECDIS Software V3.xx

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Welcome

Congratulations on purchasing the Danelec Marine ECDIS, an innovative advanced marine navigation system. The Danelec Marine ECDIS is designed to assist mariners in performing all essential navigation tasks including route planning and monitoring, keeping chart data up to date, and providing safety of navigation.

Please take some time to read this user manual to become familiar with the ECDIS software.

1 Introduction

1.1 User Manual Overview

This user manual describes all basic ECDIS functions.

It consists of fourteen chapters each describing a specific set of functions. You can read the chapters in any order.

1.2 Typographical Conventions

Formatting convention	Type of information	Example
Bold	Items you must select, such as menu options, command buttons, or other interface elements.	Press the New button.
Monospace	Names of commands, files, and directories.	The license file is located in the C:/ directory.
CAPITALS	Names of keys on the keyboard.	SHIFT, CTRL, ALT
To do smth:	Indicates a procedure described step by step.	To do smth: 1. Step 1. 2. Step 2.
The following options are available:	Indicates a list of options available on a panel or a window.	The following options are available: • Option 1 • Option 2
NOTE	Indicates additional important information about an item being described.	NOTE

1.3 Normative Reference

The ECDIS complies with the following international standards:

- IEC 60945 Edition 4.0 2002, Maritime navigation and radiocommunication equipment and systems – General requirements – Methods of testing and required test results
- IEC 61162-1 Edition 5.0 2016-08, Maritime navigation and radiocommunication equipment and systems –Digital interfaces, Part 1: Single talker and multiple listeners
- IEC 61162-450 Edition 1.0 2011-06, Maritime navigation and radiocommunication equipment and systems – Digital interfaces – Part 450: Multiple talkers and multiple listeners – Ethernet interconnection.
- IEC 62288 Edition 2.0 2014-07, Maritime navigation and radiocommunication equipment and systems – Presentation of navigation-related information on shipborne navigational displays – General requirements, methods of testing and required test results
- IEC 61174 Edition 4.0 – 2015-08, Maritime navigation and radiocommunication equipment and systems – Electronic chart display and information system (ECDIS) – Operational and performance requirements, methods of testing and required test results
- IEC 61924-2 Edition 1.0 2012-12, Maritime navigation and radiocommunication equipment and systems – Integrated navigation systems – Part 2: Modular structure for INS – Operational and performance requirements, methods of testing and required test results
- IEC 61097-6 Edition 2.1 2012-01 Global maritime and safety system (GMDSS) – Part 6: Narrowband direct-printing telegraph equipment for the reception of navigational and meteorological warnings and urgent information to ships (NAVTEX)
- IEC 61996-1 Edition 2.0 2013-05 Maritime navigation and radiocommunication equipment and systems – Shipborne voyage data recorder (VDR) – Part 1: Performance requirements, methods of testing and required test results
- IEC 61616 Edition 1.0 2010-02 Maritime navigation and radiocommunication equipment and systems – Bridge navigational watch alarm system (BNWAS)
- ITU-R M.1371-4 2010-04 Technical characteristics for an automatic identification system using time division multiple access in the VHF maritime mobile band
- IHO S-52 ed.5 – 1996, Specifications for chart content and display aspects of ECDIS
- IHO S-52, appendix 1 – Guidance on updating the electronic navigational chart
- IHO S-52, appendix 2 – Color and symbol specifications for ECDIS
- IHO S-52, ANNEX A of APPENDIX 2 – IHO ECDIS Presentation Library
- IHO S-52 APPENDIX 2 ADDENDUM TO ANNEX A, PART I, Users´ Manual Edition 3.4 – 2008 Paper based description of symbols for use on ECDIS

- IHO S-57, appendix B.1 – 2000, ENC product specification
- IHO S-63 Edition 1.2 – June 2015, IHO data protection scheme
- IHO CHART 1 datasets
- IHO S-64 IHO TEST DATA SETS IN ECDIS Edition 3.0.1 – June 2015

2 ECDIS Overview

2.1 Turning ECDIS On/Off

2.1.1 Turning ECDIS On

To turn the ECDIS on:

1. Press the HOLD FOR RESET buttons on the alarm panel.
2. The ECDIS starts automatically and the Main Screen opens.

2.1.2 Putting ECDIS to Standby

To turn the ECDIS off:

3. Go to Main menu.
4. Press the STANDBY button and select the Standby option: the ECDIS turns off.



Figure 1 Standby options

5. The ECDIS closes automatically with all the current settings memorized.

2.1.3 Rebooting ECDIS

To reboot the ECDIS:

1. Go to Main menu.
2. Press the STANDBY button and select the Reboot option: the ECDIS closes automatically with all the current settings memorized and reboots the system.

2.2 Main Screen

Below is the image of the main screen of the ECDIS.



Figure 2 ECDIS Main Screen

The basic parts of the main screen are:

- Zoom buttons – use zoom buttons to zoom in and zoom out the chart view;
- Chart View –the Chart View displays charts, routes, own vessel, AIS and ARPA targets and all other chart and navigation information;
- Status bar – the status bar displays chart view scale, mouse pointer coordinates, mouse pointer distance and bearing from own vessel, chart in use, and current user;
- Notices – information notices;
- Indicators – indicators notify the user about certain states of the ECDIS operation and important events; as well as provide access to most used functions and tools;
- Sensors panel – the Sensors panel displays date and time, own vessel coordinates, and data coming from external sensors connected to the ECDIS;
- Look-ahead window – the Look-ahead window displays the chart independently from the Chart View. It can be synchronized with the Chart View;
- Main Menu button – opens the Main Menu panel. Here you can access ECDIS functions and settings.

2.3 *Main Menu*

Main Menu provides access to all ECDIS functions and settings.

To open the Main Menu:

3. Press the Main Menu button in the lower-left corner of the Chart View.
4. The Main Menu panel opens. Here you can access ECDIS functions and settings.

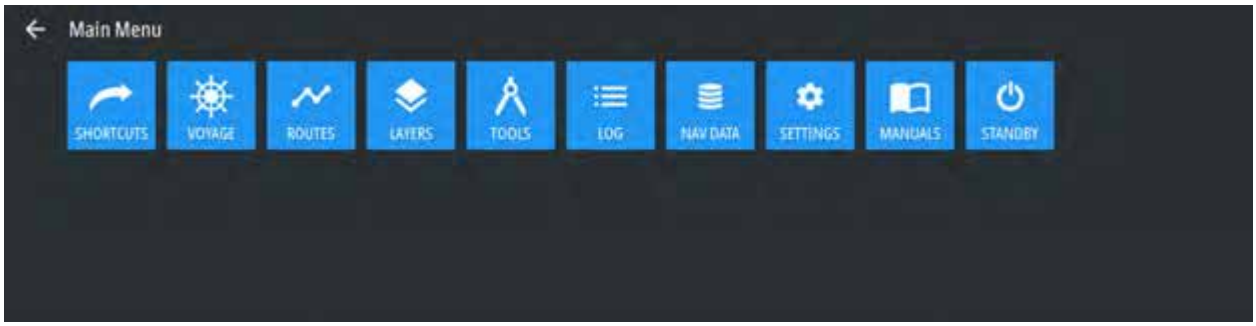


Figure 3 Main Menu panel

To close the Main Menu:

5. Press the Back button in the upper-left corner of the Main Menu panel.

From the Main Menu you can open the following function panels:

- SHORTCUTS – access to most commonly used functions;
- VOYAGE – here you can start monitoring a voyage along a specified route;
- ROUTES – here you can create and edit routes, and export and import them;
- LAYERS – access to information about chart overlaying data (AIS, ARPA, Radar);
- TOOLS – access to navigational calculation tools;
- LOG – access to the Log Book;
- NAV DATA – here you can install navigational chart data, update this data, add mariner objects and manual updates;
- SETTINGS – access to ECDIS settings;
- MANUALS – access to ECDIS manuals;
- STANDBY – reboots the ECDIS or switches it off.

2.4 Functional Panels

Control over ECDIS functions and settings are provided in the functional panels. There are eight panels.

The panels are the following:

- SHORTCUTS – access to most commonly used functions;
- VOYAGE – here you can start monitoring a voyage along a specified route;
- ROUTES – here you can create and edit routes as well as export and import them;
- LAYERS – here you can access:
  - Chart overlays – here you can hide or display User chart, AIS, Radar targets, Admiralty information, and Navtex overlays;
  - AIS – here you can see information about detected AIS targets;
  - Radar targets – here you can see information about detected radar targets;
  - Navtex – here you can see received NAVTEX messages.
- TOOLS – access to navigational and system tools;
- LOG – access to the Log Book;
- NAV DATA – here you can access:
  - Chart library – here you can view catalogs of the installed SENC databases, display or hide the databases and their graphical index, access update history of the databases;
  - Install charts – here you can install ENC databases and their updates;
  - User chart – here you can add and edit objects to a user chart;
  - Manual update – here you can add and edit manual updates to charts;
- SETTINGS – access to ECDIS settings:
  - Chart – here you can access chart portrayal settings, chart objects display settings, and navigational settings;
  - Vessel – here you can access vessel display settings, vessel performance characteristics setup, sensors setup, and dead reckoning setup;
  - AIS – here you can access AIS display settings and configuration of AIS data processing;
  - Radar targets – here you can access radar target display settings and configuration of radar target data processing;
  - Radar overlay – here you can access radar overlay settings;
  - Alerts – here you can access alert settings;

– System – here you can access system settings.

How to work with function panels:

6. To open a panel, open the Main Menu by pressing the Main menu button in the lower-left corner of the chart view and press the panel's button in the Main Menu.

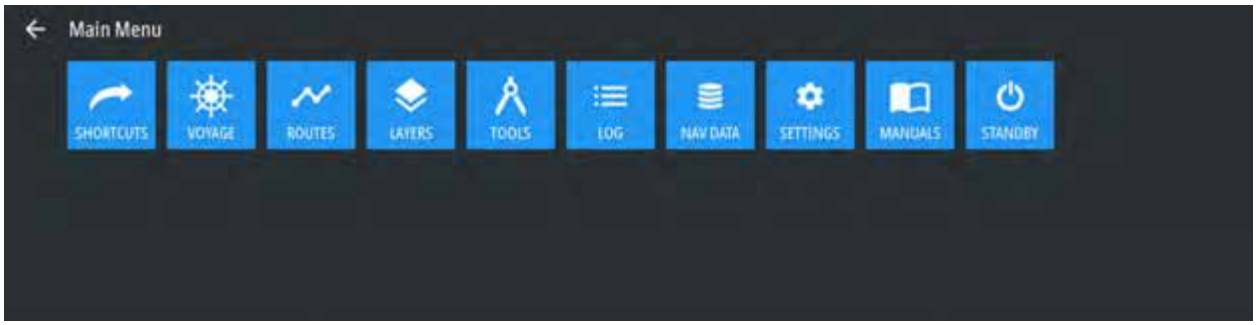


Figure 4 Main Menu panel, function panel buttons

7. To access functions located in a tab of a panel, use the Navigation Menu on the left side of the panel: select the tab or the tab group in the menu. With a tab group, select the tab you need in the tab list.



Figure 5 Access to tabs in panels

8. To return to the tabs list, press the tab group name either in the navigation menu or in the path to the opened tab at the top of the tab.



Figure 6 How to return to tabs list

9. To close a panel, press its Close button in the upper-right corner.

10. To return to the Main menu, press the Back button or the ESC key.

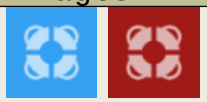
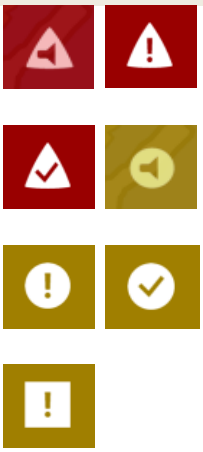
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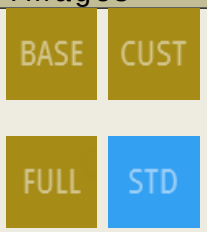
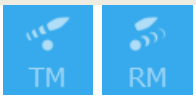
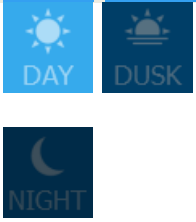
Function panels have a fixed size and cannot be resized.

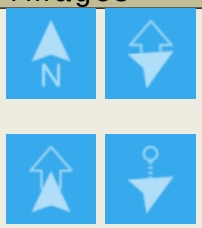
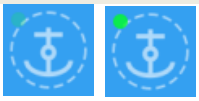
2.5 *Indicators*

The ECDIS informs the user about some important events using indicators. Some indicators also give access to most commonly used functions of the ECDIS.

The table below describes indicators used by the ECDIS.

Indicator	Images	Description and action
Man overboard Always onscreen		Press the MOB indicator to plot a position on the chart where the accident happened: the MOB mode is on and the indicator turns red and starts flashing. To switch the MOB mode off, press the indicator and confirm the action.
Alerts Appears if an alert is triggered		Press the indicator to open the Alarms, warnings and cautions panel. The indicator is removed when all alerts are acknowledged and rectified.
Grounding check Appears if dangerous objects are detected inside the grounding zone		Press the indicator to open the Grounding check panel with the list of dangers and cautions found in the grounding zone.
Go to the own ship Appears if the Follow the own ship mode is off		Press the indicator to switch to the Follow the own ship mode. The indicator disappears.

Indicator	Images	Description and action
Display mode Always onscreen		Press the indicator to switch to the Standard display mode.
NavBox updates available Appears if an updated SENC database is found on a connected NavBox		Press the indicator to see more details.
Targets display on / off Always onscreen		Press the indicator to hide or show AIS and radar targets.
Vessel motion mode Always onscreen		Press the indicator to switch between the True and Relative motion modes.
NAVTEX message Appears if a NAVTEX message has come		Press the indicator to open the NAVTEX panel.
AIS message Appears if an AIS message has come		Press the indicator to open AIS messages history.
Dividers Always onscreen		Press the indicator to switch the Dividers tool on/off.
ERBL tool Always onscreen		Press the indicator to switch the ERBL tool on/off.
Fixed VRM tool Always onscreen		Press the indicator to switch the Fixed VRM tool on/off.
Day / Night mode Always onscreen		Press the indicator to switch between Day/Dusk/Night modes.

Indicator	Images	Description and action
Chart orientation Always onscreen		Press the indicator to switch between North up/Course up/Heading up/Track up orientation modes.
Anchor watch Always onscreen		Press the indicator to set up a swing circle radius and turn on the Anchor watch mode.
Default Always onscreen		Press the indicator to restore control settings to their default values.
Radar overlay Always onscreen		Press the indicator to hide or show the radar overlay. Right-click the indicator to select a radar processor or to open configuration parameters.
Port mode Always onscreen		Press the indicator to switch the Port mode on/off.
Info mode Always onscreen		Press the indicator to switch the Info mode on/off.

2.6 *Hot keys*

You can use the following hot keys to access important functions:

- F1 – opens the Shortcuts panel;
- F4 – turns the Show vessel mode on/off;
- F5 – switches between Base, Standard, Full, and Custom display modes;
- F6 – switches between Day, Dusk and Night monitor modes;
- F7 – restores control settings to their default values;
- F8 – sets monitor settings to default values;
- F10 – switches the MOB mode on/off;
- ESC – closes the currently opened function panel and returns to the Main menu; if the chart zoom-area selection is active, press the ESC key to cancel the selection. Press again to close the function panel.
- Page Up – Zooms in the chart view
- Page Down – Zooms out the chart view
- Alt+Arrow up – increases the backlight value by 1
- Alt+Arrow down – decreases the backlight value by 1

3 Navigation Data

Navigation chart data comes as geospatial databases distributed over the Internet or on portable data storage devices. The data is made up of official ENC geodatabases protected with S-63 data protection scheme.

ENC data installed to the ECDIS is converted to the system ENC format (SENC). For SENC protection, the same S-63 scheme is used as for ENC.

3.1 Chart Library

Chart databases installed in the ECDIS are listed in the Chart Library.

In the chart library, you can browse the list of installed databases and the catalog of datasets in each database, scroll the chart view to a specified dataset, display the coverage of a selected database, and open and close a database for display.

3.1.1 Browsing list of databases and datasets

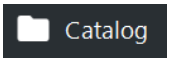
To browse the list of databases and datasets catalog:

11. Go to the Main menu → Nav Data → Chart library: the Chart library panel opens with the list of installed databases.



Figure 7 Chart library panel

12. For each database, the ENC to SENC compilation date and time are provided.

13. To open the list of datasets of a database, select the database in the list or press its Catalog 

button: the list of datasets opens.



Figure 8 Catalog panel

14. To find a specified dataset, enter its name in the Search field: the list is scrolled to the specified dataset.

The following data is provided for each dataset:

- Produced by – producing agency of the dataset;
- Edition – edition number of the dataset;
- Embedded updates – the number of embedded updates;
- Issued – issue date of the dataset;
- Updated – the last update date of the dataset;
- Compilation scale – compilation scale of the dataset;
- Bounding – coordinates of the south-west and northeast corners of the dataset bounding rectangle.

3.1.2 Displaying graphical index of databases

To display graphical index of a database in the chart view:

1. Go to the Main menu → Nav Data → Chart library: the Chart library panel opens with the list of installed databases.
2. Set the Graphical index switch to the On position.
3. To hide the graphical index, set the Graphical index switch to the Off position.

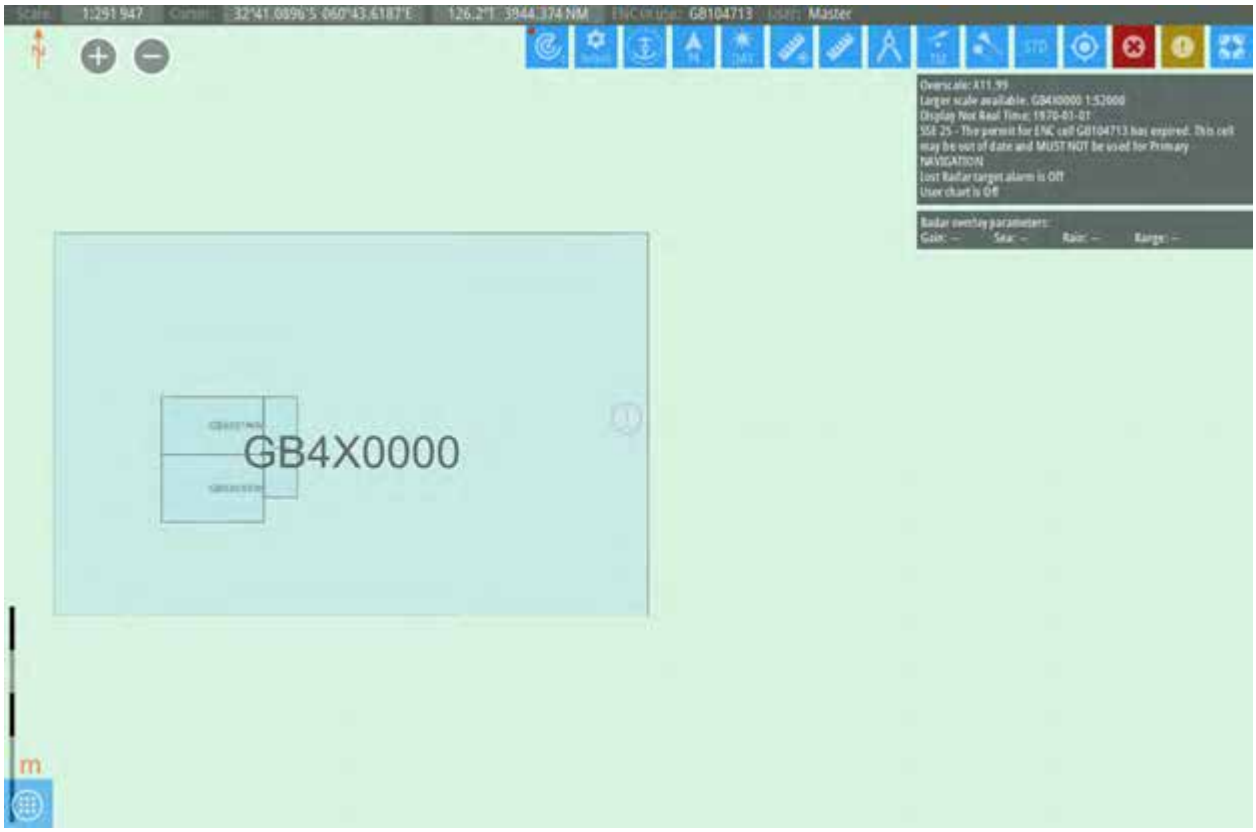


Figure 9 Database graphical index display

3.1.3 Opening databases for display

To open a database for display:

1. Go to the Main menu → Nav Data → Chart library: the Chart library panel opens with the list of installed databases.
2. To open a database for display, set the Display switch of the database to the On position: the database is now displayed in the chart view.
3. To close a database for display, set its Display switch to the Off position.

3.1.4 Scrolling chart view to datasets

To scroll the chart view to a dataset:

1. Go to the Main menu → Nav Data → Chart library: the Chart library panel opens with the list of installed databases.
2. Open the catalog of the database whose dataset you want to display in the chart view by pressing the Catalog button.
3. Find the dataset you want to display in the list of datasets. Use the Search field.
4. To display the dataset in the chart view, press its go to button: the chart is scrolled and scaled to display the dataset in the center of the chart view.

3.1.5 Deleting databases

NOTE:

Before deleting a database, make sure you have original chart data to be able to restore it if necessary.

To delete an installed database:

1. Go to the Main menu → Nav Data → Chart library: the Chart library panel opens with the list of installed databases.
2. Find the database you want to delete in the list of databases and press its delete button: a confirmation dialog opens.
3. Confirm the operation twice: the database is deleted.

3.1.6 Deleting datasets

To delete a dataset:

1. Go to the Main menu → Nav Data → Chart library: the Chart library panel opens with the list of installed databases.
2. Open the catalog of the database whose dataset you want to delete by pressing the Catalog button.
3. Find the dataset you want to delete in the list of datasets. Use the Search field.
4. Press the delete button of the dataset: a confirmation dialog opens.
5. Confirm the operation twice: the dataset is deleted.

3.1.7 Chart validity report

In the chart catalog, you can generate and print out a chart validity report. It can show all valid charts, charts with licenses expiring in less than 30 days, and charts with expired licenses.

To generate a chart validity report:

1. Go to the Main menu → Nav Data → Chart library: the Chart library panel opens with the list of installed databases.
2. Open the catalog of the database whose charts you want to report.
3. Select a type of the report in the drop-down list in the upper-right corner of the panel.

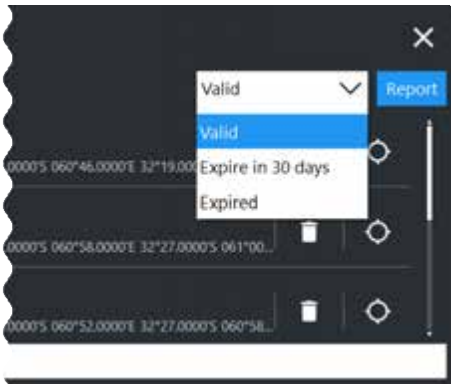


Figure 10 Validity report type selection

4. Press the Report button: a report is created with all charts meeting the report type condition listed.

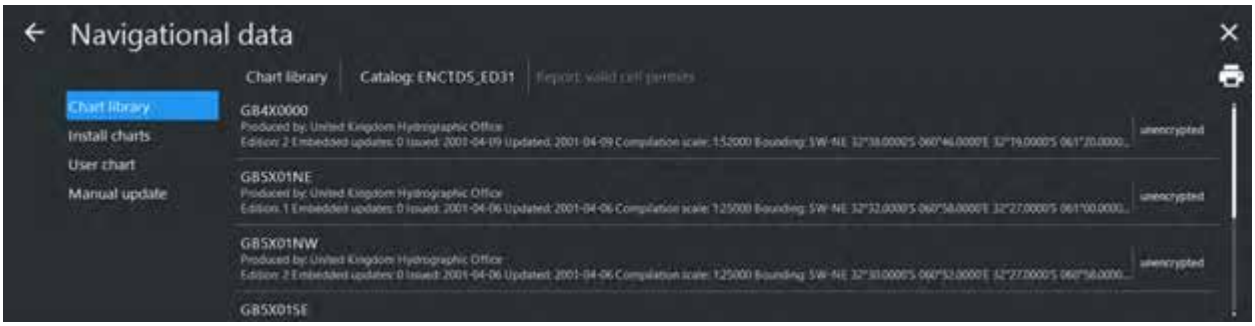


Figure 11 Generated chart validity report

5. To print the report, press the print button in the upper-right corner of the panel: the Print panel opens.



Figure 12 Printing a chart validity report

6. Press the Save to file button: the Choose file format dialog opens.

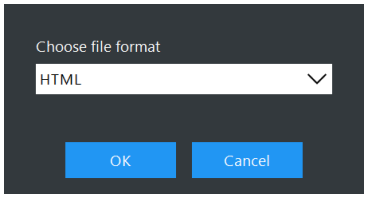


Figure 13 Choose file format

7. Select a format option in the drop-down list and press OK: the Save to file dialog opens.

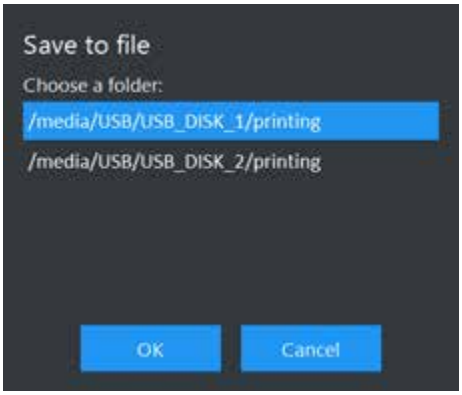


Figure 14 Save to file dialog

8. Select the folder where you want to save the report and press OK: the chart validity report is saved to a file with the specified format.

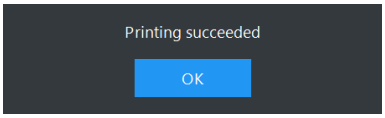


Figure 15 Printing succeeded

9. You can print the file using standard printing procedures.

3.2 ENC Cell Permits

Official ENC data is protected using the S-63 data protection scheme.

To install ENC data, you need cell permits for the cells you intend to use. To obtain cell permits, send your order and your user permit to your data distributor. After obtaining the permits, install them in the ECDIS. Next, you can install and use cartographic data.

3.2.1 Installing cell permits

After receiving cell permits, you must install them in the ECDIS before you can start installing data.

To install cell permits:

1. Connect the removable data storage device with cell permits to the ECDIS.
2. Go to the Main menu → Nav Data → Install charts → Install permits: the Install permits panel opens.
3. Press the refresh button in the upper-right corner of the panel: the ECDIS starts searching for cell permits on all connected data storage devices.

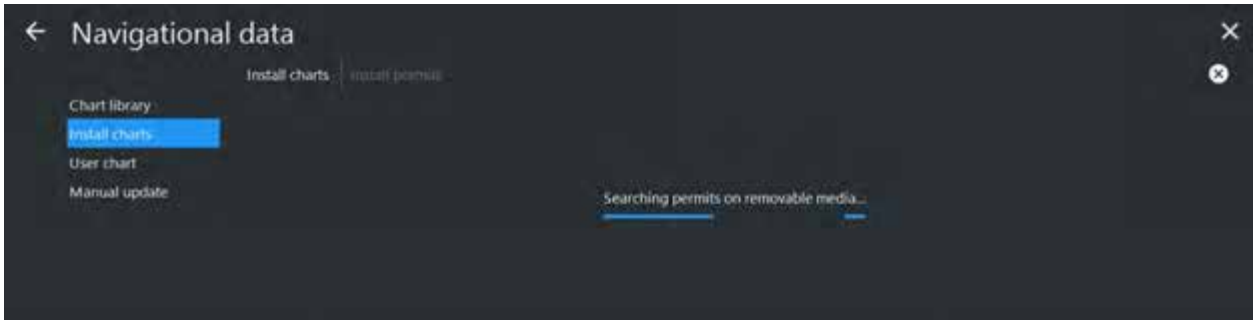


Figure 16 Install permits panel, Searching permits

4. To stop the search, press the cancel button in the upper-right corner of the panel: the search stops and the cancel button changes to the refresh button. To restart the search, press the refresh button: the search restarts.

5. All found cell permits are displayed in the panel.

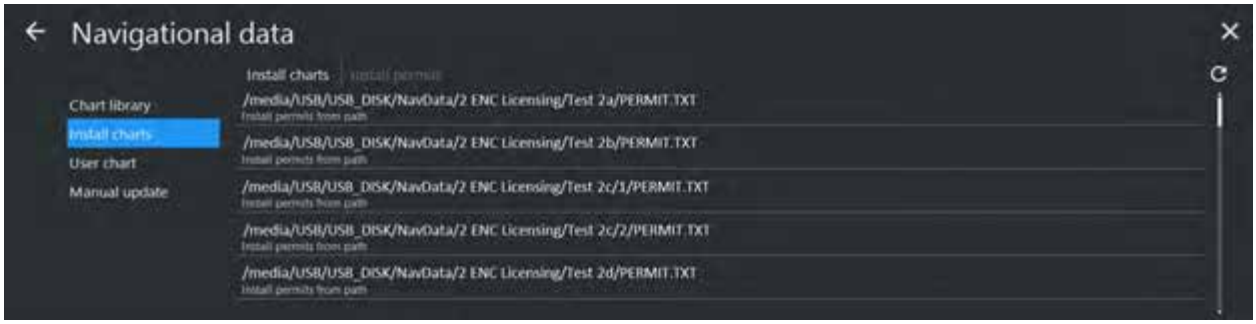


Figure 17 List of found cell permits

6. Select the cell permit file you want to install: installation starts immediately.
7. At the end of installation, a message appears giving notification of the result. Press OK to close the message.

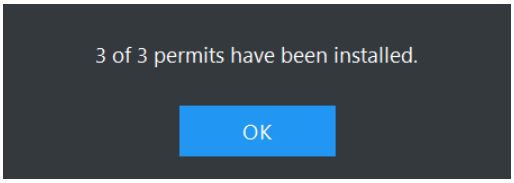


Figure 18 Installation end message

8. In addition, the panel with installation statuses and warning messages for cell permits opens. Installation status shows if the permit installation was successful (Ok) or not (Fail). Warning messages give notification of any errors occurring during installation.

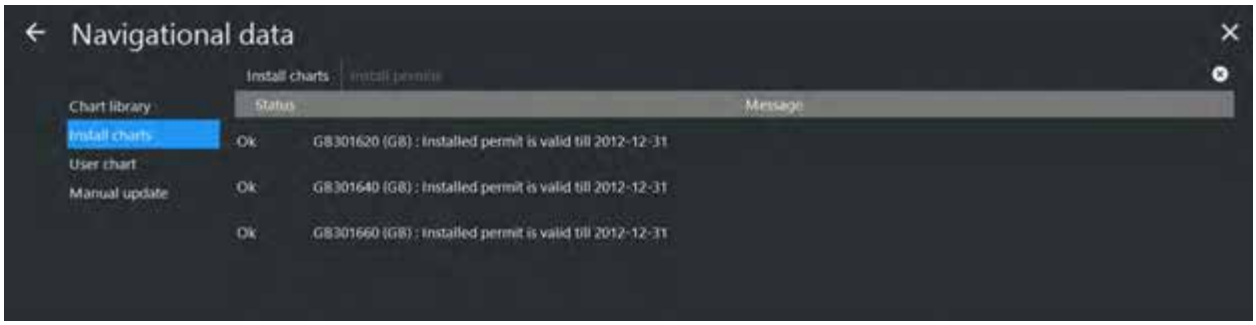


Figure 19 Installation statuses and error messages for installed permits

9. To close the panel and return to the list of found cell permits, press the close button in the upper-right corner of the panel.

3.2.2 Viewing installed cell permits

To view all installed cell permits:

1. Go to the Main menu → Nav Data → Install charts → List of installed permits: the List of installed permits opens.

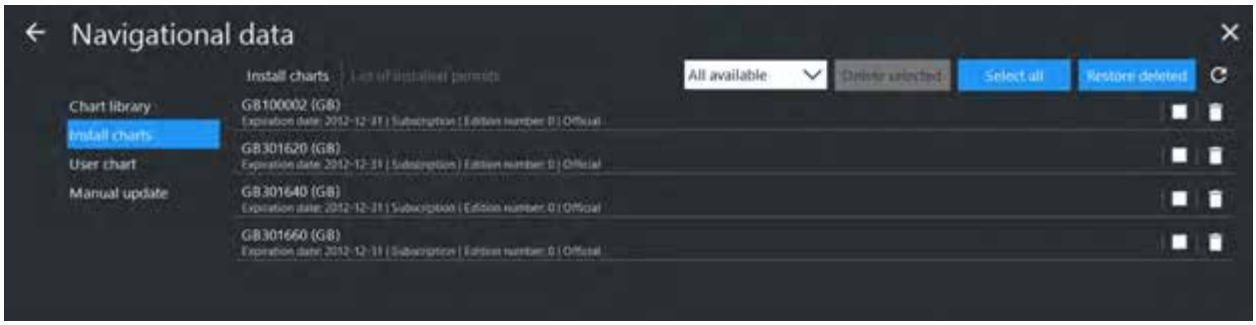


Figure 20 List of installed cell permits

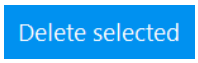
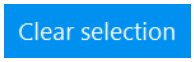
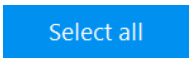
2. In the panel, the list of all installed cell permits with brief information is displayed.
3. To filter installed cell permits, select one of the filter options in the drop-down list at the top of the panel: All available, Valid only, Expire in 30 days, and Expired options are available.
4. To refresh the list, press the refresh button.

The following information for cell permits is available:

- Expiration date – expiration date of the permit.
- Service level – service level of the permit (subscription or single purchase).
- Edition number – edition number of the ENC cell.
- Cell permit type – permit type of the cell (official (ENC) or non-official (ECS)).

3.2.3 Deleting installed cell permits

To delete installed cell permits:

1. Go to the Main menu → Nav Data → Install charts → List of installed permits: the List of installed permits opens.
2. To delete one of installed cell permits, press its delete  button and confirm the operation: the specified cell permit is deleted from the system.
3. To delete several cell permits, select the permits you want to delete by ticking their check boxes, press the Delete selected  button, and confirm the operation: the selected cell permits are deleted.
4. To clear selection, press the Clear selection  button.
5. To delete all installed permits, press the Select all  button, press the Delete selected button, and confirm the operation: all installed permits are deleted.

3.2.4 Restoring deleted cell permits

The ECDIS allows deleted cell permits to be restored.

To restore deleted cell permits:

1. Go to the Main menu → Nav Data → Install charts → List of installed permits: the List of installed permits opens.
2. Press the Restore deleted  button and confirm the operation: the permits list is restored to its previous state.

3.3 Installing ENC Data

After installing cell permits, you can start installing navigational data.

ENC data is distributed as exchange sets in S-57 format, including datasets, updates, pictures, text descriptions, and a catalog file describing each exchange set.

When installing ENC data, the data is converted to the system format of the ECDIS (SENC). You can create a new SENC database or add ENC data to an existing one.

3.3.1 Adding data to a new database

To add data to a new database:

1. Go to the Main menu → Nav Data → Install charts → Find and install charts: the Find and install charts panel opens with the list of all ENC exchange sets found on removable data storage devices connected to the ECDIS.

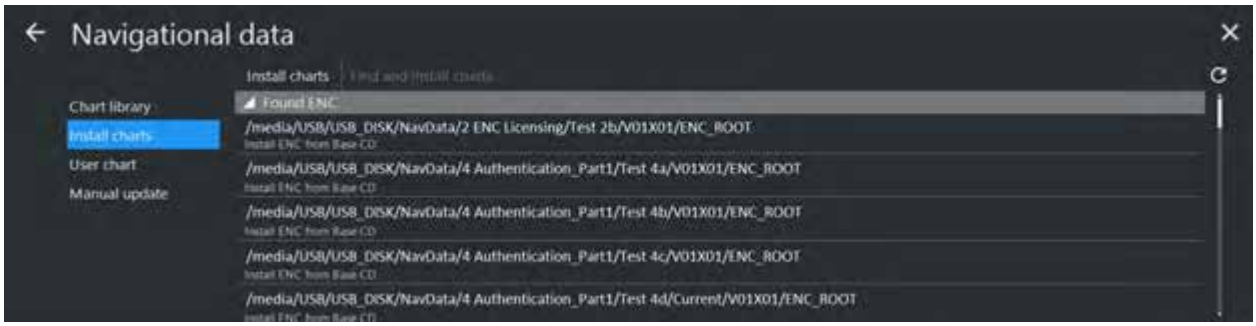


Figure 21 Find and install charts panel

2. When you open the Find and install charts panel for the first time, the ECDIS automatically searches for exchange sets on all removable data storage devices connected to the system. To start a new search, press the refresh button in the upper-right corner of the panel: the search starts and the refresh button changes to cancel. Press it to stop the search.
3. Find the exchange set you want to install and select it in the list: the Confirm destination SENC geodatabase name message opens.

4. Enter a name for the new database and press OK: installation starts.

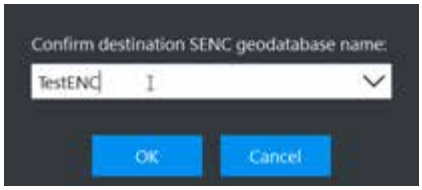


Figure 22 Destination database name

5. At the end of installation, an information message confirms completion of the operation: press OK to close the message and view the installation summary.

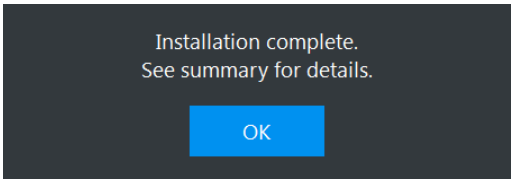


Figure 23 Installation complete message

6. The installation summary is displayed, and the result and warning messages window opens. To close the window, press the cancel button in the upper-right corner of the window.

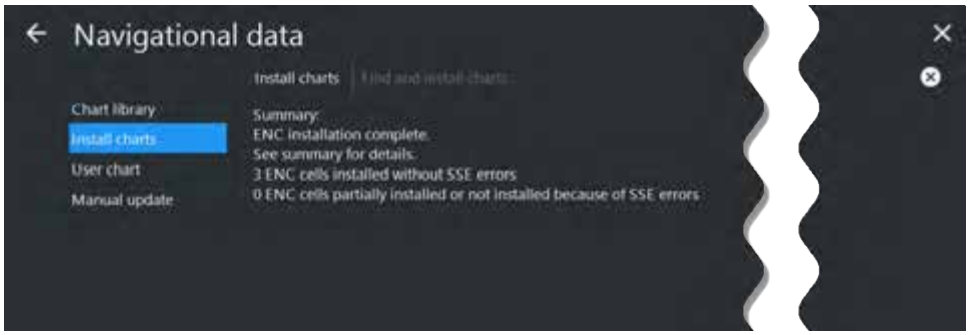


Figure 24 Data installation result messages

7. If the data was successfully converted and installed, the new database would be added to the Chart Library and you can start using it.

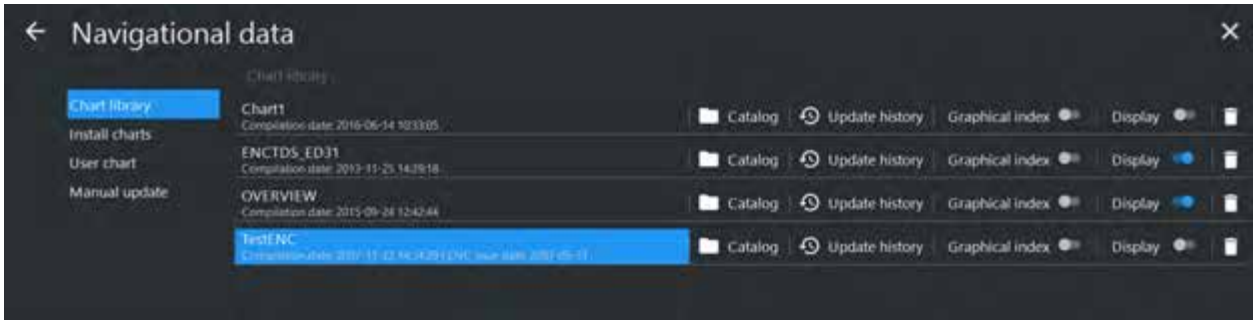


Figure 25 A new database created and added to Chart library

NOTE:

When a new database is created, it is not open for display. To see the data, set the Display switch of the database to the On position.

3.3.2 Adding data to an existing database

To add data to an existing database:

1. Go to the Main menu → Nav Data → Install charts → Find and install charts: the Find and install charts panel opens with the list of all ENC exchange sets found on removable data storage devices connected to the ECDIS.
2. Find the exchange set you want to add to an existing database and select it in the list: the Confirm destination SENC geodatabase name dialog opens.
3. Select the database to which you want to add the data in the drop-down list and press OK: installation starts.

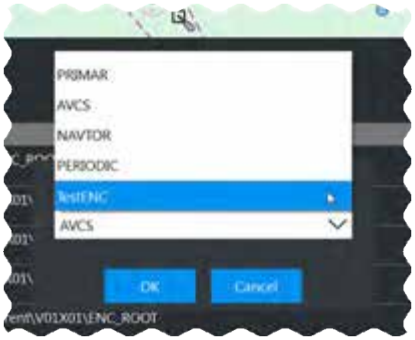


Figure 26 Selecting destination database

4. When the installation is finished, the result and warning messages window opens. To close the window, press the cancel button in the upper-right corner of the window.
5. If the data was successfully converted and installed, it will be added to the specified database. You can see the new datasets in the database catalog.

3.3.3 Installing ENC updates

Updates to ENC data is distributed as part of ENC data exchange sets.

To install ENC updates:

1. Use the procedure described in chapter *3.3.2, Adding data to an existing database*.
2. Make sure to select the destination database containing datasets for which updates are intended.

3.4 NavStick/NavBox Data

If your data provider is NAVTOR, you will receive your data on a NavStick or via a NavBox. They contain ENC data pre-converted to the SENC format.

3.4.1 Installing NavStick/NavBox data

NavStick/NavBox provides data converted and compiled to a SENC database by NAVTOR so the ECDIS won't have to convert it to the SENC format. Installation will take much less time compared to installation of ENC data.

To install data from NavStick/NavBox:

1. Connect your NavStick/NavBox to the ECDIS.
2. Go to the Main menu → Nav Data → Install charts → Find and install charts: the Find and install charts panel opens with the list of all ENC exchange sets and SENC databases found on removable data storage devices, including NavStick/NavBox connected to the ECDIS.
3. Expand the Found SENC list by pressing the plus sign: the list of SENC databases found on the NavStick/NavBox opens.

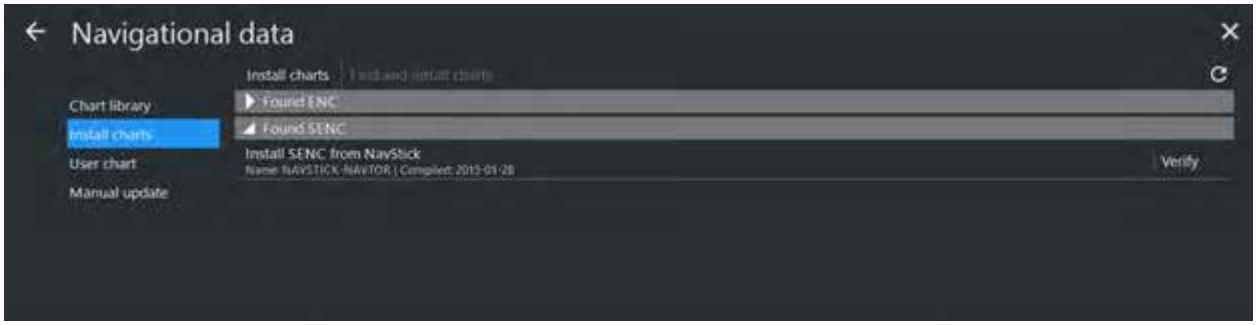


Figure 27 SENC data found on NavStick/NavBox

4. To verify SENC data, press the Verify button: verification starts. If the verification has failed, contact your data provider.
5. To install SENC from NavStick/NavBox, select the Install SENC from NavStick item in the list: data installation starts.
6. Installation progress is displayed in the Progress window. You can interrupt installation: press the cancel button in the upper-right corner of the progress window.

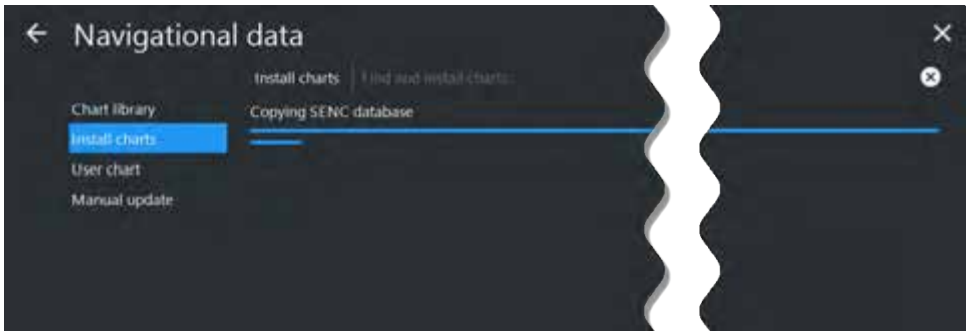


Figure 28 Installation progress

7. When the installation is finished, the Installation complete message appears: press OK to close the message and see the installation summary.

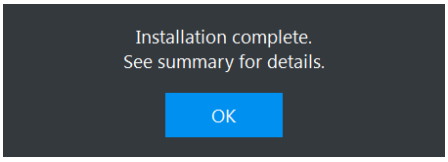


Figure 29 Installation complete message

8. To close the summary, press the cancel button in the upper-right corner of the window.

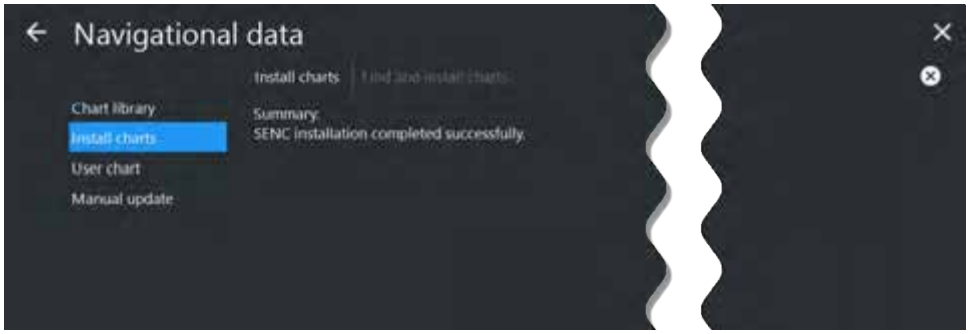


Figure 30 Installation result and warnings window

9. If the data was successfully installed, the new database is added to the Chart library. Now you can start using the new data.

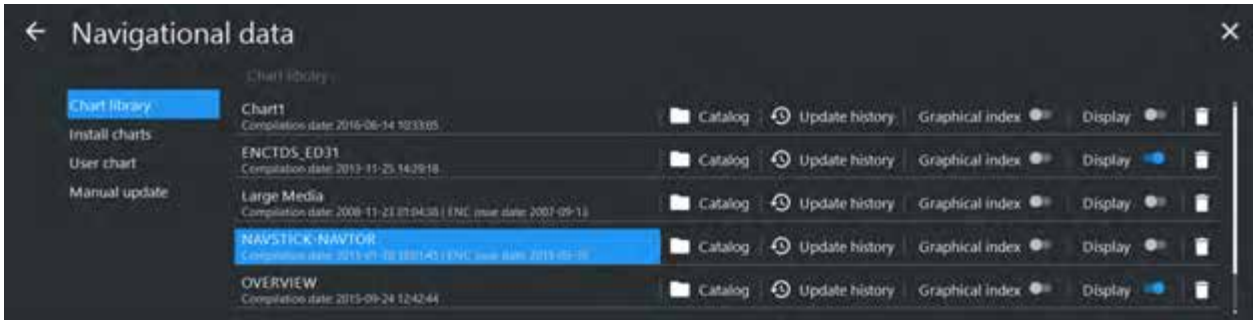


Figure 31 New database is created and added to the Chart library

NOTE:

When a new database is created, it is not open for display. To see the data, set the Display switch of the database to the On position.

3.4.2 Updating data from NavStick/NavBox

Updates to SENC data is distributed as a newly compiled SENC database.

To install updated SENC database from NavStick/NavBox:

1. If you are using a NavStick, you should download updates to the NavStick using the NavSync application first; and then connect the NavStick to the ECDIS and install updates.
2. To install updated SENC data, use the procedure described in chapter *3.4.1, Installing NavStick/NavBox data* .
3. If you are using a NavBox, updates are downloaded to it automatically. When the ECDIS finds the updates, it displays the NavBox updates indicator .
4. To update the data, press the NavBox updates indicator and confirm the operation by pressing the Update now button: the data is updated.

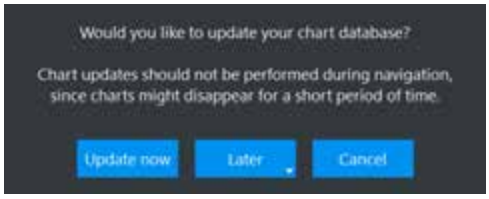


Figure 32 Updating NavBox data: confirmation dialog

5. To postpone the update, press the Later button and select one of the options.

NOTE:

When installing an updated SENC database, it overwrites the previous one.

3.5 *Large Media Support*

The ECDIS fully supports processing data recorded on large media.

3.5.1 Installing large media data

To install large media data:

1. Connect the media with data to the ECDIS.
2. Go to Main menu → Nav Data → Install charts → Find and install charts: the Find and install charts panel opens with the list of all chart data found on connected storage devices.



Figure 33 Large media support: found large media

3. Find the ENC from base media in the list of chart data and select it: the Confirm destination SENC geodatabase name dialog opens.



Figure 34 Large media support: confirming destination database name

4. Enter the name of the database and press OK: installation starts.
5. At the end of installation, an information message confirms completion of the operation: press OK to close the message and view the installation summary.

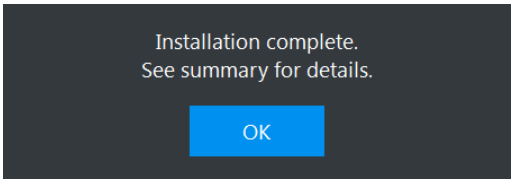


Figure 35 Installation complete message

6. To close the summary, press the close button in the upper-right corner of the panel.
7. Chart datasets from the large media are converted and added to the indicated database. The database is added to the Chart library.

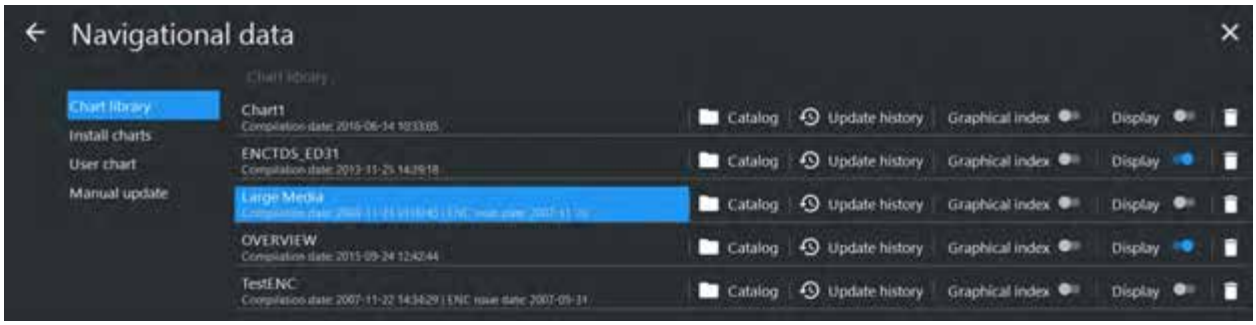


Figure 36 Large media: data is compiled and added to the indicated database

3.5.2 Updating large media data

To install large media data:

1. Use the procedure described in chapter *3.5.1, Installing large media data*.
2. Make sure to select the destination database containing datasets for which updates are intended.

NOTE:

Update media can only be installed if the Base media to which the Update media is related is installed in the ECDIS.

3.6 Adding ENC data to SENC database

You can add ENC data to a SENC database installed from NavStick. To do so, use the procedure described in chapter *3.3.2, Adding data to an existing database*.

NOTE:

When an updated SENC database is installed, the new database overwrites the previous one, and all ENC data added to the database is lost. You can restore the data by re-installation using original ENC data.

3.7 Viewing Updates

You can view all updates added to a database as an update log with short information about the updates, or as an update tree with detailed information about each updated object.

3.7.1 Update log

To view the update log:

1. Go to Main menu → Nav Data → Chart library: the Chart library panel opens with the list of all installed chart databases.

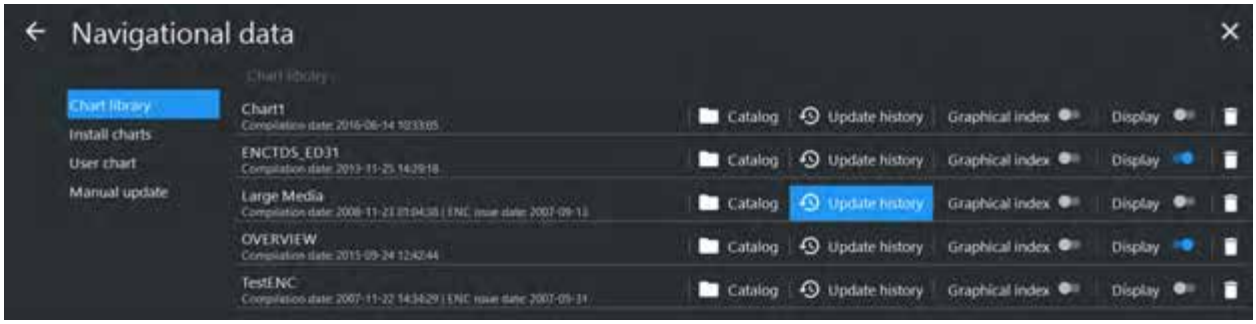


Figure 37 Viewing update history of a database

2. Find the database you need and press its Update history button: the Update history panel opens with the list of all updated datasets.



Figure 38 Updates log

3. By default, the updates log is displayed. To switch between the updates log and updates tree, select the required option in the drop-down list in the upper-right corner of the panel.



Figure 39 Update log display options

4. To view information about updates applied to a dataset, select the dataset in the list: the list of updates applied to the selected dataset opens. Use the Search field at the bottom of the datasets list to find the dataset you need.

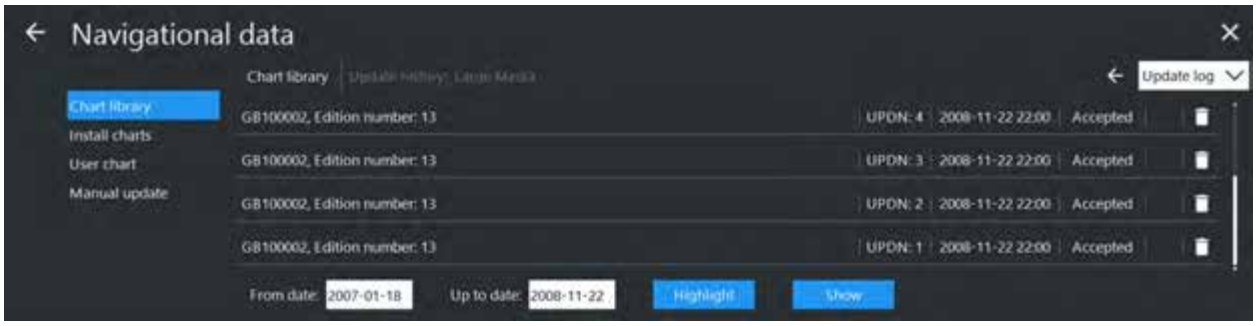


Figure 40 Updates applied to a dataset

5. To highlight features updated at a specified period, enter a start date to the From date field, end date to the Up to date field and press Highlight. To scroll the chart view to the updated objects, press the Show button.

The following information is provided about updates:

- Dataset name
- Dataset edition number
- Update number
- Update application date
- Update status

3.7.2 Update tree

To view update tree:

1. Go to Main menu → Nav Data → Chart library: the Chart library panel opens with the list of all installed chart databases.

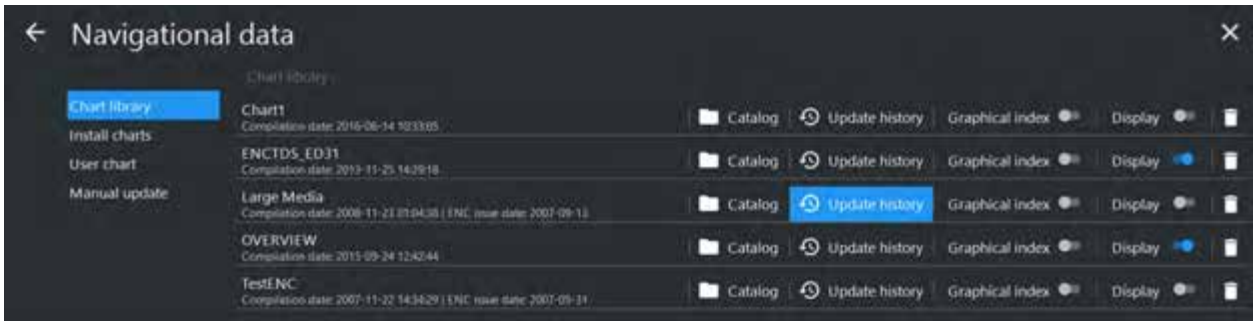


Figure 41 Viewing updates history of a database

2. Find the database you need and press its Update history button: the Update history panel opens with the list of all updated datasets.



Figure 42 Update log

3. By default, the update log is displayed. To switch to the update tree, select the Update tree option in the drop-down list in the upper-right corner of the panel.



Figure 43 Update log display options: select Update tree

4. The update tree opens with updates grouped by producing agency and sorted alphabetically. The update tree levels are the following:
   a) Hydrographic office
   b) Dataset
   c) Update
   d) Updated objects

   To expand each level, press the arrow button near the level name or double-click the level. To collapse a level, press the arrow button or double-click the level once more.



Figure 44 Expanded update tree, updates grouped by producing agency

5. To group and sort updates by date, press the sort by date button in the upper-right corner of the panel: updates are grouped and sorted by date. The update tree levels are the following:
   a) Update date
   b) Dataset
   c) Update
   d) Updated objects



Figure 45 Expanded update tree, updates grouped by date

6. To group and sort updates by producing agency, press the sort by agency button in the upper-right corner of the panel.
7. To scroll the chart view to an updated object, select the object in the list: the chart view is scrolled to the object. The object is highlighted, and the clear highlight button appears. Press it to remove the highlight.

3.7.3 Updates report

Using the Updates report function, you can view the updates report for a specified database and save the report to a file.

To create and save an updates report:

1. Go to Main menu → Nav Data → Chart library: the Chart library panel opens with the list of all installed chart databases.
2. Find the database you need and press its Update history button: the Update history panel opens with the list of all updated datasets.
3. Press the Report button: the report window opens with the updates report for the selected database.

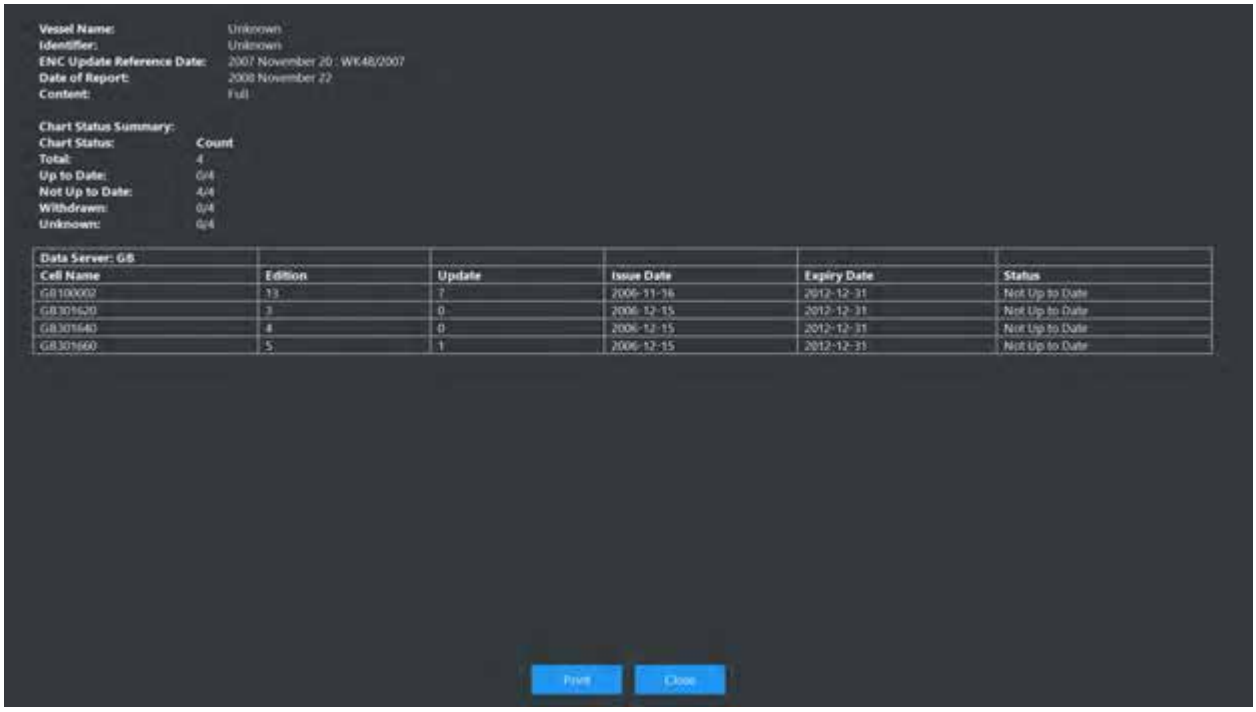


Figure 46 Database updates report

4. To save the report to a file, press the Print button: the Choose file format dialog opens.

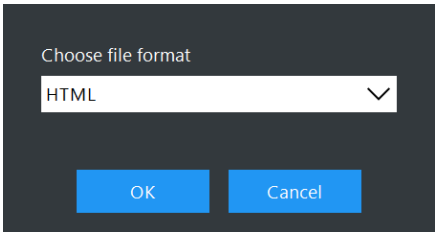


Figure 47 Selecting file format for updates report

5. Select a format option in the drop-down list, press OK and confirm the operation: the Save to file dialog opens with the list of all connected removable data storage devices.

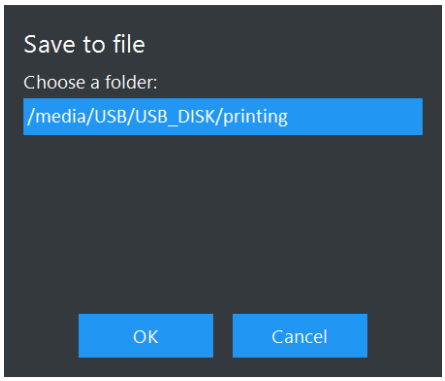


Figure 48 Selecting device to save the updates report file

6. Select a device to save the report file to and press OK: the updates report is saved to a file.

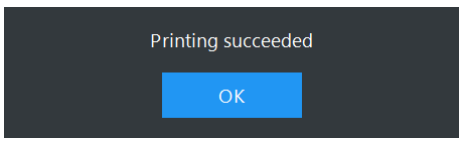


Figure 49 Printing succeeded

3.8 Manual Update

Using the Manual Update function, you can add new objects to specified datasets and modify existing objects.

3.8.1 Creating a new manual update object

To create a new manual update object:

1. Go to Main menu → Nav Data → Manual update: the Manual update panel opens.

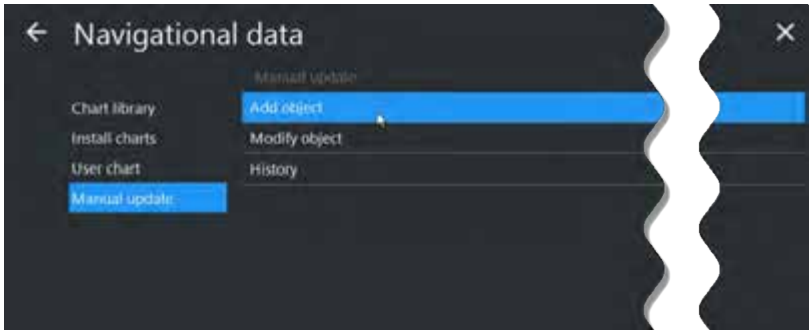


Figure 50 Manual update panel

2. Select the Add object option: the Add object panel opens with the list of datasets currently in the chart view (datasets of all scale levels are listed including those that are not displayed).



Figure 51 Manual update: datasets list

3. To scroll the chart view to a dataset, press the go to button of the dataset.

4. Select the dataset to which you want to add the object: the list of object categories opens. To go back to the list of datasets, press the Back button.

NOTE:

When selecting a dataset, the chart view is scrolled and scaled to display the selected dataset; also, the graphical index of the dataset is displayed.

The ECDIS will not allow the plotting of an object outside the selected dataset.

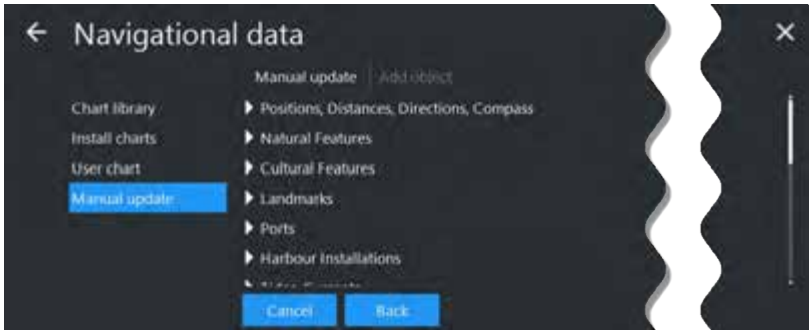


Figure 52 Manual update: object categories

5. To expand a category, press the right arrow button near the category name: the list of objects opens.

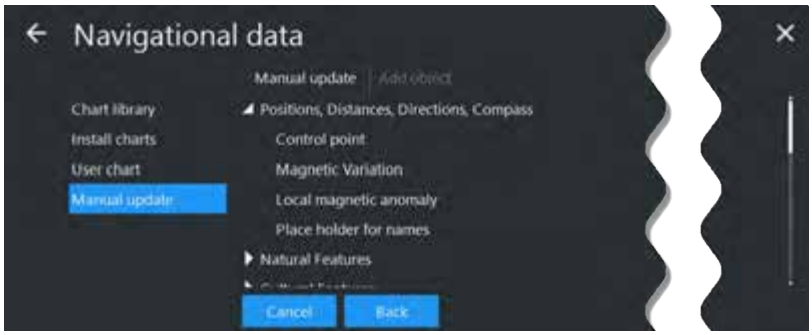


Figure 53 Manual update: objects list

6. Select the object you want to add: the object is created, and the object options panel opens where you can start editing its geometry and attributes.



Figure 54 Manual update: object editing options

7. To return to the list of objects, press Back.

3.8.2 Adding geometry

To add geometry to a newly created object:

1. Press the edit geometry button: the edit geometry panel opens.



Figure 55 Manual update: edit geometry panel

2. Select a geometry type of the object in the Geometry type drop-down list in the upper-right corner of the panel.

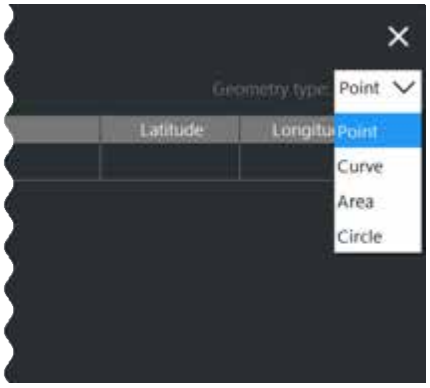


Figure 56 Manual update: geometry type

3. To plot an object's point in the chart view, left-click in the position where you want the point: it is added both to the chart and to the points table.
4. To add an object's point in the table, enter its coordinates to the last empty line of the table: double-click in the Latitude field to make it editable and enter the point's latitude. Then double-click in the Longitude field and add the point's longitude. The point is added both to the table and to the chart view.

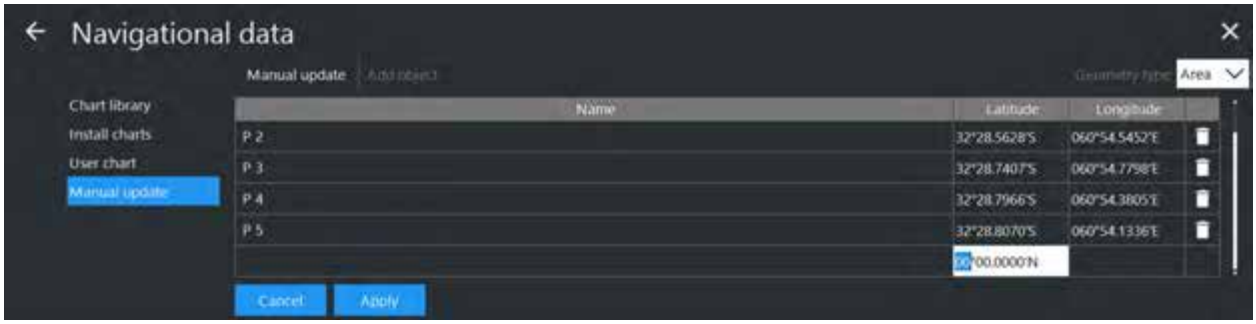


Figure 57 Manual update: adding object points in the table

5. Add all required points and press Apply to save the object's geometry: the geometry is saved, and you are back to the object editing options panel.

3.8.3 Adding attributes

To add attributes to a newly created object:

1. Press the edit attributes button: the edit attributes panel opens where you can add attributes to the object.



Figure 58 Manual update: attributes panel

2. Some objects have mandatory attributes: such attributes are already in the attributes table and cannot be removed, only edited.

3. To add a new attribute, select its type in the drop-down list in the upper-right corner of the panel and press the add button: the attribute line is added to the attributes table.

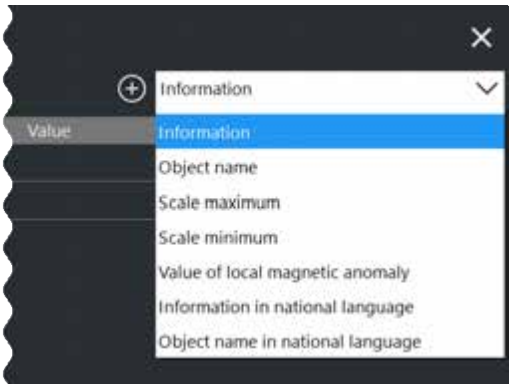


Figure 59 Manual update: attribute types

4. To enter a value, double-click in the field to make it editable and enter or select the value.

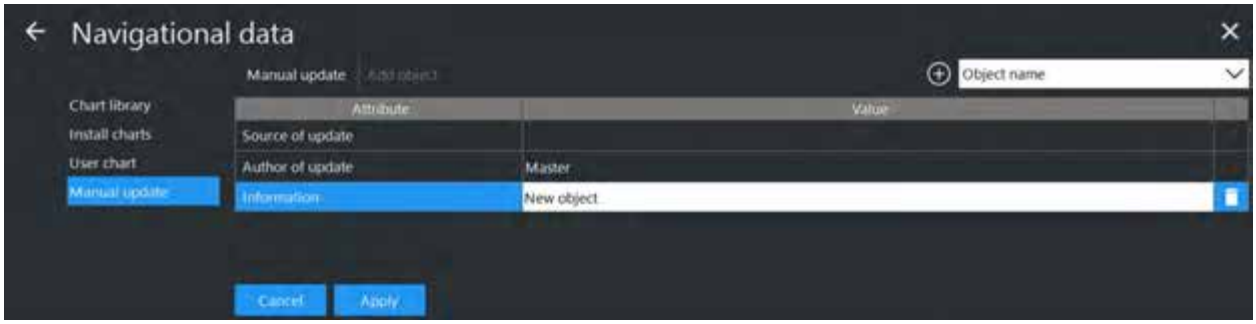


Figure 60 Manual update: entering an attribute value

5. Add required attributes and attribute values and press Apply to save them: the attributes are saved, and you are back to the object editing options panel.
6. To cancel the operation, press Cancel.

3.8.4 Adding slaves

Objects serving as aids to navigation often have so called slaves (lights, top marks and so on). When creating a manual update object, you can add as many slaves as necessary.

To add slaves to a manual update object:

1. Objects that can have slaves have an additional editing option: Slaves.

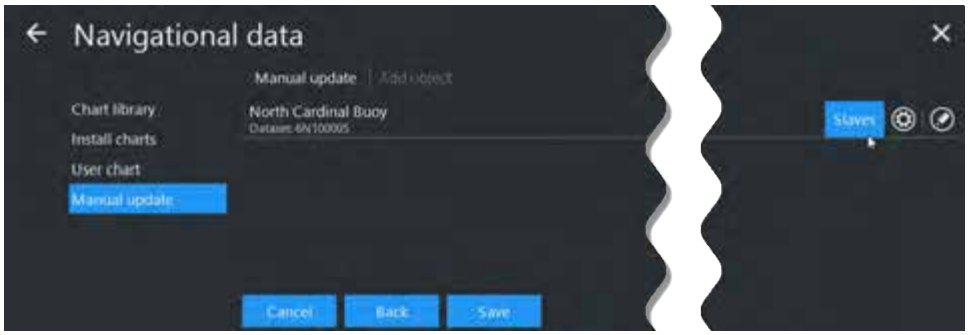


Figure 61 Manual update: adding slaves

2. To add a slave, press the Slaves button: the slave editing panel opens.
3. Select the slave type in the drop-down list in the upper-right corner of the panel and press the add button: the slave editing options panel opens.

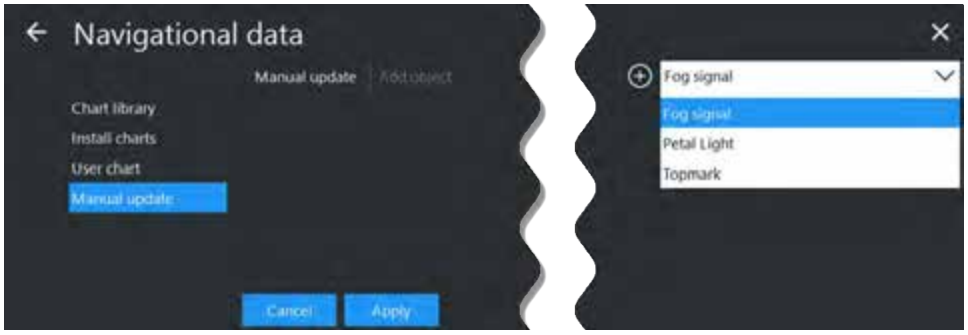


Figure 62 Manual update: slave type

4. Add required attributes to the slave: see the procedure below.
5. Add required slaves and press Apply to save them: the slaves are saved, and you are back to the object editing options panel.
6. To cancel the operation, press Cancel.

3.8.5 Adding slave attributes

To add slave object attributes:

1. Go to the slave editing object panel: press the Slaves button of the manual update object.
2. Press the edit attributes button: the slave attribute panel opens.

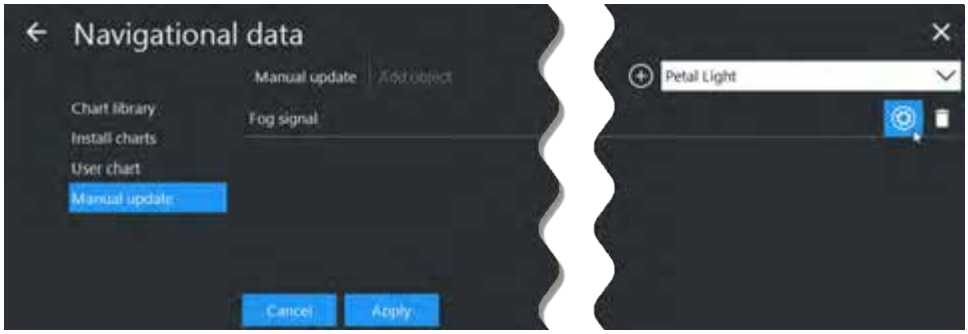


Figure 63 Manual update: slave attributes

3. Mandatory attributes are already added to the attributes table and cannot be removed, only edited.
4. To add a new attribute, select the attribute type in the drop-down list in the upper-right corner of the panel and press the add button: the attribute is added to the table.



Figure 64 Manual update: adding a new attribute

5. To enter a value, double-click in the field to make it editable and enter or select the value.

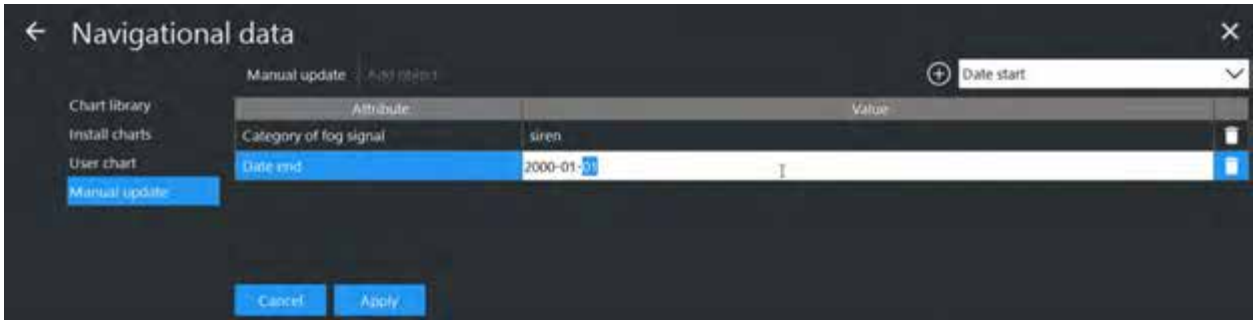


Figure 65 Manual update: entering slave attribute value

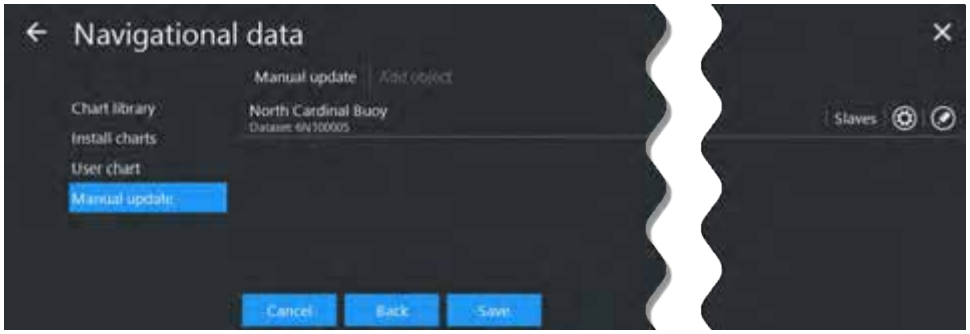
6. Add required attributes and attribute values and press Apply to save them: the attributes are saved, and you are back to the slave editing options panel.
7. To cancel the operation, press Cancel.

3.8.6 Saving manual updates

After adding geometry and all required attributes, save the manual update object.

To save a manual update object:

1. After adding and applying the object geometry and required attributes, you return to the object editing options panel.



2. To save the object, press the Save button: the confirmation dialog opens.

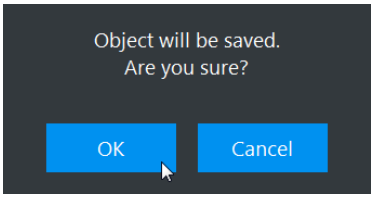


Figure 66 Manual update: save object confirmation dialog

3. Confirm the operation: the object is saved to the database and it will be displayed in the chart view with the newly added attributes.



Figure 67 Manual update: object before and after save

3.8.7 Modifying objects: geometry

You can modify both newly added manual update objects and objects that are already in chart databases.

Modifying geometry involves the following operations:

- Selecting an object to modify
- Moving object points
- Adding object points
- Inserting object points
- Deleting object points
- Saving changes

To select an object to modify:

1. Go to Main menu → Nav Data → Manual update → Modify feature: the modify object mode is switched on and the Modify object panel opens.
2. Select the object you want to modify in the chart view by right-clicking the object: all objects under the mouse pointer are listed in the panel.



Figure 68 Manual update: selecting objects to modify

3. Find the object you want to modify in the list and press the edit geometry button: the geometry edit panel opens.

To move an object point:

1. To move points of the object in the chart view, select the point you want to move by left-clicking it: the point is captured by the mouse pointer and moves around with it.
2. Move the point to a new position and left-click again to plot it there: the point is plotted in the new position and its coordinates are changed in the points table.



Figure 69 Manual update: moving a point

3. To move a point using the points table, click twice in the Latitude field to make it editable and enter the new latitude; then click twice in the Longitude field to make it editable and enter the new longitude.
4. To finish editing, click anywhere in the chart view: the new latitude and longitude are applied to the object's point, and it is moved to the new position in the chart view.

To add an object point:

1. To add a point to a line object in the chart view, left-click in the position where you want to plot the additional point: the point is plotted in the chart view and added to the table.



Figure 70 Manual update: adding a point in the chart view

2. To add a point in the points table, scroll the table to the last empty line.
3. Click twice in the Latitude field to make it editable and enter the new latitude; then click twice in the Longitude field to make it editable and enter the new longitude.



Figure 71 Manual update: adding a point in the table

4. To finish editing, click anywhere in the chart view: the new point with the specified latitude and longitude is added to the table and to the chart view.

NOTE:

A point can only be added to the end of a line object. If you want to add a point to the beginning of an object, move the first point and then insert another point to the previous position of the first one.

To insert an object point:

1. To insert a point between two existing points of an area or a line object in the chart view, move the mouse pointer to the position on the line connecting the two points where you want to insert a new point: the insert indicator appears.
2. Left-click in the selected position: a new point is plotted in the chart view and added to the points table.



Figure 72 Manual update: inserting a point

NOTE:

A point can only be inserted between two existing points in the chart view.

To delete an object point:

1. To delete an object point, find the point in the points table and press its delete button : the point is deleted from the table and from the chart view.

NOTE:

A point can only be deleted in the table.

You cannot delete all points of an object: for an area object three points is the mandatory number; for line objects two points; and for point objects one point.

To apply geometry modifications:

1. After making all required modifications, press the Apply button: all modifications are applied, the object appearance in the chart view changes to display the modifications.
2. To exit without saving modifications, press Cancel.

3.8.8 Modifying objects: attributes

You can modify both newly added manual update objects and objects that are already in chart databases.

Modifying attributes involves the following operations:

- Selecting object to modify
- Changing values of object attributes
- Adding object attributes
- Deleting object attributes
- Saving changes

To select an object to modify:

1. Go to Main menu → Nav Data → Manual update → Modify feature: the modify object mode is switched on and the Modify object panel opens.
2. Select the object you want to modify in the chart view by right-clicking the object: all objects under the mouse pointer are listed in the panel.



Figure 73 Manual update: selecting objects to modify

3. Find the object you want to modify in the list and press the edit attributes button: the attribute edit panel opens.

To change value of an attribute:

1. Left-click twice in the attribute's Value field to make it editable or to open list values panel.

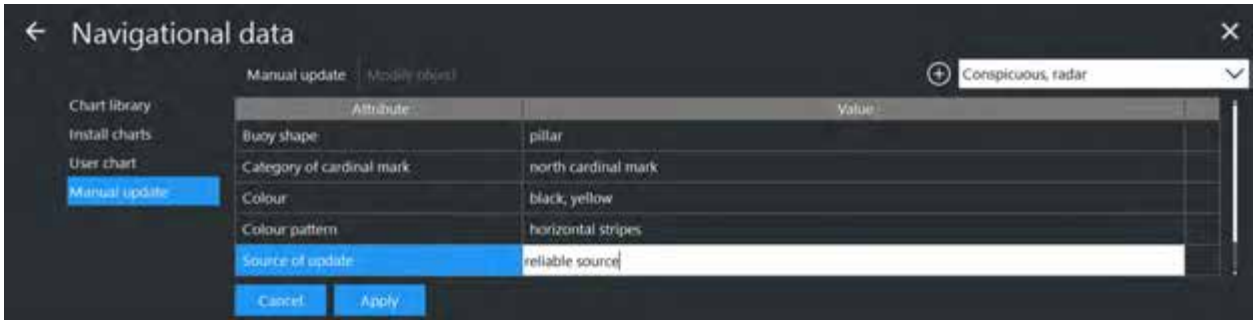


Figure 74 Manual update: changing attribute value

2. Enter/select a new value and left-click anywhere outside the field: the new value is applied to the attribute.

To add a new attribute:

1. Select the attribute type in the drop-down list in the upper-right corner of the panel.

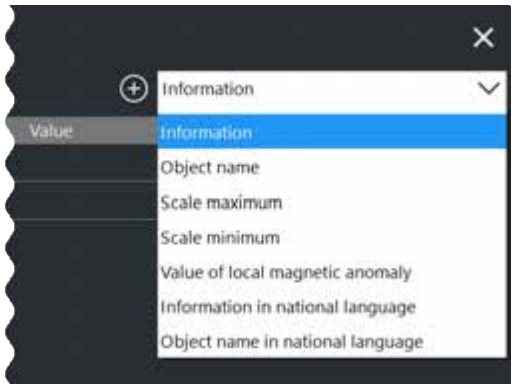


Figure 75 Manual update: adding new attribute

2. Press the add button: the new attribute is added to the attributes table.
3. Specify the attribute value.

To delete an attribute:

1. Find the attribute you want to delete and press its delete button: the attribute is removed from the attributes table.



Figure 76 Manual update: deleting attribute

2. Mandatory attributes cannot be deleted and do not have the delete button.

To apply attribute modifications:

1. After making all required modifications, press the Apply button: all modifications are applied, the object appearance in the chart view changes to display the modifications.
2. To exit without saving modifications, press Cancel.

3.8.9 Modifying objects: list attributes

List attributes are attributes that can have several values at the same time. When you select a list attribute to edit, the Listed values table opens where you can add required values and specify their priority.

To edit list attributes:

1. Click twice on a list attribute to open its Listed values table.



Figure 77 Manual update: Listed values table

2. To add a new value, double-click in the last line to make it editable and select the value in the drop-down list.
3. To change an existing value, double-click the value to make it editable and select a new value in the drop-down list.
4. To move a value up in the table, press its up button.
5. To move a value down in the table, press its down button.
6. To delete a value, press its delete button.
7. To save changes, press the Apply button: the Listed values table closes and you are back to the attribute edit panel.
8. To exit the Listed values table without saving changes, press the Cancel button: the Listed values table closes, and you are back to the attribute edit panel.

3.8.10 Modifying objects: delete

One of object update options can be deleting it.

If you apply this modification to an existing object from a chart database, it is not actually removed from the database: it changes its status. However, if you apply this update to an object added to the database

using the manual update function, this object will be deleted from the database.

To delete an object:

1. Go to Main menu → Nav Data → Manual update → Modify feature: the modify object mode is switched on and the Modify object panel opens.
2. Select the object you want to modify in the chart view by right-clicking the object: all objects under the mouse pointer are listed in the panel.
3. Find the object you want to delete in the list, press its delete button and confirm the operation.



Figure 78 Manual update: deleting objects

4. If it is a database object, its status changes to 'Deleted' and it is crossed in the chart view.



Figure 79 Manual update: deleting a database object

5. If it is a manual update object, it will be removed from the objects list as well as from the chart view.



Figure 80 Manual update: deleting a manual update object

3.8.11 Viewing manual updates history

To view history of manual updates:

1. Go to Main menu → Nav Data → Manual update → History: the History panel opens with the list of all manual updates applied to objects. Updates are grouped by datasets.

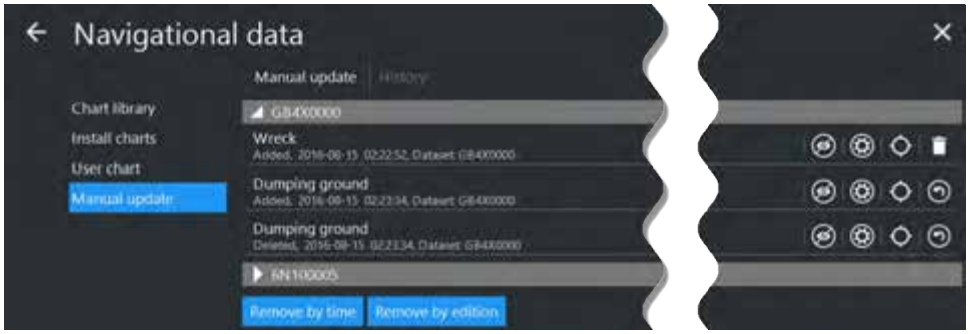


Figure 81 Manual update: history panel

2. To hide a manual update, press its show / hide button: the manually updated object is removed from the display.
3. To show a hidden manual update, press its show / hide button: the manually updated object appears in the chart view.
4. To edit a manual update, press its edit button: the Modify object panel opens.
5. To scroll the chart view to a manual update, press the go to button of the update: the chart view is scrolled to display the updated object in the center.
6. To revert a manual update, press its revert button and confirm the operation: the update is reverted together with all other manual updates applied to the same object.

3.8.12 Deleting and reverting manual updates

If manual updates were added to chart data as new objects, they can be deleted. If manual updates were applied to existing chart objects, they can be removed by reverting the objects to their initial state.

To delete or revert manual updates:

1. Go to Main menu → Nav Data → Manual update → History: the History panel opens with the list of all manual updates applied to objects.

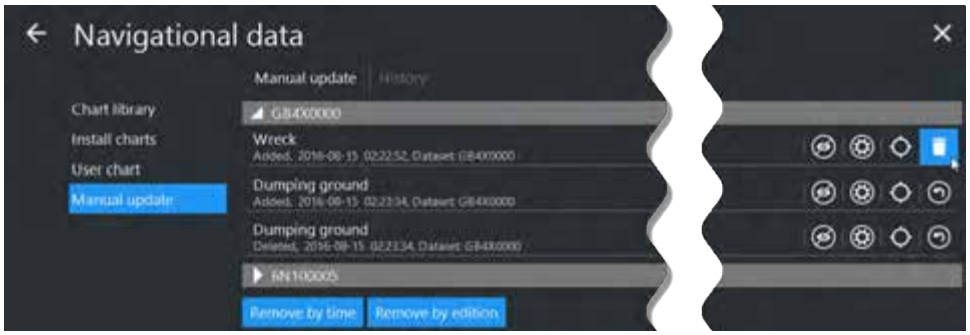


Figure 82 Manual update: deleting manual updates

2. To delete a manual update, find it in the list, press its delete button and confirm the operation: the manual update is deleted from the updates list as well as from the chart view.
3. To revert a manual update, find it in the list, press its revert button and confirm the operation: the manual update is deleted from the updates list as well as from the chart view together with all other manual updates applied to the same object.
4. To delete manual updates more than 90 days old, press the Remove by time button and confirm the operation: all updates created earlier than 90 days ago are deleted.
5. To delete manual updates applied to datasets with edition number less than now, press the Remove by edition button and confirm the operation: if the current edition of a dataset is newer than the edition to which manual updates were applied, manual updates are deleted from this dataset.

3.9 User Chart

Using the User chart function, you can add new objects to a separate worldwide dataset.

3.9.1 Creating a new user chart object

To create a new user chart object:

1. Go to Main menu → Nav Data → User chart: the User chart panel opens.



Figure 83 User chart panel

2. Select the Add object option: the Add object panel opens with the list of available object categories.

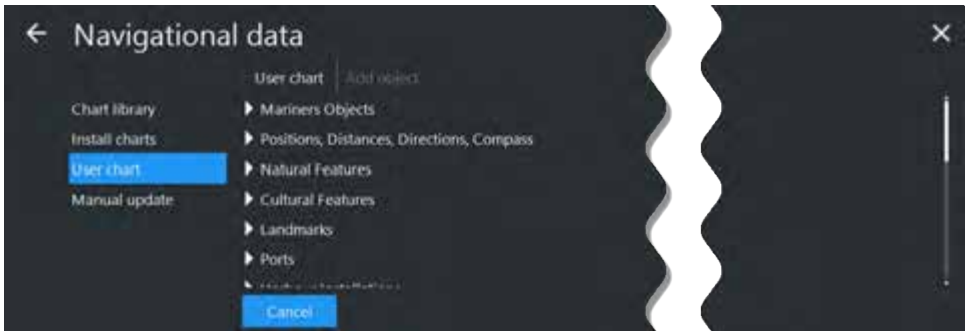


Figure 84 User chart: object categories

3. To expand a category, press the right arrow button near the category name: the list of objects opens.

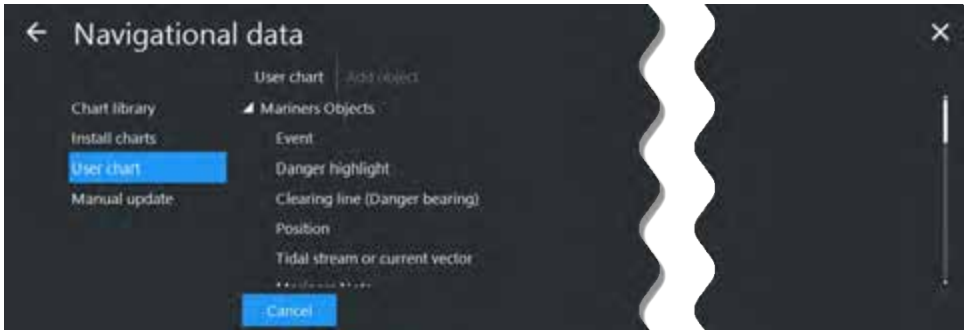


Figure 85 User chart: objects list

4. Select the object you want to add: the object is created, and the object options panel opens where you can start editing its geometry and attributes.



Figure 86 User chart: object editing options

5. To return to the list of objects, press Back.

3.9.2 Adding geometry

To add geometry to a newly created object:

1. Press the edit geometry button: the edit geometry panel opens.



Figure 87 User chart: edit geometry panel

2. Select the geometry type of the object in the Geometry type drop-down list in the upper-right corner of the panel.



Figure 88 User chart: geometry type

3. To plot an object's point in the chart view, left-click in the position where you want the point: it is added both to the chart and to the points table.
4. To add an object's point in the table, enter its coordinates to the last empty line of the table: double-click in the Latitude field to make it editable and enter the point's latitude, then double-click in the Longitude field and add the point's longitude. The point is added both to the table and to the chart view.



Figure 89 User chart: adding object points in the table

5. Add all required points and press Apply to save the object's geometry: the geometry is saved, and you are back to the object editing options panel.

3.9.3 Adding attributes

To add attributes to a newly created object:

1. Press the edit attributes button: the edit attributes panel opens where you can add attributes to the object.



Figure 90 User chart: attributes panel

2. Some objects have mandatory attributes: such attributes are already in the attributes table and cannot be removed, only edited.

3. To add a new attribute, select its type in the drop-down list in the upper-right corner of the panel and press the add button: the attribute line is added to the attributes table.

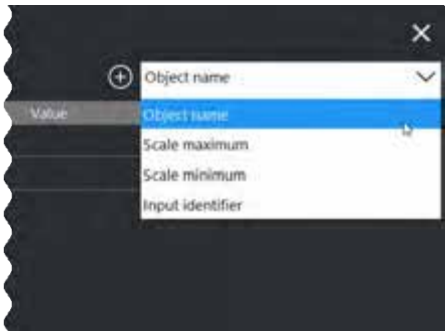


Figure 91 User chart: attribute types

4. To enter a value, double-click in the field to make it editable and enter or select the value.

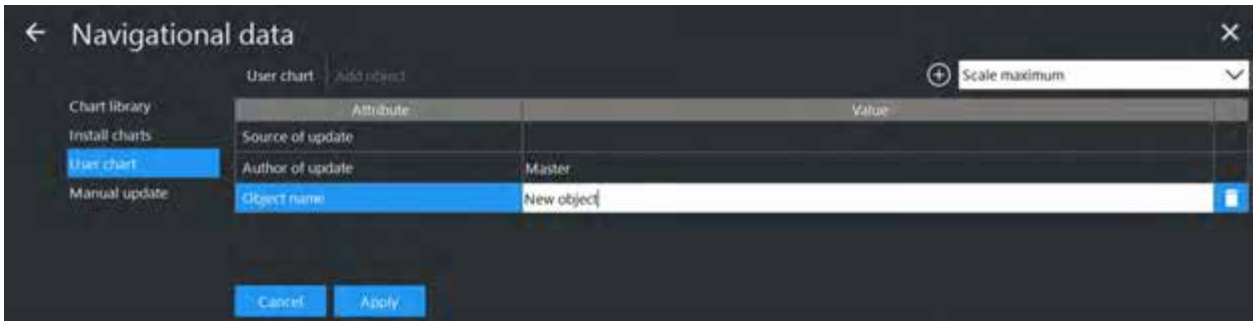


Figure 92 User chart: entering an attribute value

5. Add required attributes and attribute values and press Apply to save them: the attributes are saved, and you are back to the object editing options panel.
6. To cancel the operation, press Cancel.

3.9.4 Adding slaves

Objects serving as aids to navigation often have so-called slaves (lights, top marks and so on). When creating a user chart object, you can add as many slaves as necessary.

To add slaves to a user chart object:

1. Objects that can have slaves have an additional editing option: Slaves.

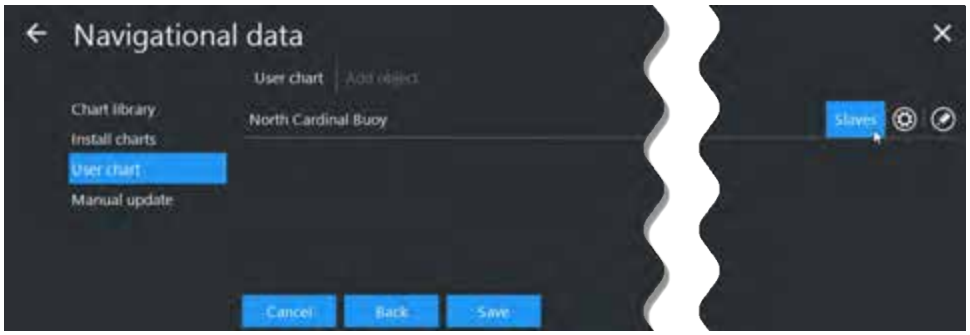


Figure 93 User chart: adding slaves

2. To add a slave, press the Slaves button: the slave editing panel opens.
3. Select the slave type in the drop-down list in the upper-right corner of the panel and press the add button: the slave editing options panel opens.

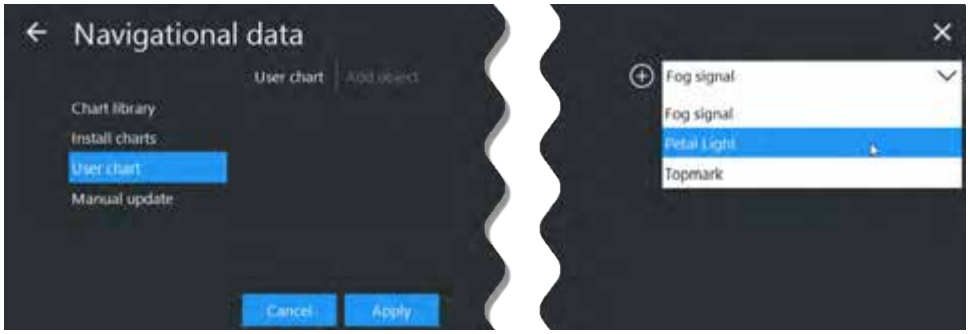


Figure 94 User chart: slave type

4. Add required attributes to the slave: see the procedure below.
5. Add required slaves and press Apply to save them: the slaves are saved, and you are back to the object editing panel.
6. To cancel the operation, press Cancel.

3.9.5 Adding slave attributes

To add slave object attributes:

1. Make sure you are in the slave editing object panel.
2. Press the edit attributes button: the slave attribute panel opens.



Figure 95 User chart: slave attributes

3. Mandatory attributes are already added to the attributes table and cannot be removed, only edited.
4. To add a new attribute, select the attribute type in the drop-down list in the upper-right corner of the panel and press the add button: the attribute is added to the table.

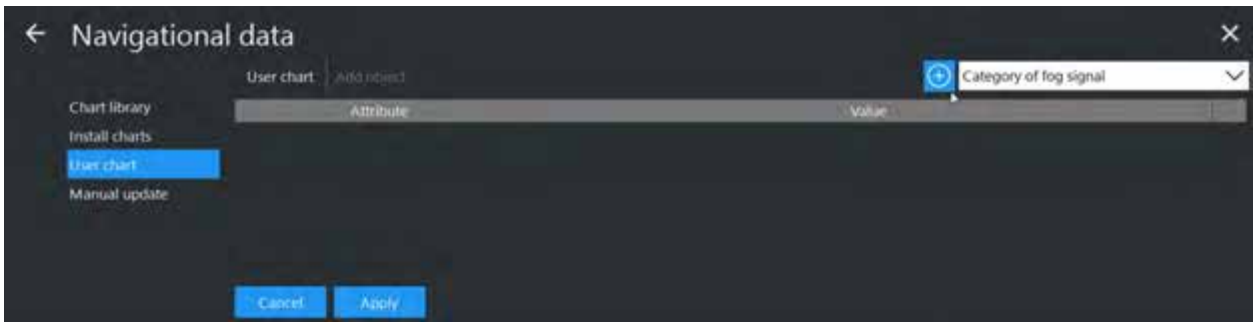


Figure 96 User chart: adding a new attribute

5. To enter a value, double-click in the field to make it editable and enter or select the value.



Figure 97 User chart: entering slave attribute value

6. Add required attributes and attribute values and press Apply to save them: the attributes are saved, and you are back to the slave editing options panel.
7. To cancel the operation, press Cancel.

3.9.6 Saving user chart objects

After adding geometry and all required attributes, save the user chart object.

To save a user chart object:

1. After adding and applying the object geometry and required attributes, you return to the object editing options panel.

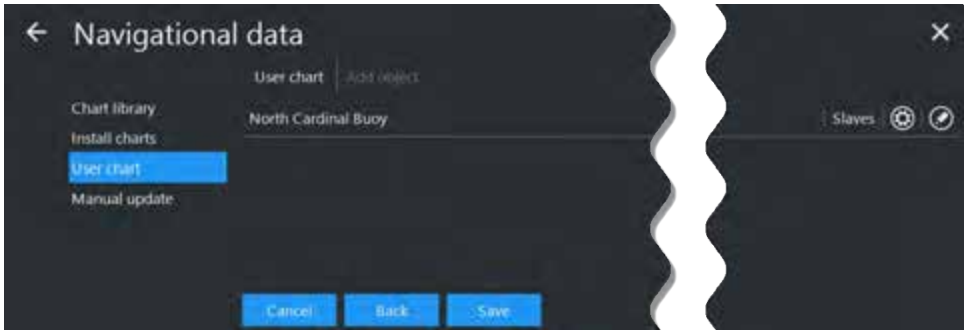


Figure 98 User chart: saving object

2. To save the object, press the Save button: the confirmation dialog opens.

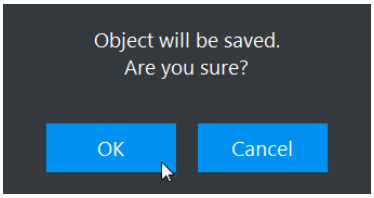


Figure 99 User chart: save object confirmation dialog

3. Confirm the operation: the object is saved to the database and its appearance in the chart view changes to display its attributes.



Figure 100 User chart: object before and after save

3.9.7 Modifying objects: geometry

You can only modify mariner objects and chart objects created using the User chart function. Database objects can only be modified using the Manual update function.

Modifying geometry involves the following operations:

- Selecting object to modify
- Moving object points
- Adding object points
- Inserting object points
- Deleting object points
- Saving changes

To select an object to modify:

1. Go to Main menu → Nav Data → User chart → Modify object: the modify object mode is switched on and the Modify object panel opens.
2. Select the object you want to modify in the chart view by right-clicking the object: all user chart objects under the mouse pointer are listed in the panel.



Figure 101 User chart: selecting objects to modify

3. Find the object you want to modify in the list and press the edit geometry button: the geometry edit panel opens.



Figure 102 User chart: geometry edit panel

To move an object point:

1. To move points of the object in the chart view, select the point you want to move by left-clicking it: the point is captured by the mouse pointer and moves around with it.
2. Move the point to a new position and left-click again to plot it there: the point is plotted in the new position and its coordinates are changed in the points table.



Figure 103 User chart: moving a point

3. To move a point using the points table, click twice in the Latitude field to make it editable and enter the new latitude; then click twice in the Longitude field to make it editable and enter the new longitude.
4. To finish editing click anywhere in the chart view: the new latitude and longitude are applied to the object's point, and it is moved in the chart view.

To add an object point:

1. To add a point to a line object in the chart view, left-click in the position where you want to plot the additional point: the point is plotted in the chart view and added to the table.

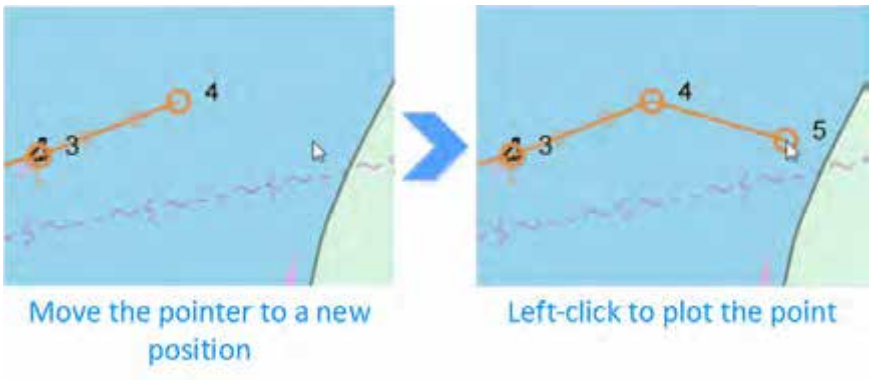


Figure 104 User chart: adding a point in the chart view

2. To add a point in the points table, scroll the table to the last empty line.

3. Click twice in the Latitude field to make it editable and enter the new latitude; then click twice in the Longitude field to make it editable and enter the new longitude.



Figure 105 User chart: adding a point in the table

4. To finish editing click anywhere in the chart view: the new point with the specified latitude and longitude is added to the table and to the chart view.

NOTE:

A point can only be added to the end of a line object. If you want to add a point to the beginning of an object, move the first point and then insert another point to the previous position of the first one.

To insert an object point:

1. To insert a point between two existing points of an area or a line object in the chart view, move the mouse pointer to the position on the line connecting the two points where you want to insert a new point: the insert indicator appears.
2. Left-click in the selected position: a new point is plotted in the chart view and added to the points table.



Figure 106 User chart: inserting a point

NOTE:

A point can only be inserted between two existing points in the chart view. You cannot do so in the table.

To delete an object point:

1. To delete an object point, find the point in the points table and press its delete button : the point is deleted from the table and from the chart view.

NOTE:

A point can only be deleted in the table.

You cannot delete all points of an object: for an area object three points is the mandatory number; for line objects two points; and for point objects one point.

To apply geometry modifications:

1. After making all required modifications, press the Apply button: all modifications are applied, the object appearance in the chart view changes to display the modifications.
2. To exit without saving modifications, press Cancel.

3.9.8 Modifying objects: attributes

You only can modify mariner objects and chart objects created using the User chart function. Database objects can only be modified using the Manual update function.

Modifying attributes involves the following operations:

- Selecting object to modify
- Changing values of object attributes
- Adding object attributes
- Deleting object attributes
- Saving changes

To select an object to modify:

1. Go to Main menu → Nav Data → User chart → Modify object: the modify object mode is switched on and the Modify object panel opens.
2. Select the object you want to modify in the chart view by right-clicking the object: all mariner objects under the mouse pointer are listed in the panel.



Figure 107 User chart: selecting objects to modify

3. Find the object you want to modify in the list and press the edit attributes button: the attribute edit panel opens.

To change value of an attribute:

1. Left-click twice in the attribute's Value field to make it editable or to open list values panel.

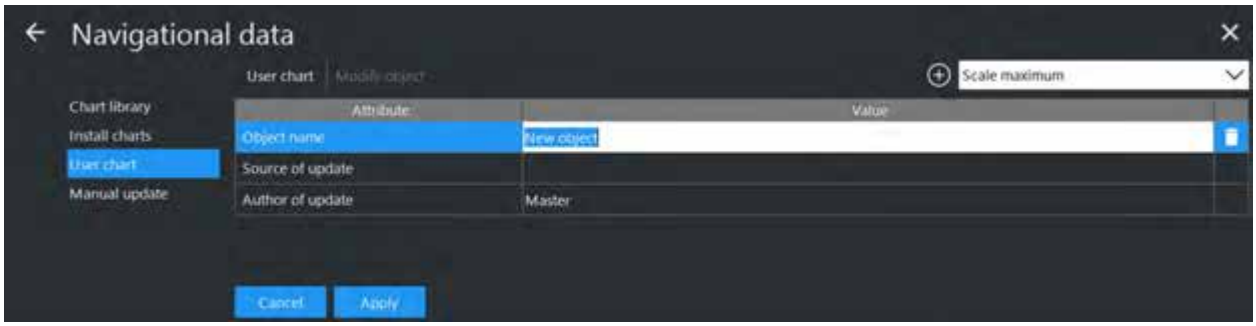


Figure 108 User chart: changing attribute value

2. Enter/select a new value and left-click anywhere outside the field: the new value is applied to the attribute.

To add a new attribute:

1. Select the attribute type in the drop-down list in the upper-right corner of the panel.

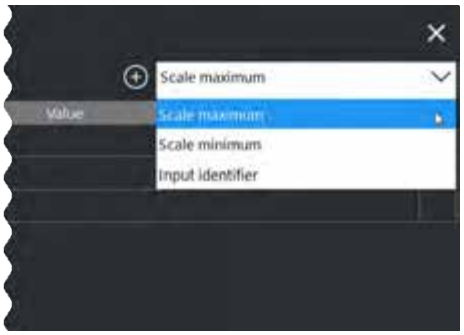


Figure 109 User chart: adding new attribute

2. Press the add button: the new attribute is added to the attributes table.
3. Specify the attribute value.

To delete an attribute:

1. Find the attribute you want to delete and press its delete button: the attribute is removed from the attributes table.



Figure 110 User chart: deleting attribute

2. Mandatory attributes cannot be deleted and do not have the delete button.

To apply attribute modifications:

1. After making all required modifications, press the Apply button: all modifications are applied, the object appearance in the chart view changes to display the modifications.
2. To exit without saving modifications, press Cancel.

3.9.9 Modifying objects: delete

One of object update options is to delete the object.

To delete a user chart object:

1. Go to Main menu → Nav Data → User chart → Modify object: the modify object mode is switched on and the Modify object panel opens.
2. Select the object you want to modify in the chart view by right-clicking the object: all user chart objects under the mouse pointer are listed in the panel.
3. Find the object you want to delete in the list, press its delete button and confirm the operation: the object is deleted from the objects list as well as from the chart view.



Figure 111 User chart: deleting objects

3.9.10 Viewing user chart objects history

To view history of user chart objects:

1. Go to Main menu → Nav Data → User chart → History: the History panel opens with the list of all created user chart objects.



Figure 112 User chart: history panel

2. User chart objects are divided into two categories: User chart and Chart objects. User chart objects are special objects that the mariners can create themselves and include Event, Danger highlight, Clearing line, Position, Tidal stream or current vector, Mariner's note, Mariner's feature, and Manufacturer's feature. Chart objects are common database objects created using the User chart function.
3. To expand a category, press its expand button . To collapse a category, press its collapse button .
4. To hide a mariner object, press its hide button: the object is removed from the display.
5. To show a hidden mariner object, press its show button: the object appears in the chart view.
6. To edit a mariner object, press its edit button: the editing options panel opens where you can edit the object's geometry and attributes.
7. To scroll the chart view to a manual mariner object, press the go to button of the object: the chart view is scrolled to display the object in the center.
8. To delete a mariner object, press its delete button and confirm the operation: the object is deleted.

3.9.11 Displaying user chart

If display of the user chart is turned on, you can see user chart objects in the chart view.

To turn on the display of the user chart:

1. Go to Main Menu → Layers → Chart overlays: the list of available chart overlays opens.
2. Set the User chart switch to the On position.



Figure 113 Layers – Chart overlays panel

3.9.12 Backing up user chart

The ECDIS provides the option of backing up the user chart to a file on a removable data storage device.

The application also makes an automatic back-up every time the user chart is modified. This back-up is stored on a local drive.

To back up the user chart to a file:

1. Go to Main menu → Nav Data → User chart: the User chart panel opens.
2. Select the Backup option: the Backup dialog opens with the list of available removable data storage devices.
3. Choose the drive to back up in the list of available drives and press OK: the user chart is saved to a file with the DB3 format.



Figure 114 User chart: Backup dialog

3.9.13 Restoring user chart

The ECDIS provides the option of restoring the user chart from a file. You can restore the user chart from a file on a removable storage device that was created during the back-up procedure, or from a local copy that the ECDIS creates and updates automatically.

To restore the user chart from a file:

1. Go to Main menu → Nav Data → User chart: the User chart panel opens.
2. Select the Restore option: the Restore dialog opens with the list of available user chart files stored both locally and on removable data storage devices.

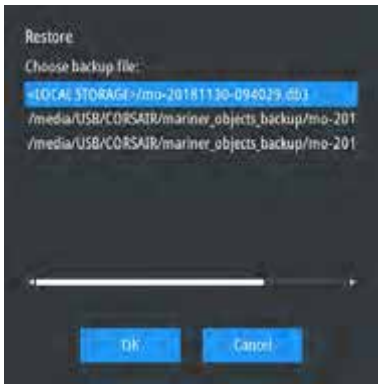


Figure 115 User chart: Restore dialog

3. Choose the file with the user database in the list of available files and press OK: the user chart is restored from the file.

NOTE:

The restored user chart overwrites the current user chart.

4 Charts

4.1 Zooming the Chart View

To zoom the chart using the mouse:

1. To zoom in the chart view, rotate the mouse wheel forward. OR press and hold the left mouse button and select an area down and right: the selected area is zoomed in to fill the chart view.
2. To zoom out the chart view, rotate the mouse wheel backward. OR press and hold the left mouse button and select an area up and left: the chart view is zoomed out to fill the selected area.

To zoom the chart using zoom in/zoom out buttons:

1. To zoom in the chart view, press the Zoom in button in the upper-left corner of the chart view: the scale is enlarged by a 1.5 scale factor.
2. To zoom out the chart view, press the Zoom out button in the upper-left corner of the chart view: the scale is reduced by a 1.5 scale factor.

To zoom the chart using standard scale options:

1. Press the scale indicator in the Status bar: the drop-down list of standard scale options opens.
2. Select a scale option in the drop-down list: the chart view is zoomed to the selected scale, and the standard scale options list closes.
3. To close the list without selecting a scale option, press Cancel.

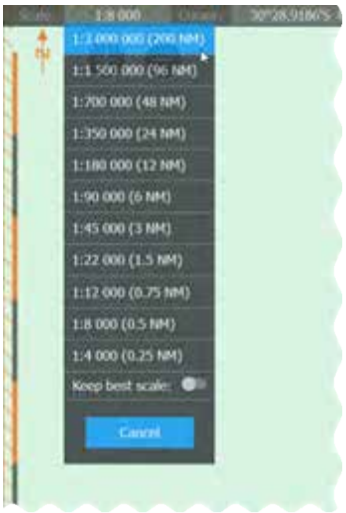


Figure 116 Standard scale options list

To zoom the chart using the Go to position function:

1. Press the cursor coordinates indicator in the Status bar: the Go to position window opens.

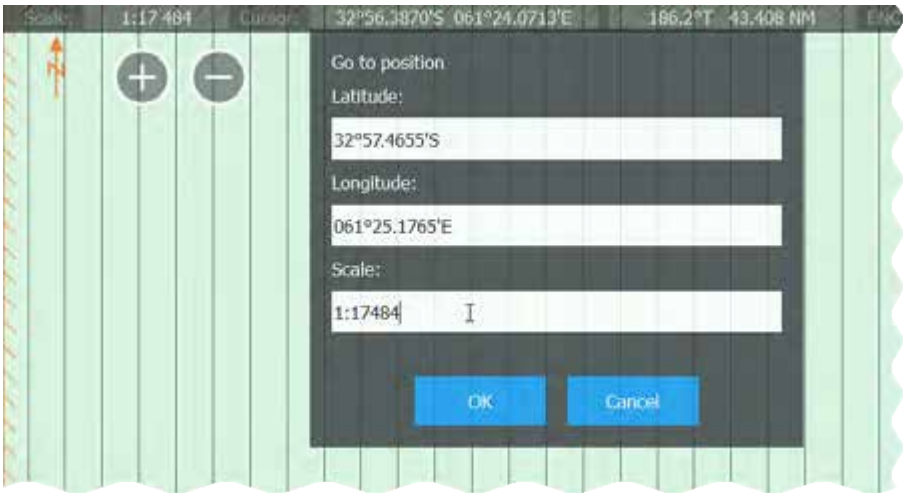


Figure 117 Standard scale options list

2. Enter a scale in the Scale field and press OK: the chart view is zoomed to the indicated scale.
3. To close the Go to position window without scrolling and zooming the chart view, press Cancel.

4.2 Scrolling the Chart View

To scroll the chart using the mouse:

1. Left-click a position in the chart and it will move to display the selected position in the center of the chart view.

To scroll the chart using the Go to position function:

1. Left-click the cursor coordinate indicator in the Status bar: the Go to position window opens.

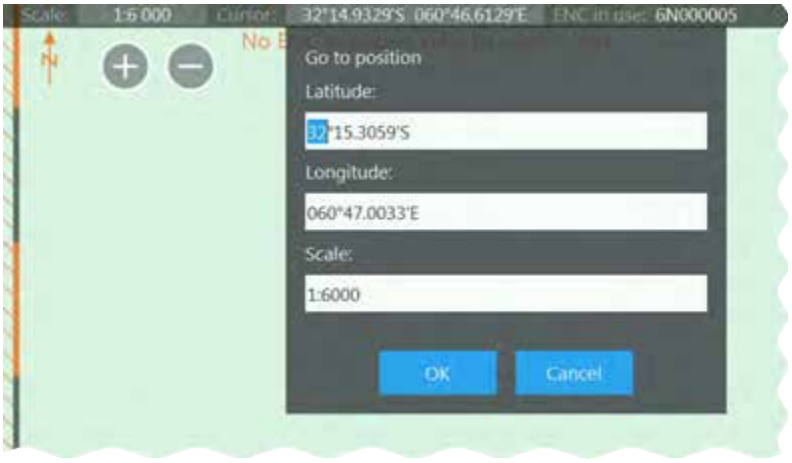


Figure 118 Go to position pane

2. Enter the latitude of the position to go to in the Latitude field.
3. Enter the longitude of the position to go to in the Longitude field.
4. Enter the scale to zoom the chart view to in the Scale field.
5. Press OK: the chart view is scrolled to display the specified position in the center of the screen at the specified scale, the Go to position pane closes.
6. To close the Go to position window without scrolling and zooming the chart view, press Cancel.

To scroll the chart in the graphics editing mode:

1. When editing graphic objects such as manual updates, routes, and so on in the chart view, a scroll chart control appears in the upper-left corner.

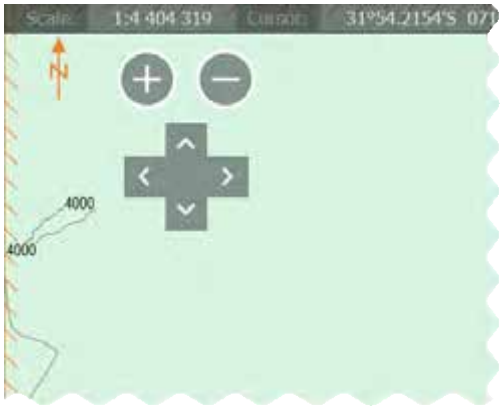


Figure 119 Scroll chart control for graphics editing mode

2. Press the arrow buttons to move the chart view in the direction of the selected arrow.

To scroll the chart using the trackball only (map pan):

1. During normal operation, it is possible to scroll the chart area just by moving the trackball.
2. The feature is activated by pressing and holding the CTRL button. Move the trackball to move the chart view in the direction, in which the trackball is moved. The cursor stays in the last position on the screen, and no other operations (e.g. ERBL measurement, route planning, etc.) are interrupted.
3. Release the CTRL button to resume normal use of the trackball.

4.3 Chart Portrayal Settings

4.3.1 Depth display setup

For safety reasons ECDIS provides the option of setting up portrayal of depths and depth areas so that it is more informative visually.

To set a depth portrayal setting:

1. Go to the Settings → Chart → Portrayal settings.
2. Set a value to the required setting.

3. The new setting is applied immediately.



Figure 120 Chart → Portrayal settings, Depth settings

The following depth portrayal settings are available:

- Shallow contour – Value set by the mariner and used by the ECDIS to distinguish between medium shallow (from the shallow to the safety contour) and very shallow (from the shallow to the 0 meter contour) waters if the "4 colors" mode is on.
- Safety contour – Value set by the mariner that is used by the ECDIS to select a "safety contour" from among the depth contours available in the SENC that is equal to or deeper than the value.



Figure 121 Safety contour is set to 10 meters

NOTE:

Safety contour to be used during the ECDIS operation is set by the ECDIS based on the value set by the mariner. It is a contour equal to the specified value or deeper than it if no equal depth contour is available.

Safety contour demarks the boundary between "safe-water" and shallow water with an extra wide isoline and is used to give an alarm if the ship crosses it.

- Deep contour – Value set by the mariner and used by the ECDIS to distinguish between medium deep (from the safety to the deep contour) and very deep (deeper than the deep contour) waters if the "4 colors" mode is on.
- Safety depth – Value set by the mariner – e.g. the ship's draft plus under keel clearance – that is used by the ECDIS to portray soundings as black if they are equal to or more shallow than the value, and grey if they are deeper.

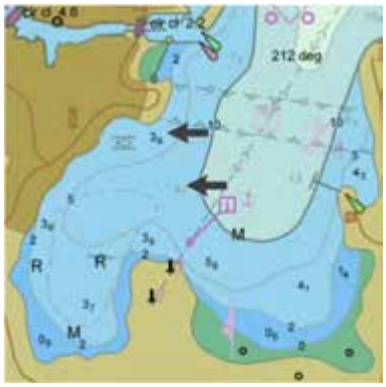


Figure 122 Safety depth is set to 6 meters

- Color mode
  - Select the "2 color" mode to have two depth areas filled with two colors: unsafe water (from the 0-meter contour to the safety contour) and safe water (from the safety contour and deeper);
  - Select the "4 color" mode to have four depth areas filled with four colors: very shallow area (from the 0 meter contour to the shallow contour), medium shallow area (from the shallow contour to the safety contour), medium deep area (from the safety contour to the deep contour), and very deep area (from the deep contour and deeper).

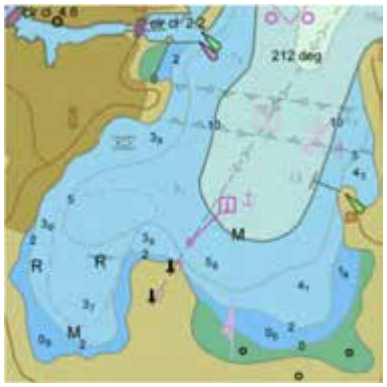


Figure 123 Color mode "4 colors"



Figure 124 Color mode "2 colors"

- Shallow pattern – Fills the shallow area from the coastline to the safety contour with a special pattern.

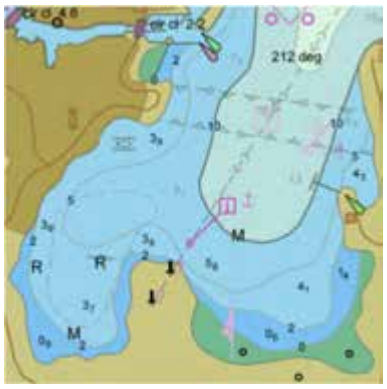


Figure 125 Shallow pattern off

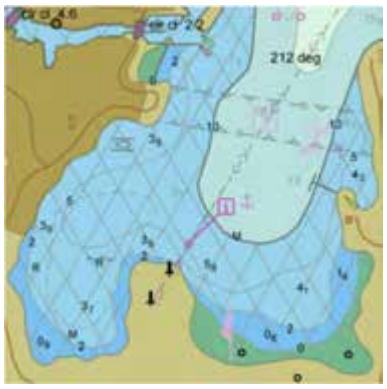


Figure 126 Shallow pattern on

4.3.2 Chart symbol size

In the ECDIS, you can select the size of chart symbols. Five options are available: extra small, small, medium, large, and extra-large.

To select a chart symbol size:

1. Go to the Settings → Chart → Portrayal settings.
2. Select a value in the Chart symbol size drop-down list.
3. The new setting is applied immediately.

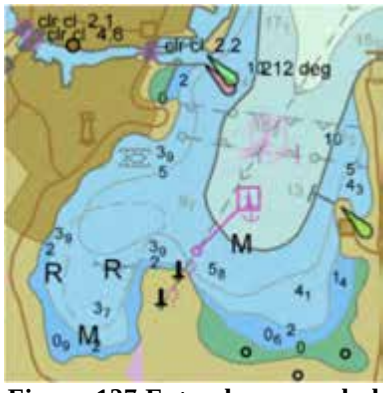


Figure 127 Extra-large symbol size

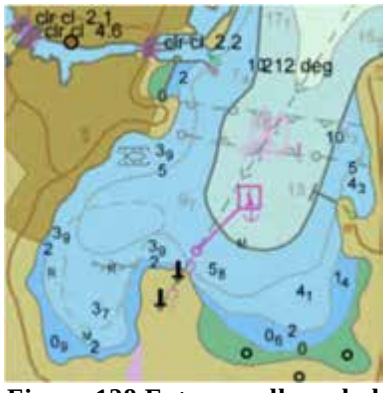


Figure 128 Extra small symbol size

4.3.3 Portrayal style

Along with the S52 portrayal style, the ECDIS provides the INT1 portrayal style where chart symbols are displayed as required in the *Specifications* of the International Hydrographic Organization.

To select a portrayal style:

1. Go to the Settings → Chart → Portrayal settings.
2. Select a value in the Portrayal style drop-down list.
3. The new setting is applied immediately.

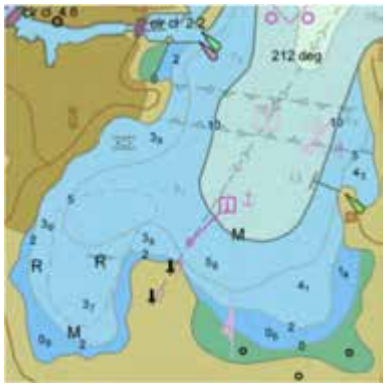


Figure 129 S52 portrayal style



Figure 130 INT1 portrayal style

4.3.4 Symbolized boundaries

The ECDIS provides the option of turning symbolized boundaries off and displaying plain boundary lines instead.

This is only available for the S52 portrayal style.

To turn symbolized boundaries on/off:

1. Go to the Settings → Chart → Portrayal settings.
2. Set the Symbolized boundaries switch to the On or Off position, as necessary.
3. The new setting is applied immediately.



Figure 131 Symbolized boundaries On



Figure 132 Symbolized boundaries Off

4.3.5 Paper chart symbols

In the ECDIS, you can use paper chart symbols for navigation aids instead of simplified symbols.

This is only available for the S52 portrayal style.

To turn paper chart symbols on/off:

1. Go to the Settings → Chart → Portrayal settings.
2. Set the Paper chart symbols switch to the On or Off position, as necessary.
3. The new setting is applied immediately.

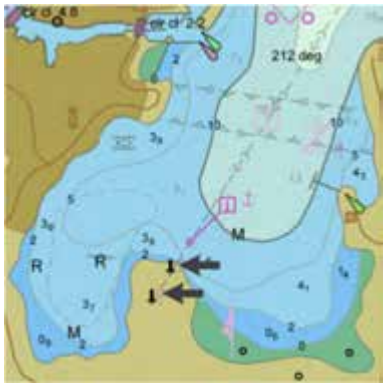


Figure 133 Paper chart symbols On



Figure 134 Paper chart symbols Off

4.3.6 Danger symbol

In the ECDIS, you can replace symbols for isolated dangerous objects with a special danger symbol .

To turn the display of danger symbol on/off:

1. Go to the Settings → Chart → Portrayal settings.
2. Set the Danger symbol switch to the On or Off position, as necessary.
3. The new setting is applied immediately.



Figure 135 Danger symbol On



Figure 136 Danger symbol Off

4.3.7 Scale min

In the ECDIS, you can select to use or not to use the SCAMIN attribute of objects. If the setting is on, the ECDIS hides objects with the SCAMIN attribute when the display scale is less than the attribute value.

To turn the use of the SCAMIN attribute on/off:

1. Go to the Settings → Chart → Portrayal settings.
2. Set the Scale min switch to the On or Off position, as necessary.
3. The new setting is applied immediately.

4.3.8 Full light lines

The ECDIS provides the option of turning on the display of light sector legs in real length.

To turn the display of light sector legs in real length on/off:

1. Go to the Settings → Chart → Portrayal settings.
2. Set the Full light lines switch to the On or Off position, as necessary.
3. The new setting is applied immediately.



Figure 137 Full light lines off

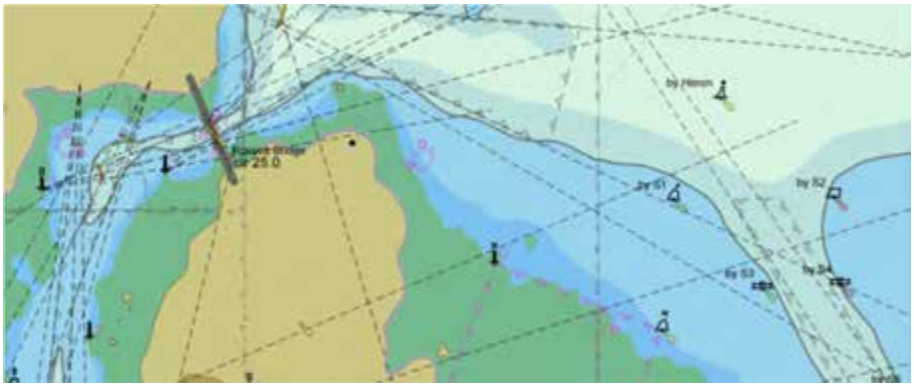


Figure 138 Full light lines on

4.3.9 Leg activation scale

The ECDIS provides the option of highlighting light sectors within a specified radius from the own vessel.

To turn the light highlight option on/off and to set up the option:

1. Go to the Settings → Chart → Portrayal settings.
2. To turn the function on, select a scale option in the Leg activation scale drop-down list: light highlight options appear in the panel. Light sectors are highlighted in the chart view if the scale is larger or equal to the specified leg activation scale.



Figure 139 Leg activation scale controls

3. Specify the light distance in the Light distance field: all lights are processed within the specified distance from the own vessel.
4. Specify the distance from leg in the Distance from leg field: if the distance between the own vessel and a light sector is within the specified value, the light sector is highlighted.
5. To display flashing circles indicating lights, set the Show light flashing circle switch to the On position.
6. Specify the opacity of light sectors highlight in the Light sector highlight opacity field: the value should be in the range of 0 (transparent) to 1 (opaque).
7. To turn the function off, open the Leg activation scale drop-down list and select the Deactivated option.

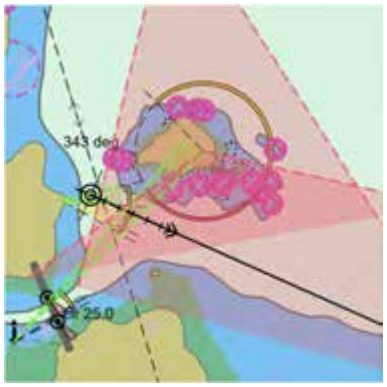


Figure 140 Leg activation On



Figure 141 Leg activation Off

4.3.10 Chart underscaling

The ECDIS provides the option of displaying chart information at a display scale smaller than the chart compilation scale.

By default, the ECDIS provides an automatic underscaling of 60 %, which causes a chart object's visibility at a scale 60 % smaller than its chart's compilation scale. For instance, with a chart compilation scale of 1:25000, objects will be visible down to 1:40000.

In addition to the above, it is possible for the mariner to exceed the default underscaling with up to 150 %, which causes a chart object's visibility at a scale 210 % smaller than its chart's compilation scale. For instance, with a chart compilation scale of 1:25000, objects will be visible down to 1:77500.

To turn the underscaling on/off and adjust the value:

1. Go to the Settings → Chart → Portrayal settings.
2. Set the Chart Underscaling switch to the On or Off position, as necessary.
3. Use the slider to adjust the underscaling percentage or set the value to the required setting.

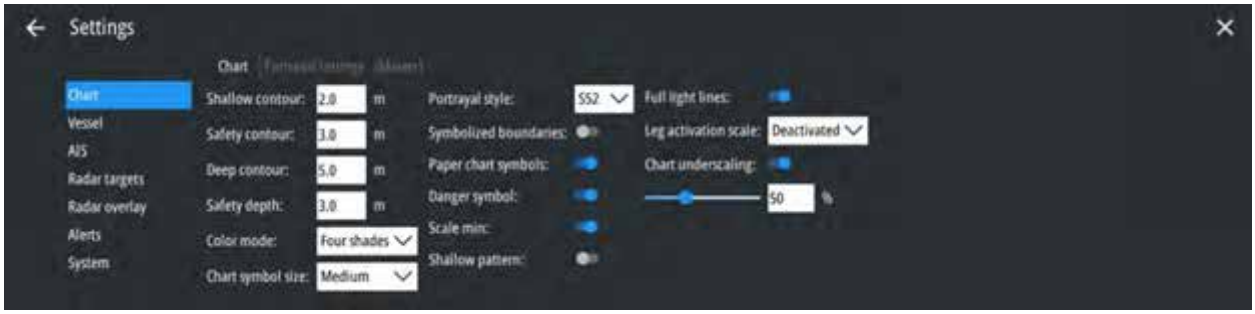


Figure 142 Chart underscaling set-up

4. The chart underscaling option is also available in the shortcuts tab (Main menu → Shortcuts), but here, it is only possible to switch the setting on or off, not to adjust the underscaling percentage.

NOTE:

If chart underscaling is enabled, a notice appears in the notices area in the chart view notifying "Underscaling: XX %"

4.4 Chart Display Mode and Chart Objects

4.4.1 Display mode

The ECDIS provides the option of selecting a display mode to have a required level of detail applied to the chart display. There are three preset display modes available: Base, Standard, and Full, as well as the Custom display mode, which the user can customize.

To set a display mode:

1. Go to the Settings → Chart → Chart objects.

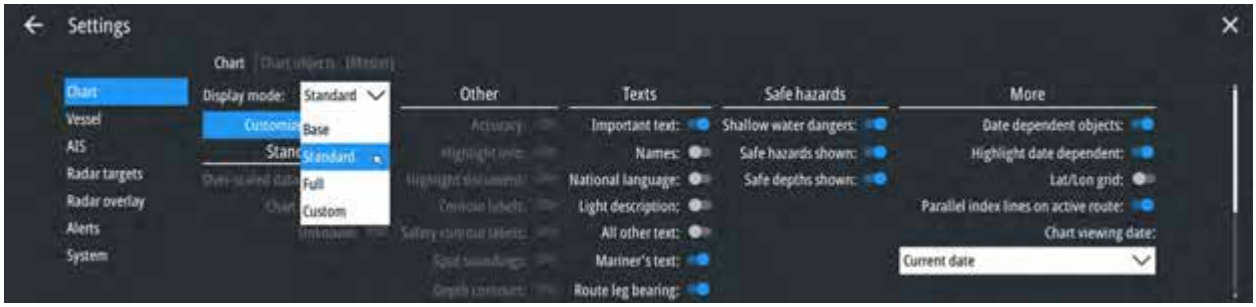


Figure 143 Chart display mode set-up

2. Select a required display mode in the Display mode drop-down list.
3. The new setting value is applied immediately.

NOTE:

Display modes are indicated with the Display mode icon BASE *in the upper-right corner of the chart view.*

Press the icon to switch to the Standard display.

The following display modes are available:

- Base – The Base display is the part of the Standard Display, which should be permanently retained on the display. It consists of coastline (high water); the own ship's safety contour, to be selected by the mariner; indication of isolated underwater dangers of depths less than the safety contour which lie within the safe waters defined by the safety contour; indication of isolated dangers which lie within the safe water defined by the safety contour such as bridges, overhead wires, etc., and including buoys and beacons whether or not these are being used as aids to navigation; traffic routing systems; scale, range, orientation and display-mode; units of depth and height.
- Standard – The Standard display is the default display mode used by the ECDIS. The Standard display consists of the Base display; drying line; indication of fixed and floating aids to navigation; boundaries of fairways, channels, etc.; visual and radar conspicuous features; prohibited and restricted areas; chart scale boundaries; indication of cautionary notes.
- Full – The Full display shows the chart information in full. The Full display type has no mandatory chart presentation parameters.
- Custom – The Custom display shows the chart information in full, but it also allows hiding/displaying all object types provided in the Chart objects panel. The ECDIS remembers the configuration of object types and uses it for next sessions.



Figure 144 Base display type



Figure 145 Standard display type

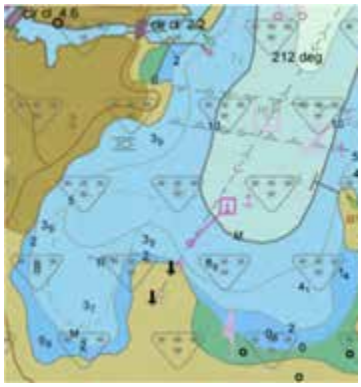


Figure 146 Full display type

4.4.2 Chart objects set-up

The ECDIS allows the displaying/hiding some types of chart objects. For preset display modes (Base, Standard, Full), a limited number of object types to customize is available. For the Custom display mode, all object types provided in the Chart objects panel are available.

To hide/display chart objects:

1. Go to the Settings → Chart → Chart objects.



Figure 147 Chart object settings

2. To display objects of a specified type, set its switch to the On position.
3. To hide objects of a specified type, set its switch to the Off position.

NOTE:

The hide/display option for an object type can have the following states:



On/Enabled – Objects of the type are displayed in the chart view; you can hide the objects.



Off/Enabled – Objects of the type are hidden; you can display the objects.



On/Disabled – Objects of the type are displayed in the chart view; you cannot hide the objects.



Off/Disabled – Objects of the type are hidden; you cannot display the objects.

The following object type groups are available:

- Base – Object types included in the Base display. The group contains only one object type; it is enabled only when the Custom Display mode is set.
- Standard – Object types included in the Standard display. All object types from the group are enabled only when the Custom Display mode is set.
- Other – Object types included in the Full display. All object types from the group are enabled only when the Custom display mode is set except for the Hide off-season objects and Lat/Lon grid types, which are enabled when the Base or Standard Display mode is set.
- Texts – Text objects. All object types from the group are only enabled when the Custom display mode is set.
- Safe hazards – Objects indicating dangerous objects and soundings. All object types from the group are enabled in the Standard, Full and Custom display modes.

4.4.3 Customizable Base chart objects

Objects from this group are always displayed in the Base, Standard and Full display mode, and can only be hidden in the Custom display mode.

Chart objects included in the Base display:

- Non-official boundary – Boundary of non-official charts.



Figure 148 Non-official boundary on



Figure 149 Non-official boundary off

4.4.4 Customizable Standard chart objects

Objects from this group are always displayed in the Standard and Full display mode and are always hidden in the Base display mode. They can only be customized in the Custom display mode.

Chart objects included in the Standard display:

- Over-scaled data indicator – A special pattern (vertical stripes) applied to the chart or to the part of it that is over-scaled (the chart display scale is twice its original scale).

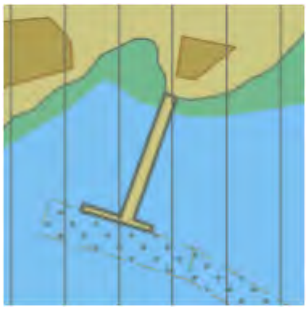


Figure 150 Over-scaled data indicator on



Figure 151 Over-scaled data indicator off

- Chart boundary – Boundary of adjacent datasets.



Figure 152 Chart boundary on



Figure 153 Chart boundary off

- Unknown -- Displays/hides objects of unknown code or with unknown attributes.

4.4.5 Customizable Other chart objects

Objects from this group are always displayed in the Full display mode and are always hidden in the Base and Standard display mode. They can only be customized in the Custom display mode.

Chart objects included in the Full display:

- Accuracy – A special symbol indicating the accuracy of the electronic chart.

  The accuracy symbols correspond to so-called confidence zones. There are six categories of the confidence zones. The categories are defined by the quality of survey; in particular by the positional accuracy, the depth accuracy, the seafloor coverage and typical survey characteristics. The categories are the following (in brackets the position accuracy is given as an example): A1 (5m), A2 (20m), B (50m), C (500m), D (worse than 500m) and U (data not assessed).
  To find out the category of the zone of confidence, open the Object information panel with a right-click in the chart view, open the chart legend and find the “Quality of data” parameter.



Figure 154 Quality of data indicator on



Figure 155 Quality of data indicator off

- Highlight info – A special symbol indicating that a chart object has some additional information encoded. To access the information, open the Object information panel with a right-click on the object with the information indicator and view the “Information” attribute.



Figure 156 Highlight info on



Figure 157 Highlight info off

- Highlight document – A special symbol indicating that a chart object has some additional information encoded as a separate file. To access the information, open the Object information panel with a right-click on the object with the document indicator and view the “Textual description” or “Picture” attribute.
- Contour labels– Displays/hides labels on all depth contours except the safety contour.



Figure 158 Contour labels on



Figure 159 Contour labels off

- Safety contour labels– Displays/hides labels on the safety contour.

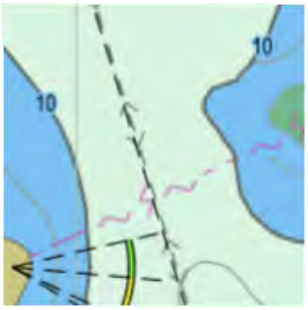


Figure 160 Safety contour labels on

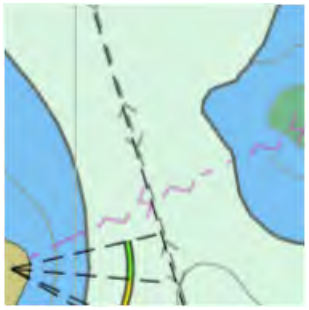


Figure 161 Safety contour labels off

- Spot soundings – Spot soundings.



Figure 162 Spot soundings on



Figure 163 Spot soundings off

- Depth contours – All depth contours.



Figure 164 Depth contours on



Figure 165 Depth contours off

- Seabed – Nature of seabed, springs, sea weed, fish havens, fishing stakes, non-dangerous rocks, wrecks, and obstructions.



Figure 166 Seabed on



Figure 167 Seabed off

- Cables, pipelines – Submarine cables and pipelines.

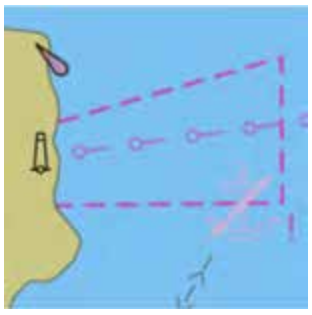


Figure 168 Cables, pipelines on

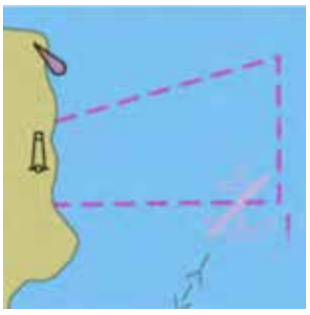


Figure 169 Cables, pipelines off

- Port features – Harbor types, customs check points, distance marks, berthing facilities, berth numbers, mooring facilities, gates, dry docks, cranes, gridirons.

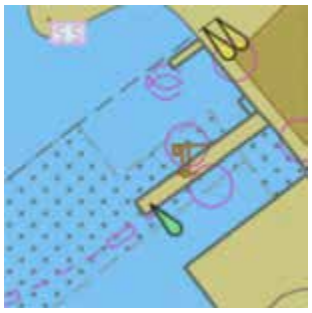


Figure 170 Port features on

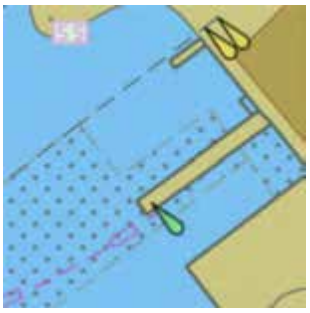


Figure 171 Port features off

- Magnetic variation – An area object containing information about magnetic variation in a geographical area.
- Administrative areas – continental shelf, harbor areas, free port areas, customs zones, fishery zones, contiguous zones, exclusive economic zones, national territorial areas, territorial seas, territorial sea baselines, administration areas.

4.4.6 Texts

Objects from this group are always displayed in the Full display mode and are always hidden in the Base and Standard display mode. They can only be customized in the Custom display mode.

Chart objects that can be displayed/hidden:

- Important texts – Texts with the category “important”: vertical clearance of bridges, overhead cables, pipes or conveyors, bearing of navigational lines, recommended routes, deep water route centerline lines, recommended tracks, names and communications channels of radio calling-in points.



Figure 172 Important texts on



Figure 173 Important texts off

- Names – Names of geographical objects such as countries, cities, islands, and so on. Names or numbers of buoys, beacons, day marks, light vessels, floating lights, offshore platforms.



Figure 174 Names on

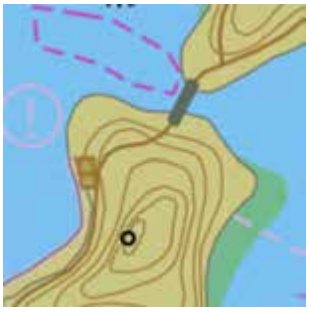


Figure 175 Names off

- National language – Displays/hides names in national language.
- Light description – Light characteristics displayed near the lights.



Figure 176 Light description on



Figure 177 Light description off

- All other text – Notes on chart data or nautical publications, nature of seabed, values of magnetic variation and swept depths, heights of islets and land features, berth numbers.



Figure 178 All other texts on



Figure 179 All other texts off

- Mariner's text – Text related to mariners' objects.
- Route leg bearing – Bearing indication on route legs.

NOTE:

If you cannot display some text, make sure that chart objects to which the text belongs are displayed.

4.4.7 Safe hazards

Objects from this group are always hidden in the Base display mode, and can be customized in Standard, Full and Custom display type modes.

Chart objects that can be displayed/hidden:

- Shallow water dangers – The danger symbol can be used to highlight isolated dangerous objects which lie in unsafe shallow waters between the safety contour and the drying line.



Figure 180 Shallow water dangers on



Figure 181 Shallow water dangers off

NOTE:

In the Standard display mode, dangers in shallow waters are not displayed by default. However, if you turn this option on, the 'safe' dangerous objects appear in the chart and are displayed as isolated danger symbols.

This option is provided If you are forced to navigate in waters shallower than the safety contour shown on the display.

- Safe hazards shown– You can hide or display hazardous objects that are not dangerous to the own vessel.



Figure 182 Safe hazards shown on



Figure 183 Safe hazards shown off

- Safe depths shown– You can hide or display soundings that are not dangerous to the own vessel (deeper than the specified safety depth).



Figure 184 Safe depths shown on



Figure 185 Safe depths shown off

4.4.8 More customizable objects

Objects from this group can be customized in all display modes.

Chart objects that can be displayed/hidden:

- Date dependent objects – Seasonal objects are objects that are active only at specific periods during the year. The ECDIS allows them to be hidden during periods when these objects are inactive, and to be displayed only when they are active. To do so, set the Date dependent objects setting to the On position.

  NOTE:

  When the property is off and inactive seasonal objects are displayed in the chart view, an indicator appears in the upper-right corner of the chart view saying: "Seasonal objects displayed. Information displayed may be incorrect for the present date and time".

- Highlight date dependent – Shows a special symbol indicating date dependent objects.



Figure 186 Highlight date dependent on



Figure 187 Highlight date dependent off

- Lat/Lon grid – Latitudes and longitudes grid.
- Parallel index lines on active route – Parallel index lines on active routes.
- Chart viewing date -- Specifies the date for display of date-dependent objects. To set the current date, select the Current option in the drop-down list. To set another date, select the Set date option and enter a date into the Viewing date field that appears. To set a date range, select the Set date range option in the drop-down list and enter a start date into the Start viewing date field and the end date into the End viewing date field.

4.4.9 Custom display mode

When in the Custom display mode, you can customize chart display and select to display or hide any type of chart objects.

To customize chart display:

1. Go to the Settings → Chart → Chart objects and press the Customize display button: the Customize display dialog opens. Here you can select chart objects to be displayed.

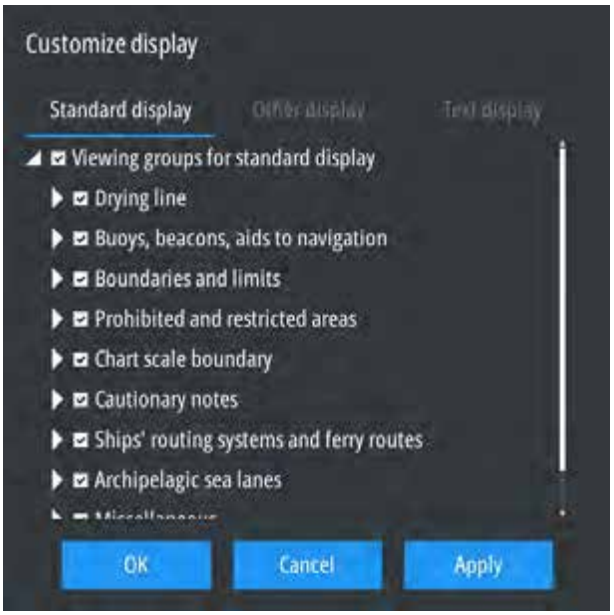


Figure 188 Customize display dialog

2. Objects are grouped into Standard, Other, and Text displays: to switch between display groups, select the group you need at the top of the panel.
3. To expand a group of objects, press the arrow next to the group name. To collapse, press the arrow once more.
4. To add an object or a group of objects to display, tick its check box.
5. To remove an object or a group of objects from display clear its check box.
6. To apply changes, press the Apply button.
7. To cancel the operation, press the Cancel button.

4.5 Objects under Mouse Pointer

4.5.1 Object information

To get information about objects in the chart, use the Object Information function.

To get information about an object on the chart:

1. Right-click the object in the chart view: the Object Information panel opens. Coordinates of the point are displayed in the upper-right corner of the panel. Objects are divided into categories:
   a) Charts – information about charts under mouse pointer, chart legend;
   b) Chart objects – information about objects under mouse pointer;
   c) Vessels – information about vessels under mouse pointer (own vessel, AIS and radar targets).



Figure 189 Object information panel

2. To expand a category, press its expand button.

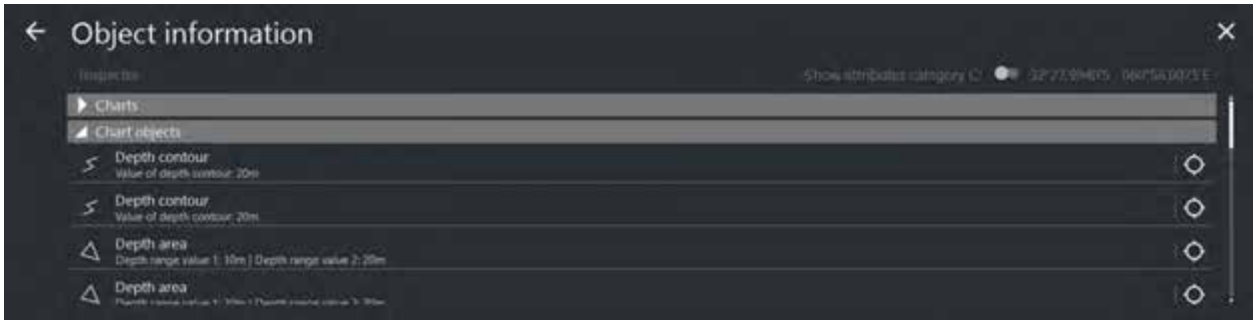


Figure 190 Object information, Chart objects

3. Find the object in the objects list and select it to open detailed information.

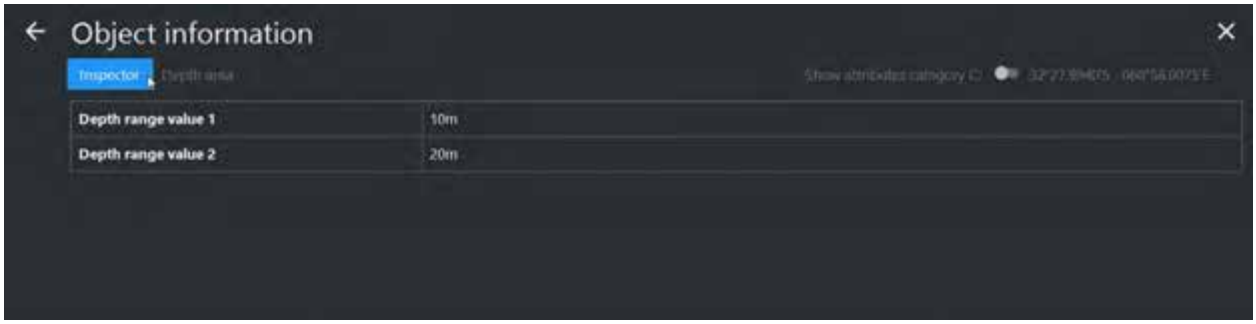


Figure 191 Object information panel, detailed information of a selected object

4. To display attributes of category C (RECDAT, RECIND, SORIND, SORDAT) in the detailed information panel, set the Show attributes category C switch to the On position.
5. To return to the objects inspector, press Inspector.
6. To highlight an object on the chart, press the go to button.
7. If an object has additional information as a *.TXT file, a book button appears in the object's line: press the button to view the text information in a separate window. To close the text information window, press the Close button.
8. If an object has additional information as an image, a picture button appears in the object's line: press the button to view the image in a separate window. To close the image window, press the Close button.
9. To close the Object information panel, press its back button: the ECDIS opens the previously opened panel.

4.5.2 Info mode

The ECDIS allows to display information about some chart objects, AIS/radar targets and route's waypoints in so-called "hover-over" manner.

When this mode is enabled tooltip with information appears near the cursor while it is located over the object in question.

To enable and disable Info mode:

1. To enable Info Mode, press the "Info mode" indicator in the "Indicators panel" area or enable "Show on map" parameter in Settings -> Chart -> Map info panel.

2. When Info Mode is active, The “Info mode” indicator will display a green light  to show that the tool is active.
3. When the cursor is moved over a chart object/target/route’s waypoint, a tooltip with information about the object under the cursor appears after a couple of seconds. The left column of the tooltip contains object type (“AIS”, “Radar”, “Route” or “Chart”), and the right column contains object attributes with values (e.g. chart object name, “CPA/TCPA”, etc.)

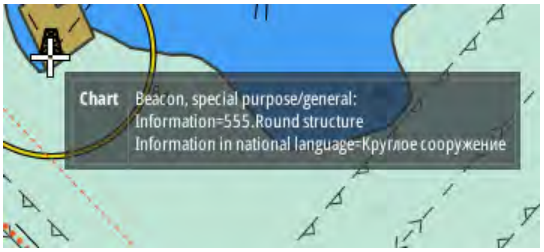


Figure 192 Info mode tooltip

4. Presentation of information about particular object types in the tooltip can be disabled in Settings -> Chart -> Map info panel.

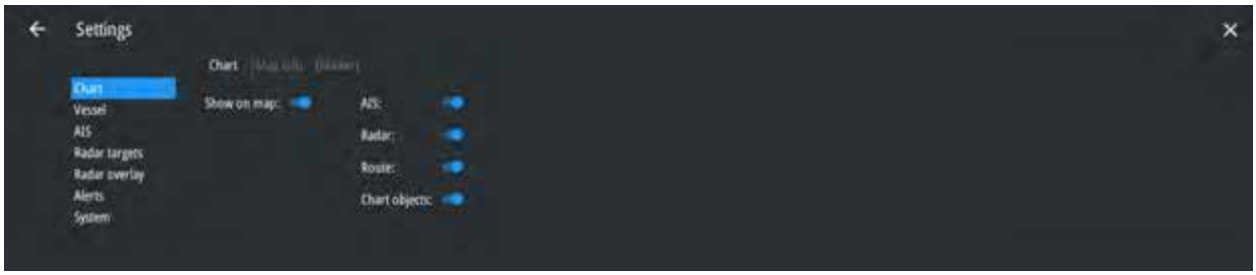


Figure 193 Info mode: enabling and disabling object types

5. The tooltip will disappear immediately after the cursor is moved, or 10 seconds after the tooltip appeared.
6. To disable Info mode, press the “Info mode” indicator in the “Indicator panel” area or disable “Show on map” parameter in Settings -> Chart -> Map info panel.

To get information about AIS/Radar targets:

1. Enable Info mode.
2. Enable the appropriate parameter in Settings -> Chart -> Map info panel.
3. Move the cursor over any displayed target. CPA/TCPA, COG/SOG and BRG/DST information will be available.

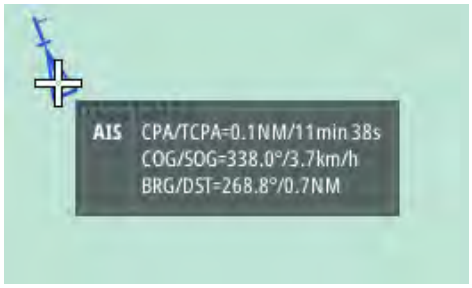


Figure 194 Tooltip for AIS target

If any parameter has no value, the word “missing” is displayed.

If there are more than 1 target of the same type under the cursor (e.g. 2 AIS targets), the text “There are more than 1 target under the cursor. Please, change cursor location or chart scale” is displayed.

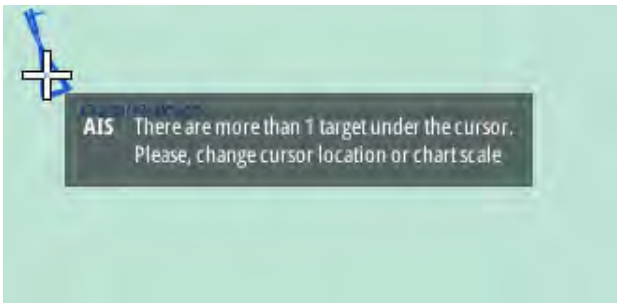


Figure 195 Tooltip for more AIS targets

If there are 2 targets of different types (1 AIS and 1 Radar) under the cursor, the appropriate parameters are displayed.

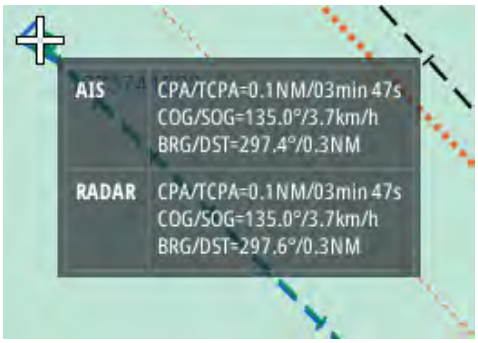


Figure 196 Tooltip for AIS and RADAR targets

To get information about Route waypoints:

1. Enable Info mode.
2. Enable the appropriate parameter in Settings -> Chart -> Map info panel.
3. For the route currently in Voyage mode, move the cursor over any waypoint. WTA (date/time for reaching the waypoint with current SOG) and TTG (time to go to waypoint) will be available.

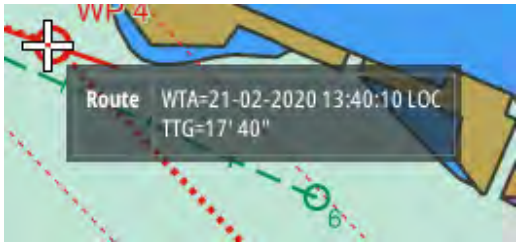


Figure 197 Tooltip for waypoint on route in voyage mode

If the inspected waypoint is already passed, the text “WP passed” is displayed.

If there are more than one applicable waypoint under the cursor (e.g. at small scales), the text “There are more than 1 waypoint under the cursor. Please, change cursor location or chart scale” is displayed.

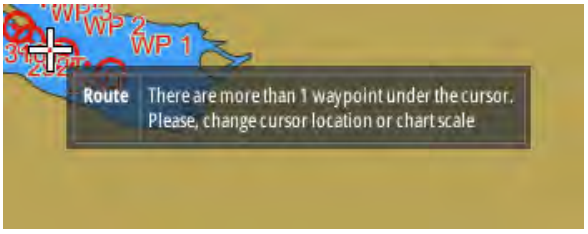


Figure 198 Tooltip for more waypoints

To get information about Route waypoints:

1. Enable Info mode.
2. Enable the appropriate parameter in Settings -> Chart -> Map info panel.
3. Move the cursor over an object from the following list of objects with hover-over information.

The following chart objects have hover-over information:

- Lights
- Beacon, cardinal
- Beacon, isolated danger
- Beacon, lateral
- Beacon, safe water
- Beacon, special purpose/general
- Buoy, cardinal
- Buoy, installation
- Buoy, isolated danger
- Buoy, lateral
- Buoy, safe water
- Buoy, special purpose/general
- Landmarks

The following object attributes are available for display:

- “Object information” and “Object information in national language”
- “Textual description” and “Textual description in national language”
- “Pictorial representation”
- “Periodic date, start” and “Periodic date, end”
- “Date start” and “Date end”

If an inspected object is not on the list of chart objects, or doesn’t have any of the listed object attributes, no tooltip will be displayed.

If an attribute value is too long (e.g. “Object information”), the value will be cut and the remaining part replaced by “…” symbols. In such cases, refer to “Object information” tool to get a full value description.

4.6 Chart Legend

Chart legends are available in the Object information panel. You can view chart legends of the charts currently displayed in the chart view.

To view the chart legend:

1. Right-click the object in the chart view: the Object Information panel opens.
2. Expand the Charts category: the list of charts under the mouse pointer opens (in most cases only one chart will be under the mouse pointer at a time).



Figure 199 Object information, Charts

3. To view detailed chart legend, select the chart.



Figure 200 Chart legend

4. To return to the object inspector, press the Inspector button.

5 Route Planning

5.1 Creating Routes

5.1.1 Creating a new route

To create a new route:

1. Go to the Main Menu → Routes and press the New button.



Figure 201 Routes: creating a new route

2. Enter a route name into the Route name dialog and press OK to create the route. To cancel the operation, press Cancel.

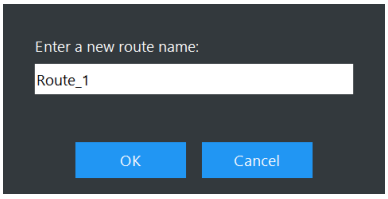


Figure 202 Routes: entering name for the new route

3. Now the new route is created, and you can start plotting waypoints.

5.1.2 Plotting waypoints

To plot a waypoint:

1. Make sure the route is open for editing.
2. To plot a waypoint in the chart view, move the mouse pointer to the position where you want to plot the waypoint and left-click there: the waypoint is plotted in the chart view and is added to the Waypoints table.



Figure 203 Routes: plotting a waypoint

3. To plot a waypoint using the Waypoints table, enter its parameters into an empty line: select a field, enter a value of the parameter, and press ENTER: the waypoint is added both to the table and to the chart view.

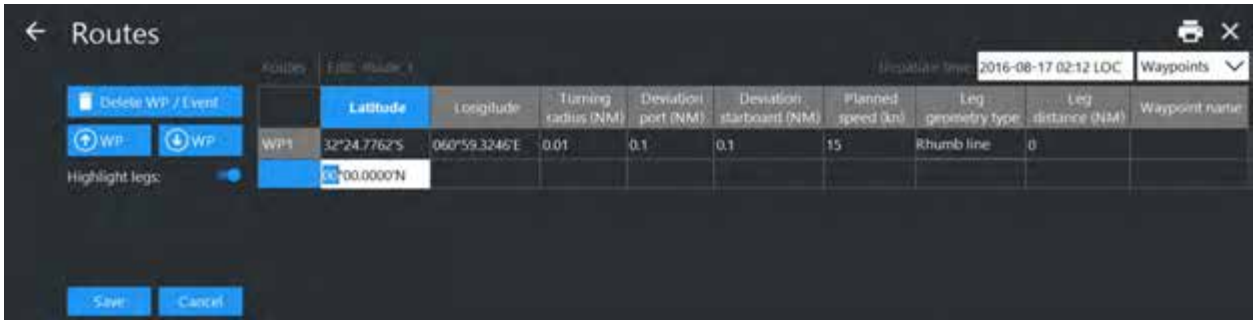


Figure 204 Routes: entering a waypoint to the Waypoints table

NOTE:

If, when plotting waypoints, the plotted turn radius on the leg is too small and the ECDIS is unable to build a geometrically correct deviation corridor, the waypoint is marked with a red cross.



Figure 205 ECDIS is unable to build correct deviation corridor

You can save such route, but the ECDIS will not allow you to use it for navigation.

Waypoint has the following parameters:

- Latitude – Latitude of the waypoint;
- Longitude – Longitude of the waypoint;

NOTE:

To specify north-south for latitude and east-west for longitude, use the UP or DOWN keys or enter 'N' for north, 'S' for south, 'E' for east and 'W' for west.

- Turning radius – Turning radius in the waypoint;
- Deviation port – Deviation to port from the route leg between this and next waypoints;
- Deviation starboard – Deviation to starboard from the route leg between this and next waypoints;
- Planned speed – Planned speed on the leg between this and next waypoints;
- Leg geometry type – Type of the leg geometry: great circle line or rhumb line;

NOTE:

To set a leg geometry type, double click in the Leg geometry type field of the waypoint to make it active, and then select a geometry type in the drop-down list.

- Leg distance – Distance to the next waypoint; the parameter is calculated and cannot be changed;
- Waypoint name – Name of the waypoint.

5.1.3 Moving waypoints up and down in the list

To move a waypoint up or down in the list:

1. Select the waypoint you want to move up/down in the waypoints list.
2. To move the waypoint up, press the up WP button: the waypoint is moved up in the table and is redrawn in the chart view to correspond to the new order.
3. To move the waypoint down, press the down WP button: the waypoint is moved down in the table and is redrawn in the chart view to correspond to the new order.

5.1.4 Saving changes to a route

To save changes to a route:

1. After editing a route, press the Save Save button to save the changes.
2. The route editing tab is closed, and the list of routes is opened, changes to the route are saved.

5.1.5 Cancelling changes to a route

To cancel changes to a route:

1. If you want to cancel changes to a route, press the Cancel Cancel button: the confirmation dialog opens.

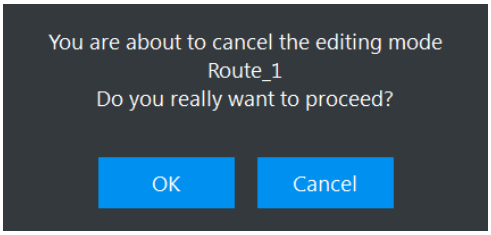


Figure 206 Routes: Cancel route edit, Confirmation dialog

2. Press OK: the route editing tab is closed, and the list of routes is opened, changes to the route are cancelled.

5.2 *Displaying a Route*

To display a route in the chart view:

1. Go to Main Menu → Routes: the list of available routes is displayed.
2. To display a route in the chart view: tick the Display / Hide route check box to the right of the route's name: the route is displayed in the chart view.



Figure 207 Routes: Display/Hide route check box

NOTE:

The chart view is not automatically scrolled to the route. If you do not see the displayed route, scroll the chart view to the route manually.

3. To hide a route, clear the Display / Hide route check box: the route is removed from the chart view.

5.3 Route Waypoints

5.3.1 Viewing route waypoints

To view waypoints of a route:

1. Go to Main Menu → Routes: the list of available routes is displayed.
2. Select a route: the list of waypoints for the selected route is displayed.
3. To scroll the chart view to display a waypoint, press the go to button of the waypoint.



Figure 208 Routes: Waypoints list, Go to waypoint

The following waypoint and route information is displayed:

- DTA – Distance to arrival: distance between the first and the last waypoints of the route;
- TTA – Time to arrival: time to go between the first and the last waypoints of the route;
- Name of the waypoint;
- Latitude of the waypoint;
- Longitude of the waypoint;
- Turning radius in the waypoint;
- Deviation starboard;
- Deviation port;
- Planned speed on the leg between this and next waypoints;
- Leg bearing;
- Leg distance;
- Leg geometry type.

5.3.2 Editing route waypoints

To edit waypoints of a route:

1. Go to Main Menu → Routes: the list of available routes is displayed.
2. Select a route: the list of waypoints of the selected route is displayed.



Figure 209 Routes: editing route waypoints

3. Press the Edit button to switch to the edit mode: the waypoints table opens.
4. To scroll the chart view to display a waypoint, select the waypoint in the table by pressing its number: the waypoint is displayed in the center of the chart view.

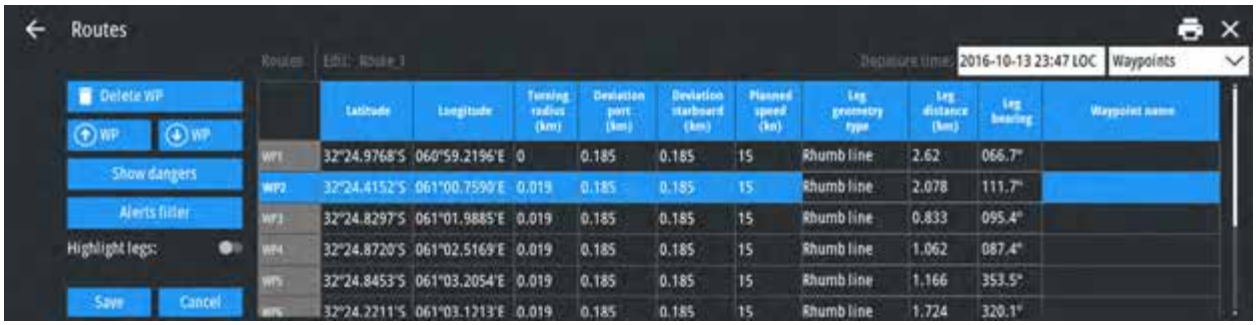


Figure 210 Routes: show waypoint

5. To change coordinates of a waypoint in the chart view, left-click the waypoint to capture it with the mouse pointer, move the pointer to a new location of the waypoint and left-click to release the waypoint: the waypoint is fixed in the new position and its coordinates are updated in the waypoints table.

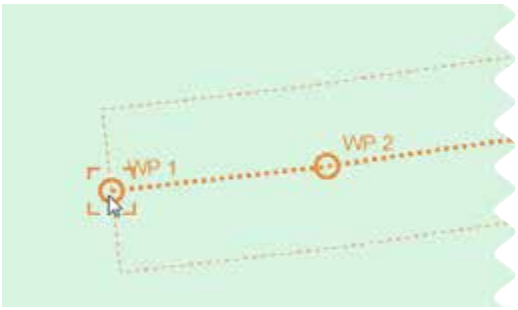


Figure 211 Routes: selecting a WP in the chart view

6. To change coordinates of a waypoint in the waypoints table, enter new latitude and longitude to the Latitude and Longitude fields of the waypoint: the waypoint is moved to the new position in the chart view.
7. To change other parameters of a waypoint, enter new values to the corresponding fields of the waypoints table.
8. To save the changes, press Save; to cancel, press Cancel and confirm the operation.

5.3.3 Adding route waypoints

To add a waypoint to a route:

1. Go to Main Menu → Routes: the list of available routes is displayed.
2. Select a route: the list of waypoints of the selected route is displayed.
3. Press the Edit button to switch to the edit mode: the waypoints table opens.
4. To add a waypoint in the chart view: move the mouse pointer to the position on a leg where you want to insert a waypoint and left-click: a new waypoint is plotted in the chart view and added to the waypoints table.

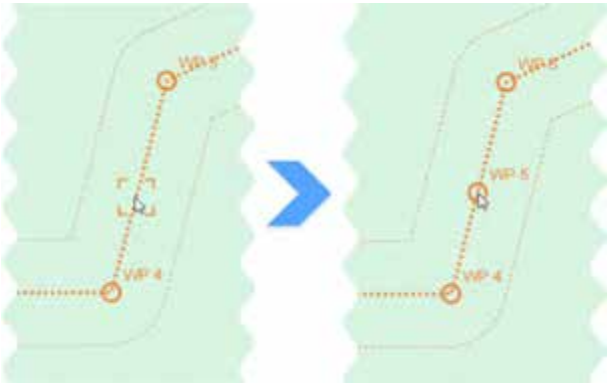


Figure 212 Routes: adding a waypoint in the chart view

NOTE:

If your left-click is not on a route leg, the new waypoint will be added to the end of the route and will become the last waypoint.

5. To add a new waypoint in the waypoints table, enter the waypoint latitude and longitude as well as other parameters to the last empty line of the table: the waypoint is added to the chart view.

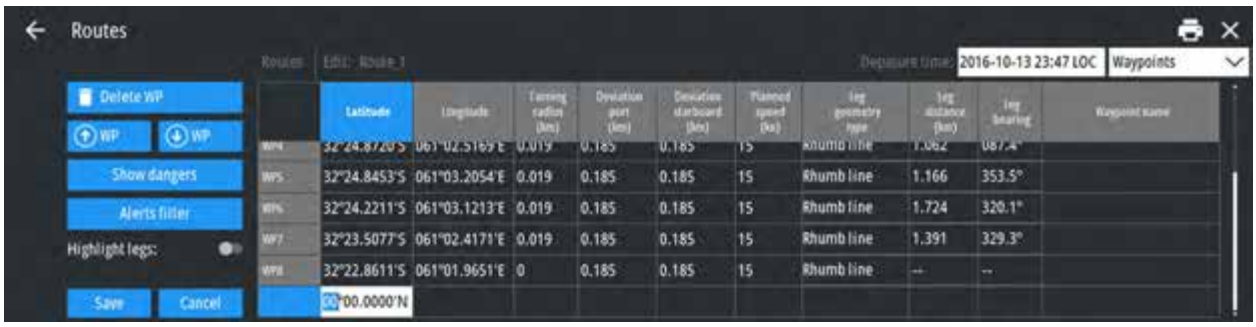


Figure 213 Routes: adding a waypoint in the waypoints table

NOTE:

You cannot insert a waypoint between two existing waypoints in the table. You can only add a waypoint to the end of the route.

5.3.4 Deleting route waypoints

To delete a waypoint in a route:

1. Go to Main Menu → Routes: the list of available routes is displayed.
2. Select a route: the list of waypoints of the selected route is displayed.
3. Press the Edit button to switch to the edit mode: the waypoints table opens.
4. Select a waypoint to delete in the waypoints table.
5. Press the Delete WP button: the confirmation dialog opens.

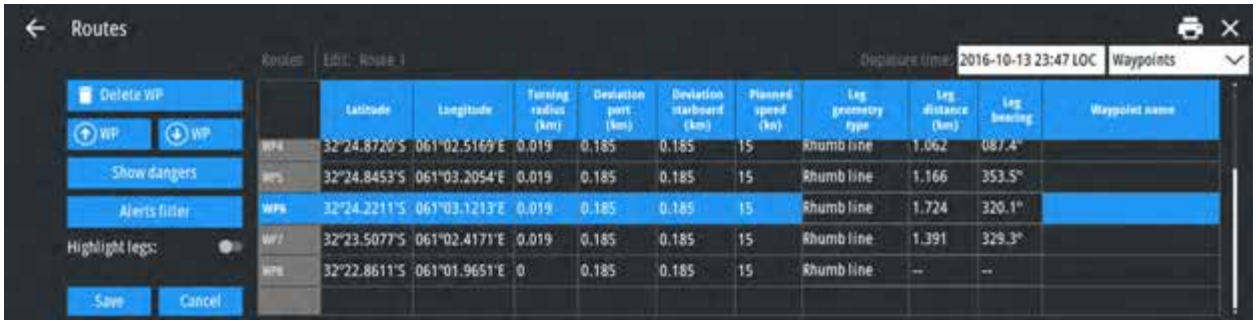


Figure 214 Routes: deleting a waypoint in the Waypoints table

6. Press OK to confirm the operation: the waypoint is deleted from the waypoints table and from the chart view. To cancel the operation, press Cancel.
7. To delete a waypoint in the chart view, right-click it: the confirmation dialog opens. Select it to delete the waypoint: the waypoint is deleted from the waypoints table and from the chart view.



Figure 215 Routes: deleting a waypoint in the chart view

5.4 Event Marks

5.4.1 Adding event marks to a route

An event mark is a point on the route where a specific event is planned to take place. You can create an event mark and the ECDIS will give an alarm within specified time before or after the event mark is passed.

To add an event mark to a route:

1. Go to Main Menu → Routes: the list of available routes is displayed.
2. Select a route: the list of waypoints for the selected route is displayed.
3. Press the Edit button to switch to the edit mode: the waypoints table opens.
4. Switch to the event marks mode: select the Event marks option in the drop-down list in the upper-right corner of the tab.

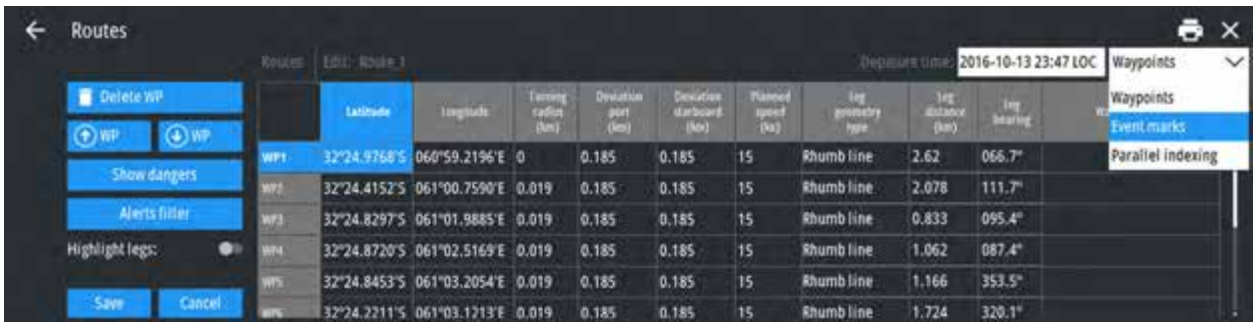


Figure 216 Routes: Event marks mode

5. In the event marks mode, the event marks table is displayed, and you can add and edit event marks both in the table and in the chart view.
6. To add an event mark in the chart view, move the mouse pointer to the position where you want to plot the event mark and left-click: the event mark appears in the chart view and in the table.

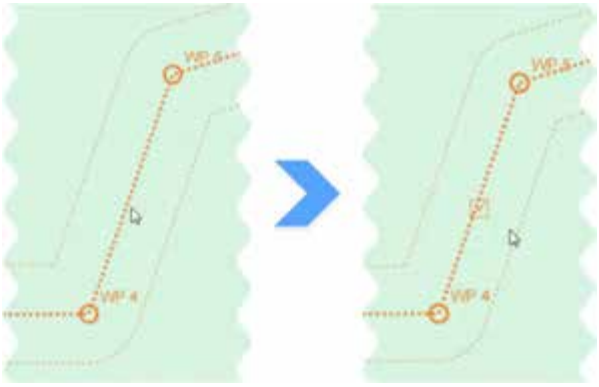


Figure 217 Routes: adding event mark in the chart view

7. To add an event mark in the table, enter coordinates and other parameters of the event mark into the empty line of the table: the event mark also appears in the chart view.

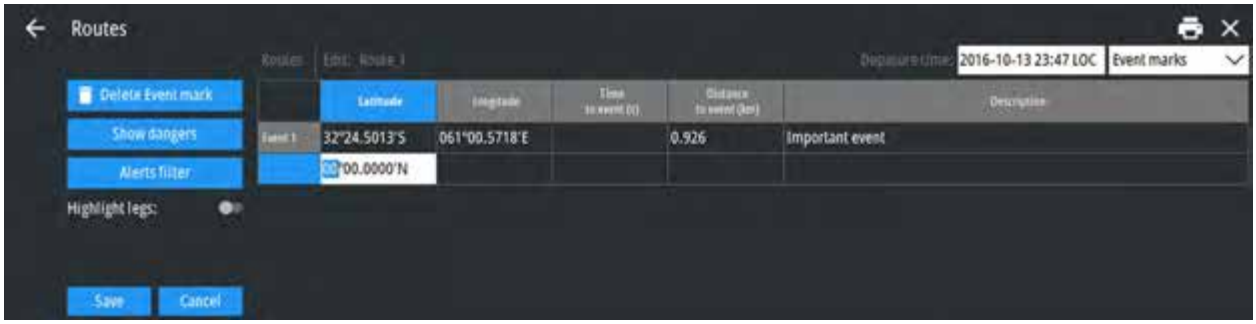


Figure 218 Routes: adding event mark in the event marks table

An event mark has the following parameters:

- Latitude – latitude of the event mark; select the Latitude field to make it active, enter a value using the keyboard, and press ENTER.
- Longitude – longitude of the event mark; select the Longitude field to make it active, enter a value using the keyboard, and press ENTER;
- Time to event – enter a positive value to have an alarm within the specified time before the own vessel reaches the event mark; enter a negative value to have an alarm within the specified time after the own vessel reaches the event mark;
- Distance to event -- enter a positive value to have an alarm within the specified distance before the own vessel reaches the event mark; enter a negative value to have an alarm within the specified distance after the own vessel reaches the event mark;
- Description – textual description of the event mark.

5.4.2 Editing event marks

To edit an event mark of a route:

1. Go to Main Menu → Routes: the list of available routes is displayed.
2. Select a route: the list of waypoints of the selected route is displayed.
3. Press the Edit button to switch to the edit mode: the waypoints table opens.
4. Switch to the event marks mode: select the Event marks option in the drop-down list in the upper-right corner of the tab.
5. To scroll the chart view to display an event mark, select the event mark by clicking its number in the table: the event mark is displayed in the center of the chart view.

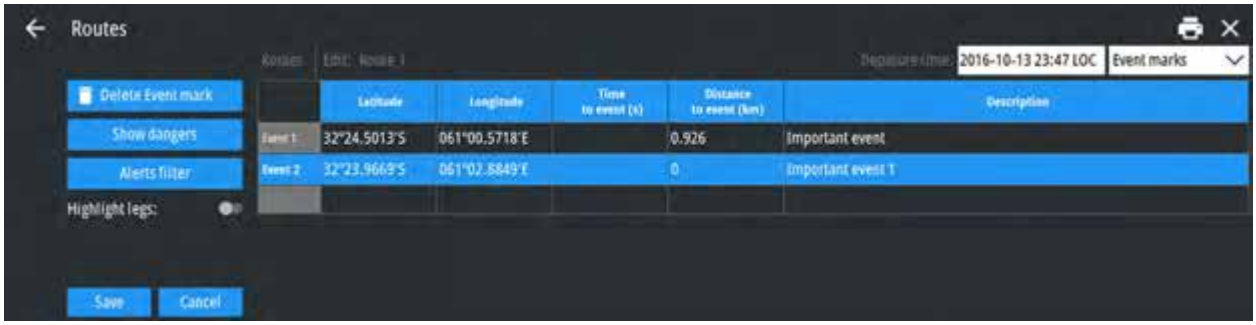


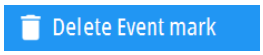
Figure 219 Routes: show event mark

6. To change coordinates of an event mark in the chart view, left-click the event mark to capture it with the mouse pointer, move the pointer to a new location of the event mark and left-click to release the event mark: it is fixed in the new position and its coordinates are updated in the event marks table.
7. To change coordinates of an event mark in the event marks table, enter new latitude and longitude to the Latitude and Longitude fields of the event mark: the event mark is moved to the new position in the chart view.

8. To change other parameters of an event mark, enter new values to the corresponding fields of the event marks table.
9. To save the changes, press Save; to cancel, press Cancel and confirm the operation.

5.4.3 Deleting event marks

To delete an event mark of a route:

1. Go to Main Menu → Routes: the list of available routes is displayed.
2. Select a route: the list of waypoints for the selected route is displayed.
3. Press the Edit button to switch to the edit mode: the waypoints table opens.
4. Switch to the event marks mode: select the Event marks option in the drop-down list in the upper-right corner of the tab.
5. Select an event mark to delete: select it in the chart view or in the event marks table.
6. Press the Delete Event mark 

button: the confirmation dialog opens.

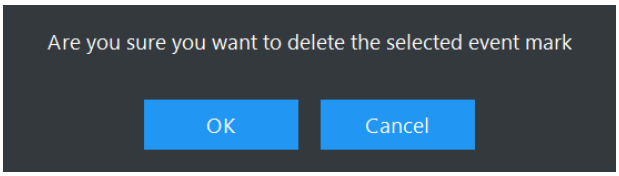


Figure 220 Routes: confirm deleting an event mark

7. Press OK to confirm the operation: the event mark is deleted from the event marks table and from the chart view. To cancel the operation, press Cancel.
8. To delete an event mark in the chart view, right-click it: the confirmation dialog opens. Select it to delete the event mark: the event mark is deleted from the event marks table and from the chart view.

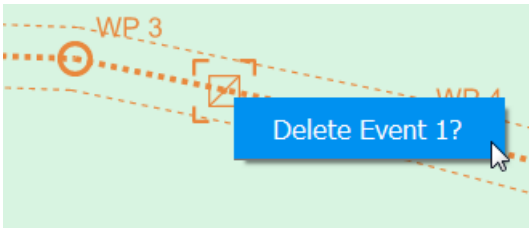


Figure 221 Routes: deleting an event mark in the chart view

5.5 Parallel Indexing

5.5.1 Adding index lines to a route leg

An index line on a route leg is a line parallel to the leg and lying at a specified distance from the leg. Index lines are used as a reference to maintain and follow a particular course.

The increase or decrease of the perpendicular distance between the bearing lines drawn parallel to course-line and the own vessel's position at any time will indicate cross track deviation from the initial planned course. This will then thus advise a mariner if they are falling out of a traffic lane, entering a traffic separation zone or closing in on a navigational danger.

To add an index line to a route leg:

1. Go to Main Menu → Routes: the list of available routes is displayed.
2. Select a route: the list of waypoints for the selected route is displayed.
3. Press the Edit button to switch to the edit mode: the waypoints table opens.
4. Select the route leg to which you want to add an index line: Press the name of the waypoint at the beginning of the leg. The selected waypoint's line is highlighted in blue.

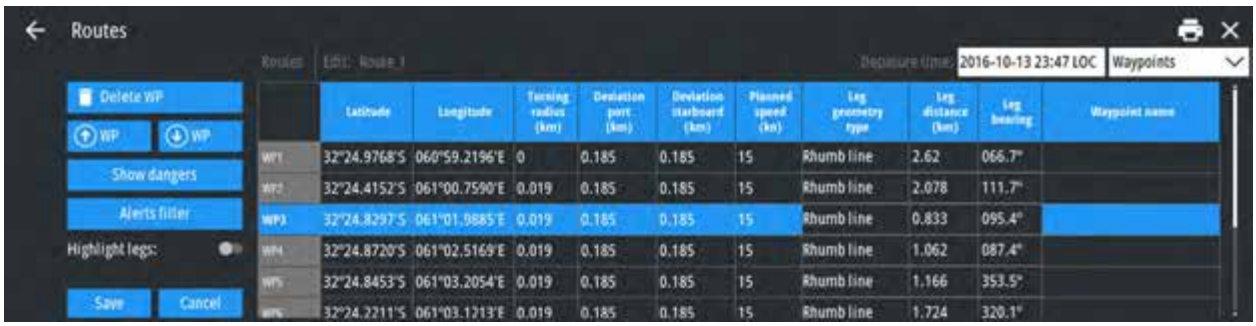


Figure 222 Routes: selecting a leg

5. Switch to the parallel indexing mode: select the Parallel indexing option in the drop-down list in the upper-right corner of the tab.

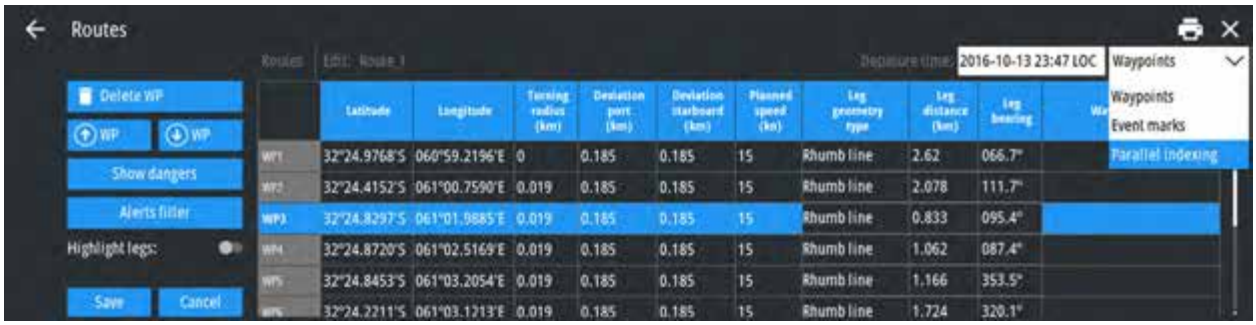


Figure 223 Routes: Parallel indexing mode

6. In the parallel indexing mode, the index lines table is displayed, and you can add and edit index lines both in the table and in the chart view.
7. To add an index line in the chart view, move the mouse pointer to the position where you want to plot the index line and left-click: the index line appears in the chart view and in the table. The index line has the distance to the route leg and bearing indicated.



Figure 224 Routes: index line display, distance and bearing to the route leg indicated

8. To add an index line in the table, enter coordinates and other parameters of the index line in the empty line of the table: the index line also appears in the chart view.



Figure 225 Routes: adding index line in the index line table

NOTE:

You can add as many index lines to a route leg as you need.

The following chart display settings affect display of parallel index lines (Settings → Chart → Chart objects):

- Mariner's text – hides/displays distance and bearing.
- Parallel index lines on active route – hides/displays parallel index lines on active routes.

An index line has the following parameters:

- Latitude – latitude of the central point of the index line; select the Latitude field to make it active, enter a value using the keyboard, and press ENTER.
- Longitude – longitude of the central point of the index line; select the Longitude field to make it active, enter a value using the keyboard, and press ENTER;
- Front range – length of the index line from the front end to the central point; the default range is specified in the Default range field in the left part of the panel;
- Rear range – length of the index line from the rear end to the central point; the default range is specified in the Default range field in the left part of the panel;
- Distance – perpendicular distance between the route leg and the index line;
- Bearing – bearing from the route leg to the index line;
- PI line name – name of the index line.

5.5.2 Editing index lines

To edit an index line:

1. Go to Main Menu → Routes: the list of available routes is displayed.
2. Select a route: the list of waypoints of the selected route is displayed.
3. Press the Edit button to switch to the edit mode: the waypoints table opens.
4. Select the route leg with the index line you want to edit: press the name of the waypoint at the beginning of the leg. The selected waypoint's line is highlighted in blue.
5. Switch to the parallel indexing mode: select the Parallel indexing option in the drop-down list in the upper-right corner of the tab.

6. To scroll the chart view to display the index line, select it by clicking its number in the table: the index line is displayed in the center of the chart view.



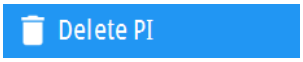
Figure 226 Routes: show index line

7. To change coordinates of an index line in the chart view, left-click the index line to capture it with the mouse pointer, move the pointer to a new location of the index line and left-click to release the index line: it is fixed in the new position and its coordinates and distance are updated in the index lines table.
8. To change coordinates of an index line in the index lines table, enter new latitude and longitude to the Latitude and Longitude fields of the index line: the index line is moved to the new position in the chart view.
9. To change other parameters of an index line, enter new values to the corresponding fields of the index lines table.
10. To save changes, press Save; to cancel, press Cancel and confirm the operation.

5.5.3 Deleting index lines

To delete an index line on a route leg:

1. Go to Main Menu → Routes: the list of available routes is displayed.
2. Select a route: the list of waypoints for the selected route is displayed.
3. Press the Edit button to switch to the edit mode: the waypoints table opens.
4. Select the route leg with the index line you want to delete: press the name of the waypoint at the beginning of the leg. The selected waypoint's line is highlighted in blue.
5. Switch to the parallel indexing mode: select the Parallel indexing option in the drop-down list in the upper-right corner of the tab.
6. Select an index line to delete: select it in the chart view or in the index lines table.

7. Press the Delete PI 

button: the confirmation dialog opens.

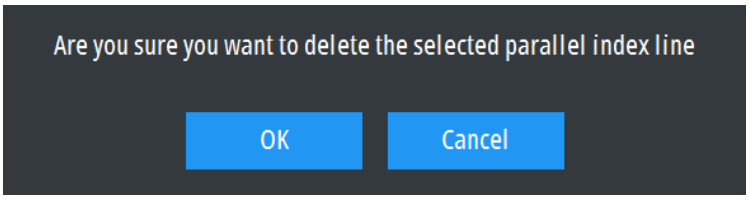


Figure 227 Routes: confirm deleting an index line

8. Press OK to confirm the operation: the index line is deleted from the index lines table and from the chart view. To cancel the operation, press Cancel.
9. To delete an index line in the chart view, right-click it: the confirmation dialog opens. Select it to delete the index line: the index line is deleted from the index lines table and from the chart view.



Figure 228 Routes: deleting an index line in the chart view

5.6 *Searching and Sorting Routes List*

For more convenient work with the list of available routes, search and sort functions are available.

To search routes in the list:

1. Go to Main Menu → Routes: the Routes panel opens with the list of available routes.
2. Start entering the name of the route in the Search field: the list of routes is reduced to display only the routes that have the entered letters in their names.



Figure 229 Routes: Search routes

3. To exit the Search mode, clear the Search field: the full list of routes is displayed.

To sort routes in the list:

1. Go to Main Menu → Routes: the Routes panel opens with the list of available routes.
2. Select a sorting option in the Sort by drop-down list: the routes are sorted according to your selection. Unsorted, Alphabetically A-Z, and Alphabetically Z-A options are available.



Figure 230 Routes: Sort routes

5.7 *Copying a Route*

To copy a route:

1. Go to Main Menu → Routes: the list of available routes is displayed.
2. Select the route to copy: the list of waypoints for the selected route is displayed.
3. Press the Copy route button 

: the route copy dialog opens.

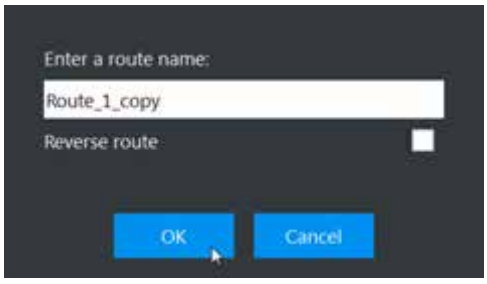


Figure 231 Routes: copy route dialog

4. Enter a new route name or leave the default one.
5. If you want to reverse the route, set the Reverse route check box.
6. Press OK: the route is copied and added to the routes list.

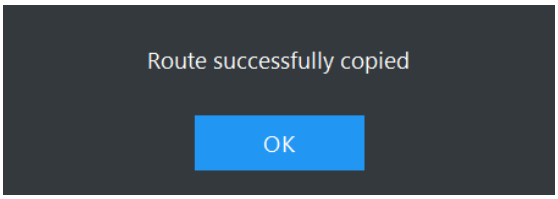


Figure 232 Routes: route successfully copied

5.8 *Copying Part of a Route*

You can also copy a part of a route (one or more waypoints) to create a separate route.

To copy part of a route:

1. Go to Main Menu → Routes: the list of available routes is displayed.
2. Select the route you want to copy: the list of waypoints for the selected route is displayed.
3. Select waypoints you want to copy to a separate route by ticking their check boxes: when at least one waypoint is selected, the Copy waypoints button becomes active.



Figure 233 Routes: selecting waypoints to copy

4. Press the Copy waypoints button 

: the route copy dialog opens.



Figure 234 Routes: copy route dialog

5. Enter a new route name or leave the default one.
6. Press OK: the selected waypoints are copied, and the new route is added to the routes list.

5.9 *Deleting a Route*

To delete a route:

1. Go to Main Menu → Routes: the list of available routes is displayed.
2. Press the delete button of the route you want to delete: the confirmation dialog opens.

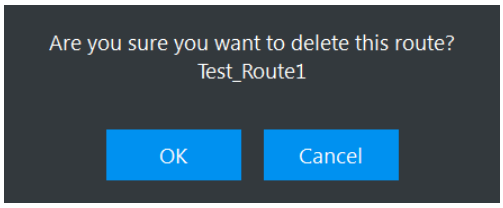


Figure 235 Routes: delete route confirmation

3. Press OK: the route is deleted. To cancel the operation, press Cancel.

5.10 *Grounding Check of a Route*

To check a route for dangers:

1. Go to Main Menu → Routes: the list of available routes is displayed.
2. Select a route: the list of waypoints for the selected route is displayed.



Figure 236 Routes: safety check

3. Press the Grounding check button: the Set departure time dialog opens where you can set departure time to check for dangerous seasonal objects.



Figure 237 Routes: setting departure time for safety check

4. Enter the departure time value and press OK: the safety check starts. To set the current time, press Now.
5. Upon completion of the safety check, route legs are marked with colors: yellow color means that there are only cautions detected on this leg; red color means that there are dangers detected on this leg; no color means that there are no cautions or dangers detected on this leg.

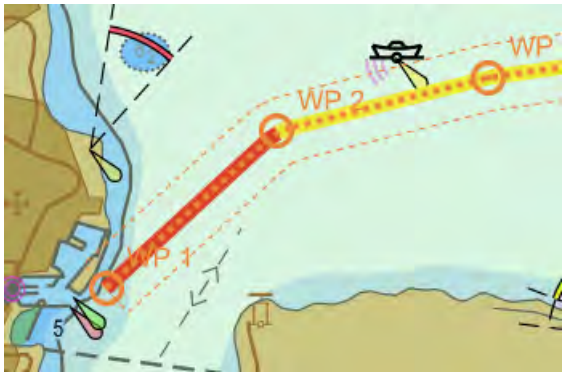


Figure 238 Routes: safety check colors

NOTE:

If the Highlight legs setting of the route is turned off, route legs are not highlighted with colors during grounding check.

6. Upon completion of the safety check, any dangers and cautions found are highlighted with yellow in the chart view and the list of the dangers and cautions opens. Dangers and cautions found for each leg of the route are listed.



Figure 239 Routes: list of route legs with dangers and cautions detected

7. To view danger and cautions for a leg, expand its entry.

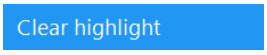


Figure 240 Route safety check: dangers and cautions list

8. To view detailed information about a dangerous object, select it in the list: the panel with object information opens. To close it, press the Close button.

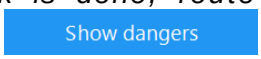


Figure 241 Route safety check: dangerous object details

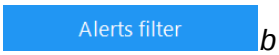
9. To scroll the chart view to a dangerous object, press its go to  button: the chart view is scrolled to display the object in the center and the object is highlighted. To clear the highlight, press the Clear highlight  button.

10. To close the dangers and cautions panel and to return to editing the route, press the Back to route button.

NOTE:

Safety check is also carried out automatically while editing a route. When the check is done, route legs are marked with colors and the Show dangers 

button appears. Press it to open the list of found dangers and cautions.

To filter alerts to be indicated, use the alerts filter: press the Alerts filter 

button and select alerts you want indicated and deselect alerts you do not want indicated in the Alerts graphical indication filter window that opens.

To specify departure time, enter a date and time value to the Departure time field.

If you do not want route legs to be highlighted, set the Highlight legs switch to the Off position.

NOTE:

The list of information concerning the route, which is displayed under Show dangers extends only up to Leg 51. This will be the last leg presented in the list, even though the route had more than 51 legs.

Provided the Highlight legs setting of the route is turned on, graphical indications of safety hazards past Leg 51 will be displayed as expected when creating a route – marking legs with detected cautions with yellow color; legs with detected dangers with red color.

5.11 Chart Report for a Route

The ECDIS provides the option of creating a chart report for a route.

To create a chart report for a route:

1. Go to Main Menu → Routes: the list of available routes is displayed.
2. Select the route for which you want to create a chart report: the list of waypoints for the selected route and route options are displayed.



Figure 242 Chart report for a route

3. To create a chart report, press the Chart report button: the Choose chart database dialog opens.



Figure 243 Chart report for a route: selecting a database

4. Select the database where you want to check for charts along the route in the drop-down list and press OK: the chart report window opens.

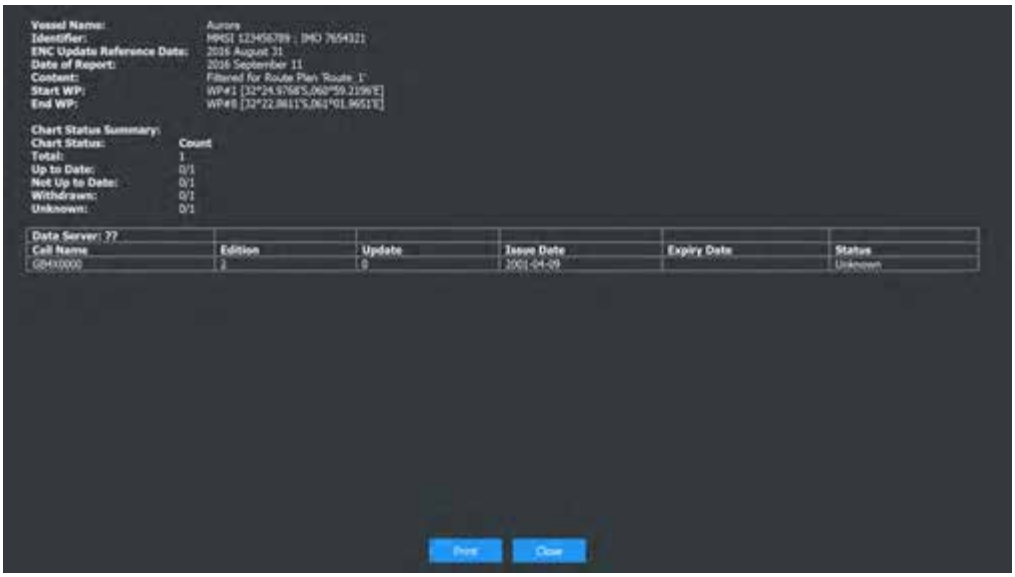


Figure 244 Chart report for a route: chart report window

5. To save the chart report to a file, press the Print button: the Choose file format dialog opens.

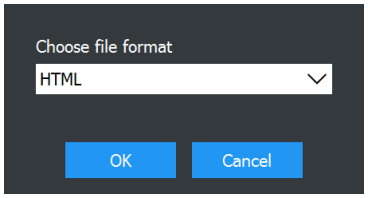


Figure 245 Chart report for a route: file format

6. Select a file format option in the drop-down list and press OK: the Save to file dialog opens with the list of all available removable data storage devices.

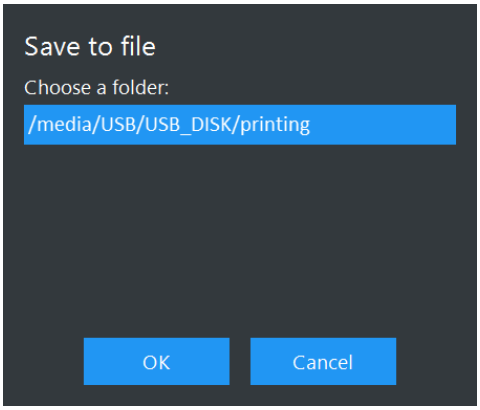
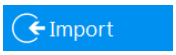


Figure 246 Chart report for a route: selecting a folder

7. Select a device to save the chart report file and press OK: the file with the chart report for the route is saved.

5.12 Importing Routes

To import a route from a file:

1. Go to Main Menu → Routes: the list of available routes is displayed.
2. Press the Import 

button: the import options dialog opens.

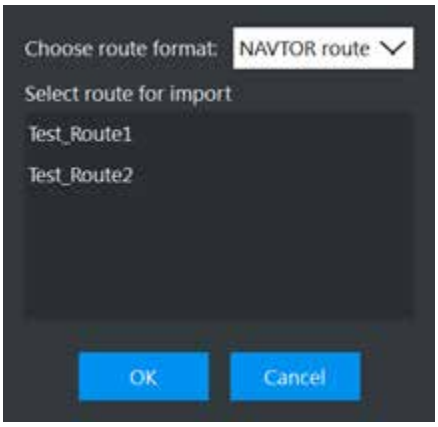


Figure 247 Route import: import options dialog

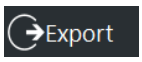
3. Select the input route format in the Choose route format drop-down list. Available formats are: NAVTOR route, RTE/WPL route, Maris RTU route, Maris TXT route, Jeppesen route, CIRM (RTZ) route, CIRM (RTZP) route, and Sperry route.
4. Select a route to be imported in the Select route for import list, which contains routes found on all removable data storage devices connected to the ECDIS, and press OK: the route is imported to the ECDIS and added to the routes list.
5. To cancel the operation, press Cancel.

5.13 Exporting Routes

With the Route Export function, it is possible to export routes to files with specified formats, or to an output sensor as a set of RTE/WPL messages.

5.13.1Exporting to a file

To export a route to a file:

1. Go to Main Menu → Routes: the list of available routes is displayed.
2. Press the Export 

button of the route you want to export: the export options dialog opens.

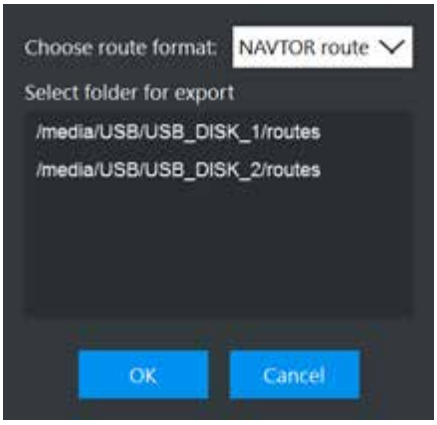
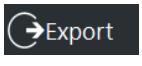


Figure 248 Route export: export options dialog

3. Select the output route format in the Choose route format drop-down list. Available formats are: NAVTOR route, RTE/WPL route, Maris RTU route, Maris TXT route, Jeppesen route, CIRM (RTZ) route, CIRM (RTZP) route and Sperry route.
4. Select a folder to save the route file to and press OK: the route file is saved to the selected location. The route file is named with the route's name.
5. To cancel the operation, press Cancel.

5.13.2Exporting to an output sensor

To export a route to an output sensor:

1. Go to Main Menu → Routes: the list of available routes is displayed.
2. Press the Export 

button of the route you want to export: the export options dialog opens.

3. Select the RTE/WPL via sensor option in the Choose route format drop-down list: the list of available sensors appears.



Figure 249 Route export: sensors list

4. Select a sensor to send the route to and press OK: the route is sent to the specified sensor as a set of RTE/WPL sentences.

5.14 Route transfer

With the Route Transfer function, it is possible to transfer routes to and receive routes from other equipment using CIRM (RTZ) and CIRM (RTZP).

5.14.1 Transmitting routes

To transfer a route to other equipment:

1. Go to Main Menu → Routes: the list of available routes is displayed.
2. Press the icon to the right of the selection box.
3. Select recipients for the route transfer in the dialog that appears.

To transfer all routes to other equipment:

1. Go to Main Menu → Routes: the list of available routes is displayed.
2. Press the Send all routes button: all routes will be transmitted to other equipment.

When transmission of one or more routes has been initiated, the list of available equipment to which the routes can be sent will be presented. Once a destination has been selected, the route(s) will be transmitted to the relevant equipment.

To browse transmitted routes:

1. Go to Main Menu → Routes → Transfer → Transferred routes: the list of transferred routes is displayed.

2. In the list of transferred routes, it is possible to verify transmission status of the transfers initiated on the ECDIS. This includes the SFI of the receiving station, reception status and time stamp.



Figure 250 List of transferred routes

3. The list of transfers can be filtered. It is possible to display All transfers or Failed transfers only.

4. For failed transfers, a retransmission icon will appear next to the SFI of the receiving station. Pressing the retransmission icon will cause the ECDIS to retry the failed transmission.

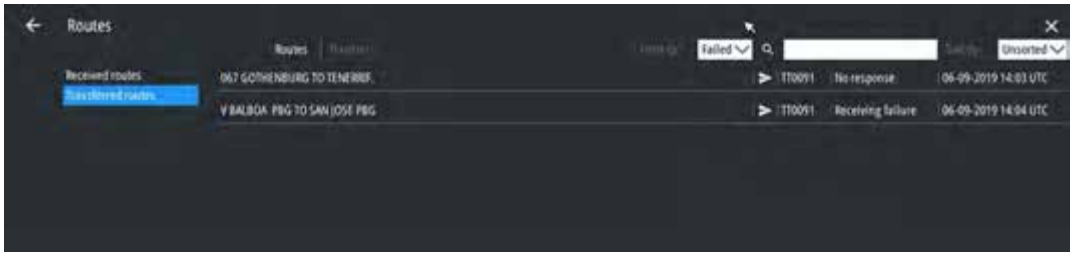


Figure 251 Filtered route list with failed transfers

As is the case for the list of routes stored on the ECDIS, the list of transferred routes can be sorted. The sort options are

- Unsorted
- Name (ordered alphabetically A-Z)
- Date (most recent transfer at the top of the list)
- SFI (ordered alphabetically A-Z)

The list of transferred routes can be searched. The list of routes is reduced to display only the routes that have the letters entered in the Search field as part of their names or destination SFIs.

5.14.2Receiving routes

To inspect received routes:

1. If a route transfer request has been received from other equipment, the Route reception indicator 

appears in the indicators area.
2. Press the indicator or go to Main Menu → Routes → Transfer → Received routes to open the Routes panel and to view the received routes.

The list of received routes indicates if a received route is currently being monitored at another ECDIS, or if it is identical to already existing routes.



Figure 252 The list of received routes

The list can be filtered to display all or a subset of the received routes.

Routes can belong to the following categories:

- All – all routes which have not yet been accepted or rejected.
- Monitored – received routes which were in voyage mode on the transmitting ECDIS when transferred.
- Planning – received routes which were not in voyage mode on the transmitting ECDIS when transferred.
- In voyage – the route currently monitored on this ECDIS.
- Identical – received routes which already exist in the ECDIS in an identical version.
- Not identical – received routes which already exist in the ECDIS in another version.
- New – received routes which were not already present in the ECDIS.
- Corrupted – received routes which cannot be used in the ECDIS, as the route contains invalid data.

The list of received routes can be filtered for any of the above categories except for In voyage and Corrupted.



Figure 253 Received routes list filtered for Not identical entries

To accept received routes in the Routes panel:

1. Click the ✓ button next to the route in the list of received routes to accept reception of the route.
2. If the accepted route is the monitored route from a transmitting ECDIS, the ECDIS will automatically take steps to start voyage of the accepted route.
3. If a route with the same name as an accepted route is already present on the receiving ECDIS, the mariner will be prompted to decide whether the route should be overwritten.

When accepting a monitored route, the mariner will be asked whether to start voyage of the route. If the mariner rejects this, the route will still be saved. Otherwise, a grounding check will be performed on the route prior to placing it in voyage mode.

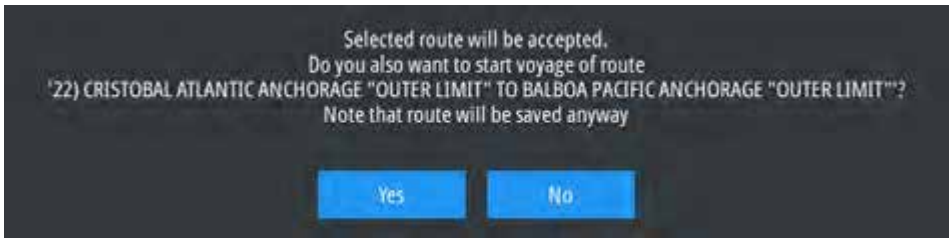


Figure 254 Accepting a monitored route

If voyage mode is already active on the ECDIS, the mariner will receive a warning and be asked whether the active voyage should be terminated. The voyage of the received route will only be started if the mariner accepts termination of the active route.

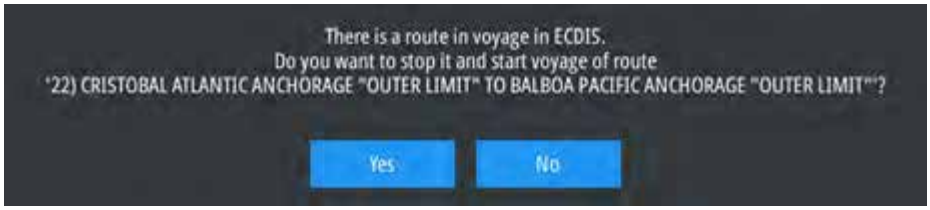


Figure 255 Accepting a monitored route when voyage mode is already active

To reject received routes in the Routes panel:

1. Click the button next to the route in the list of received routes to reject reception of the route.

More routes can be accepted or rejected simultaneously, either by selecting a number of routes, or by pressing Select all; and pressing the Accept selected or Reject selected button.

When accepted or rejected, routes are removed from the list of received routes. Accepted routes are stored in the ECDIS list of routes.

If several routes are accepted simultaneously, it will not be possible to start voyage of received monitored routes. In such cases, a warning message will be displayed, and monitored routes must be accepted separately.



Figure 256 Warning message when accepting several routes

NOTE:

If the ECDIS is restarted before a received route is accepted, the route will not be available for acceptance after ECDIS restart.

NOTE:

During startup, the ECDIS will transmit a query to other equipment in the network to determine whether routes are available for route transfer. When routes are available for transfer on other equipment, these will automatically be transferred to the ECDIS.

6 Navigation

6.1 Sensors Data

6.1.1 Sensors panel

The main function of ECDIS is monitoring position of the own vessel. This function requires positioning data as well as speed and heading data for the own vessel to be received from external sensors.

The sensors have to be connected to and registered in the ECDIS for it to be able to receive the data and process them (*see chapter 10.3, Sensors Setup*). Data coming from sensors registered in the ECDIS are displayed in the Sensors panel.

The Sensors panel can have the following lines:

- UTC time – current date and UTC time value;
- Local time – current date and local time value;
- Latitude – latitude of the current own vessel's position, comes from a positioning sensor;
- Longitude – longitude of the current own vessel's position, comes from a positioning sensor;
- COG – course over ground of the own vessel, comes from a positioning sensor;
- SOG – speed over ground, comes from a positioning sensor;
- STW – speed through water, comes from a speed sensor;
- HDG – heading, comes from a heading sensor;
- ROT – rate of turn, comes from a heading sensor;
- DPTH – depth, comes from a depth sensor;
- WDir – wind direction, comes from a wind sensor; the ECDIS can display relative, theoretical or true wind direction. If the ECDIS has HDG, COG and SOG of the own vessel coming from external sensors, it can calculate the true wind direction and display it in the Sensors panel (the indication is T North). If the ECDIS cannot recalculate wind data, it shows theoretical values if theoretical values are received (the indication is T), and relative values if relative values are received (the indication is REL). If true wind direction can be calculated from sensor data, this value will be displayed rather than theoretical and relative values[1];
- WSpd – wind speed, comes from a wind sensor. Wind speed is true, theoretical or relative as indicated for wind direction;
- Sensor description – at the end of a line with data, description of the sensor providing the data is displayed;

[1] Please note that in some cases, where sensors are configured in such a way that the same sensor delivers both sentences with true and sentences with relative wind, the display will switch continuously between true and relative values.

- Sensor name – if no sensor description is provided, default name of the sensor providing the data is displayed.

6.1.2 Primary and secondary data sensors

Several sensors of the same type can be connected to and registered in the ECDIS. Each sensor is assigned a priority number. Sensors with the priority number “1” are primary sensors; sensors with lower priorities are secondary sensors.

Data coming from primary sensors are considered true and reliable, whereas data coming from secondary sensors are considered less reliable.

If all the sensors send their data without interruptions, the Sensors panel displays data coming from the primary sensor.

If connection with the primary sensor is lost, the Sensors panel starts displaying data from the sensor with the next highest priority.

If a secondary sensor is used, a yellow indicator with its name appears in place of the primary sensor’s name.

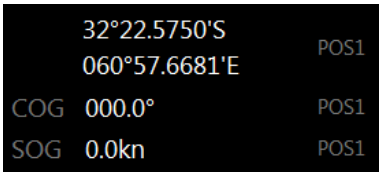


Figure 257 Data from the primary sensor

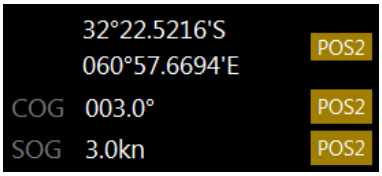


Figure 258 Data from the secondary sensor

To check the priority of a sensor:

1. Go to Main Menu → Settings → Vessel → Sensors.
2. Select the sensor you want to check: the sensor information window opens.
3. The sensor’s priority is set in the Priority field.



Figure 259 Sensor priority check

6.1.3 Data integrity indication

If integrity of data coming from sensors is compromised, two kinds of indication are provided:

- If an NMEA sentence has a faulty checksum, the ECDIS triggers the caution *"Xxx sensor has invalid CRC."* The indication is only provided if the CRC check for this sentence is turned on in the sensor settings.
- If the navigational status indicator in GNS or RMC sentences is set to 'C' (Caution) or 'U' (Unsafe), the Sensors panel displays data from these sentences in yellow.



Figure 260 Data from GNS or RMC sentences with 'C' or 'U' navigational status indicator

6.2 Own Vessel Display and Position

6.2.1 Own vessel display

Normally, the position of the own vessel comes to ECDIS from positioning sensors. The positioning data is displayed in the Sensors panel and the own vessel is displayed in the chart view using the data.

Elements of the own vessel display, such as position prediction vectors and passed track, are also based on data from positioning and other sensors.

The ECDIS can display both primary and secondary positions of the own vessel. Display of the primary position is based on data coming from primary sensors, whereas display of the secondary position is based on data from secondary sensors.

If primary sensors fail, data from secondary sensors is used for displaying the primary position.

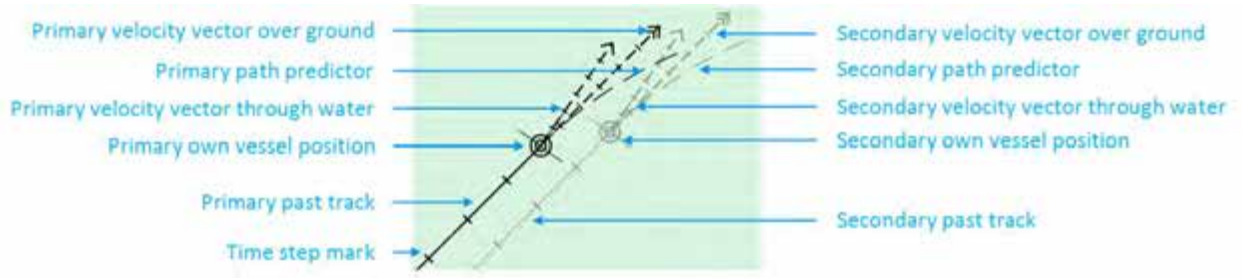


Figure 261 Own vessel position, position prediction vectors and passed track display

The following own vessel display elements are used:

- Primary velocity vector over ground – based on COG and SOG from the primary positioning sensor. If communication with sensors was lost, COG and SOG are calculated using dead reckoning.
- Primary path predictor – based on HDG, STW and ROT from the primary heading, speed through water and rate of turn sensors. If communication with sensors was lost, HDG and STW are calculated using dead reckoning; ROT is not available.
- Primary velocity vector through water– based on HDG and STW from the primary heading and speed sensors. If communication with sensors was lost, HDG and STW are calculated using dead reckoning.
- Primary own vessel position – based on coordinates from the primary positioning sensor. If communication with sensors was lost, coordinates are calculated using dead reckoning.
- Primary passed track – based on coordinates from the primary positioning sensor.
- Time step mark – marks the time step.
- Secondary velocity vector over ground – based on COG and SOG from the secondary positioning sensor. If communication with sensors was lost, COG and SOG are calculated using dead reckoning.
- Secondary path predictor – based on HDG, STW and ROT from the secondary heading, speed through water and rate of turn sensors. If communication with sensors was lost, HDG and STW are calculated using dead reckoning; ROT is not available.
- Secondary velocity vector through water – based on HDG and STW from the secondary heading and speed sensors. If communication with sensors was lost, HDG and STW are calculated using dead reckoning.
- Secondary own vessel position – based on coordinates from the secondary positioning sensor. If communication with sensors was lost, coordinates are calculated using dead reckoning.
- Secondary passed track – based on coordinates from the secondary positioning sensor.
- Heading line – a line indicating heading of the own vessel; displayed together with the beam line.

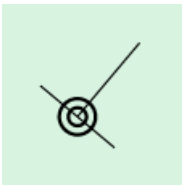


Figure 262
Heading line

NOTE:

If there is no information from one of secondary sensors, the information from a corresponding primary sensor is used to display the secondary own vessel symbol, prediction vectors and the passed track.

6.2.2 Dead reckoning

Dead reckoning is the function enabling ECDIS to continue positioning own vessel if positioning devices fail.

Dead reckoning operates continuously: it receives data from positioning sensors (coordinates, COG, SOG) as well as data from heading and speed sensors (HDG, STW) and displays the data in the Dead reckoning panel.

If the positioning sensors fail or NMEA messages from the sensors fail to pass data integrity check, Dead reckoning becomes the primary position source.

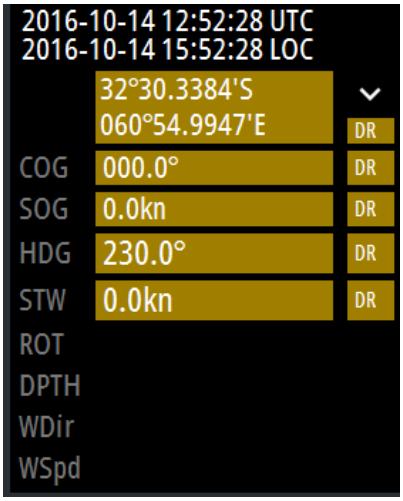


Figure 263 Dead reckoning data in Sensors panel

Dead reckoning deduces positioning data using last valid readings, data from active sensors and corrections entered by the user.

Parameters calculated by Dead reckoning are displayed in the Sensors panel and are marked with yellow color and a “DR” indicator.

Dead reckoning deduces the following parameters:

- Coordinates (LAT, LON) – own vessel position is deduced using the last valid position from the positioning sensor, heading, speed, drift direction and drift speed.
- Course over ground (COG) – course over ground is deduced using the own vessel heading, drift direction and drift speed.
- Speed over ground (SOG) – speed over ground is deduced using the own vessel speed through water, drift direction and drift speed.

NOTE:

Heading (HDG) and speed through water (STW) are not deduced. Last valid readings from sensors or values provided by the user are sent to the Sensors panel.

To enter corrections in the Dead Reckoning mode:

1. Go to Main Menu → Settings → Vessel → Dead reckoning: the Dead reckoning panel opens.



Figure 264 Dead reckoning panel

2. To enable correction, turn the Enable correction switch to the On position: dead reckoning parameters become editable.
3. To enter a new position fix, enter new latitude into the Lat field and longitude to the Lon field.

NOTE:

Position fixed using manual observation is sent to the Dead reckoning panel automatically.

4. To enter a new heading value, enter it into the HDG field.
5. To enter a new speed value, enter it into the STW field.
6. To enter a new drift direction value, enter it into the Drift direction field.
7. To enter a new drift speed value, enter it into the Drift speed field.
8. To finish correction, turn the Enable correction switch to the Off position: Dead reckoning calculates new values and sends them to the Sensors panel. If you do not turn the correction off, it turns off automatically after 2 minutes.

6.2.3 Manual observation

Using the Manual observation function of the ECDIS, you can plot lines of position (LOP) in the chart view, calculate current position of the own

vessel based on the plotted LOP's, and accept the positions in order to update the own vessel position during dead reckoning operation.

With the Manual observation function, you can perform two and three bearing LOP position fix, distance and bearing LOP fix, two and three distance LOP fix, and running LOP fix.

Manual observation involves the following operations:

- Indicating observation points in the chart view
- Entering measurements for observation points
- Calculating position
- Accepting a calculated position as a dead reckoning update
- Resetting the manual observation form

To indicate observation points:

1. Go to Main Menu → Tools → Manual observation: the Manual observation panel opens.

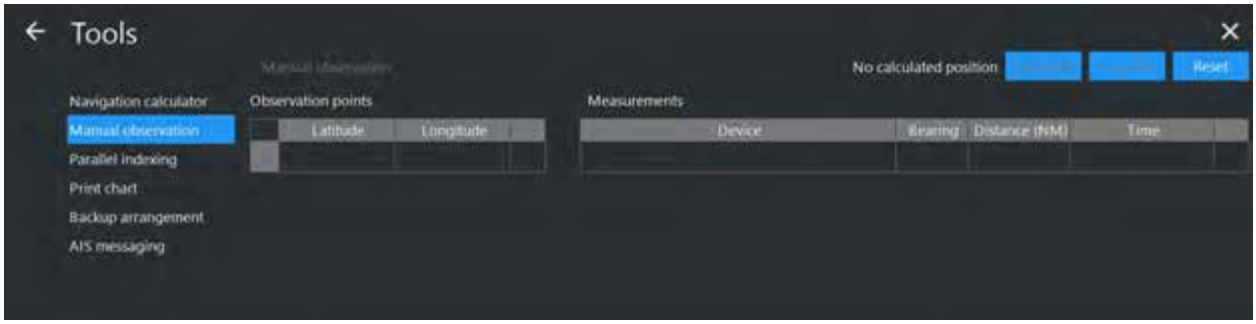


Figure 265 Manual observation panel

2. To indicate an observation point, select the empty string in the Observation points table: now you can indicate the point in the chart view.

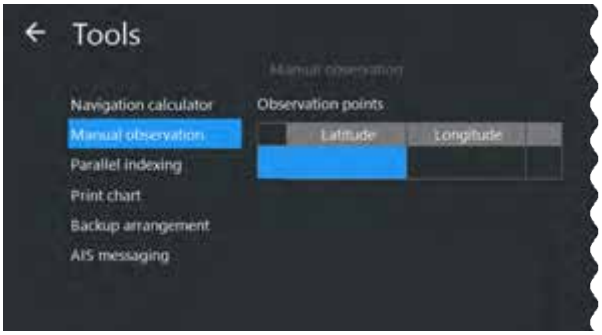


Figure 266 Manual observation: indicating observation points

3. Left-click the observation object in the chart view: an observation object symbol appears in the chart and coordinates in the Observation points table. In addition, another empty line is added so that you can indicate a second observation point.

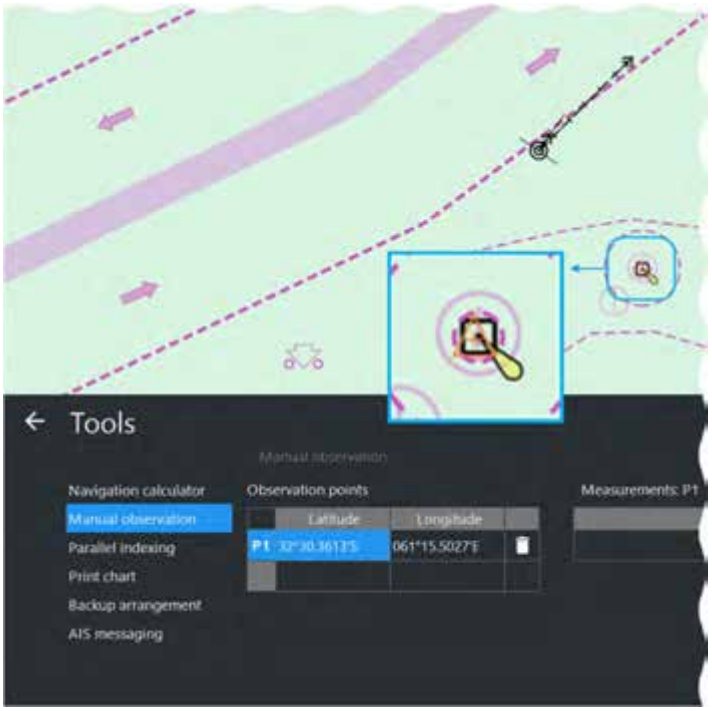


Figure 267 Manual observation: selecting observation point in the chart view

4. To fine-tune observation point coordinates, click twice in the Latitude or Longitude field to make it editable and enter precise coordinates of the object.

5. To delete an observation point, press its delete button: the point is deleted from the table as well as from the chart view.

To enter measurements to observation points:

1. Select the observation point in the Observation points table: its name appears in the caption of the Measurements table.



Figure 268 Manual observation: entering measurements

2. Select a measuring device in the Device field: click twice in the field to make it editable, open the drop-down list and select a device option.

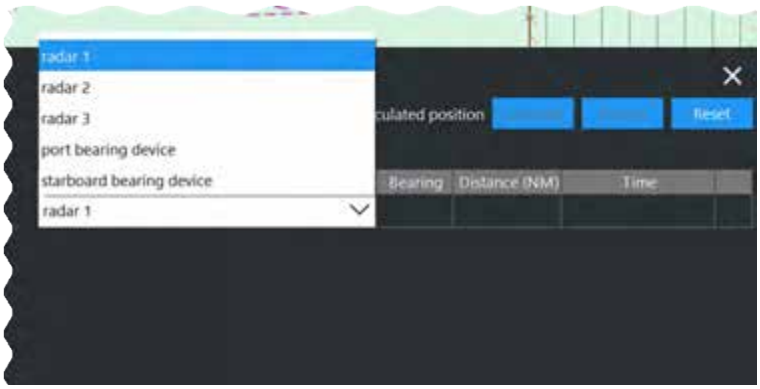


Figure 269 Manual observation: selecting measuring device

3. Next, an empty measurement record is added to the table with a time stamp.

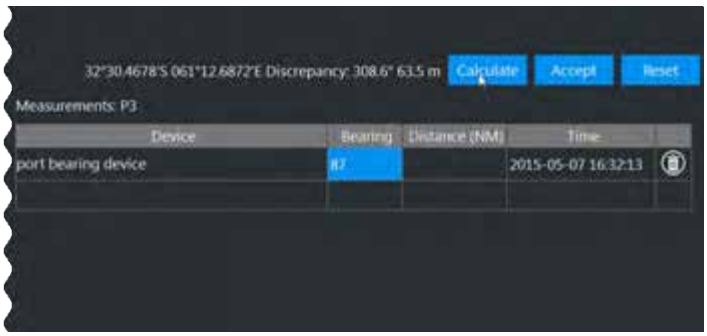


Figure 270 Manual observation: zero value measurement record and LOP

4. Enter measured and corrected bearing and/or distance values in the Bearing and Distance fields: click twice in the field to make it editable and enter the measured value. A LOP is drawn in the chart view according to the indicated value.



Figure 271 Manual observation: LOP adjusted to measured values

5. For the running fix, add other measurements in the Measurements table.
6. Previously taken measurements are transferred according to the distance the own ship has traveled.



Figure 272 Manual observation: LOP is transferred as the own ship moves

7. To delete a measurement, press its delete button: the measurement is deleted from the table as well as from the chart view.

To calculate the position:

1. After adding all required observation points and measurements at the points, calculate the estimated position of the own ship: press the Calculate button.

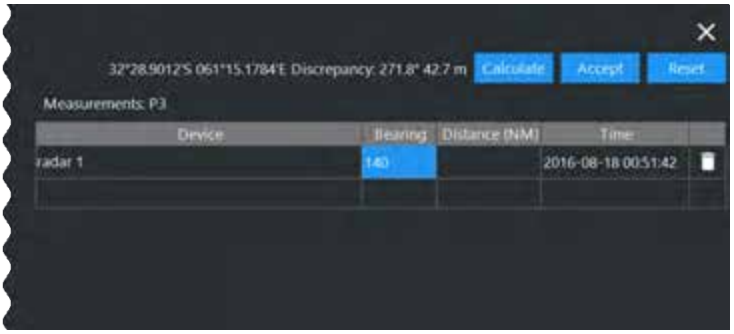


Figure 273 Manual observations: calculating estimated position

2. The estimated position of the own ship is calculated: coordinates and bearing and distance from the current position of the own vessel to the estimated one are displayed in the header of the panel, and an EP symbol is plotted in the chart view.



Figure 274 Manual observation: estimated position symbol

3. If the coordinates are white, the EP is accurate, and you can accept it as position update for dead reckoning. If the coordinates are yellow, the EP is inaccurate, and you are advised to check if the measurements were taken for the right observation points and no major errors were made during measurement.

NOTE:

For 2 bearing or 2 distance LOP's, position is always inaccurate.

For a bearing and distance LOP's, position is always accurate.

For 3 bearing LOP's, position accuracy depends on the size of the cocked hat: the position is accurate if the sides are less than 0.5 NM.

To accept the position:

1. If you decide to accept the calculated position as position update for dead reckoning, press the Accept button: the position is accepted.
2. The EP symbol changes to a DR (dead reckoning) symbol.



Figure 275 Manual observation: EP symbol changes to DR symbol

3. Dead reckoning continues from the new position.
4. A record is made in the Log book in the System section.
5. The position is added to the list of user chart objects.

To reset the manual observation form:

1. Press the Reset button: all data entered in the form is cleared. You can start manual position fixing all over again.

6.3 Voyage

6.3.1 Voyage schedule

To view the schedule of a voyage along a specified route:

1. Go to Main Menu → Voyage: the list of available routes is displayed.



Figure 276 Voyage: list of available routes

2. To display a route in the chart view, tick the check box to the right of the route name.
3. To scroll the chart view to a route, press the go to button of the route.
4. Select a route: the route information tab opens.



Figure 277 Voyage: route information

5. To find out estimated time of arrival, enter departure time to the Departure time field: estimated time of arrival is displayed in the ETA field above the routes list.
6. Time to arrival is displayed in the TTA field.
7. Distance to arrival is displayed in the DTA field.
8. To change the beginning waypoint of the voyage, select a waypoint in the table: this waypoint becomes the start of the voyage and ETA, TTA and DTA are calculated from the selected waypoint; waypoints before the selected waypoint become inactive.



Figure 278 Voyage: selecting beginning waypoint

6.3.2 Starting voyage

Starting voyage means switching the ECDIS to the voyage mode when movement of the own vessel relative to a specified route is monitored.

To start a voyage along a specified route:

1. Go to Main Menu → Voyage: the list of available routes is displayed.
1. Select the route you want to navigate: the route information tab opens. Here you can see the list of waypoints for the route, and information such as the estimated time of arrival (ETA), time to arrival (TTA), and estimated distance to arrival (DTA).
2. Select the waypoint you want to start the voyage with.



Figure 279 Voyage: route information and start tab

3. To start the voyage, press the START button and confirm the operation: route monitoring mode is switched on.

The route monitoring mode has the following indications:

- Route monitoring panel – the route monitoring panel appears below the sensors panel; it displays route monitoring information;
- Route display – the display of the monitored route in the chart view changes: instead of yellow it becomes red;

- START/STOP button – the START button becomes red and changes its label to STOP;
- Some options disappear –the Departure time and Reverse route options disappear.

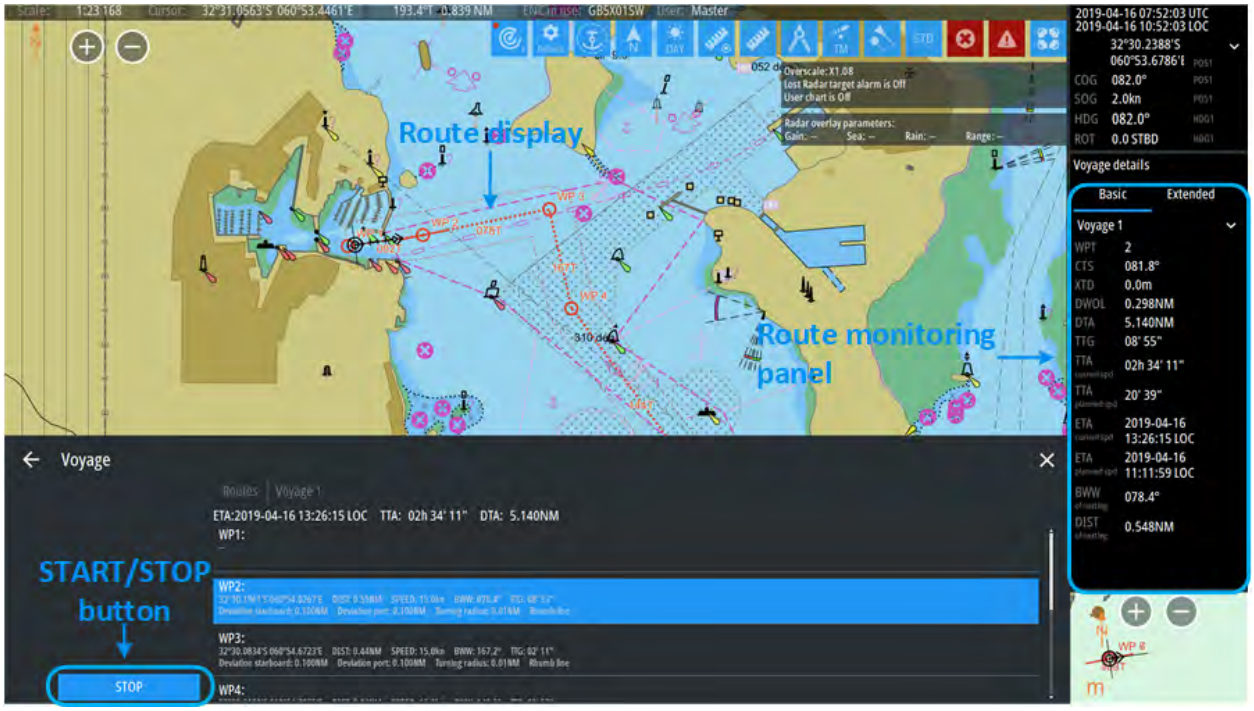


Figure **280** Voyage: Route monitoring mode indications

6.3.3 Reverse voyage

The reverse voyage option the same route to be used for the round-trip voyage.

To reverse a route:

1. Go to Main Menu → Voyage: the list of available routes is displayed.
2. Select the route you want to navigate: the route information tab opens.
3. Set the Reverse route switch 

to the On position: waypoints are reordered in the waypoints list; waypoints are reordered in the chart view when you start voyage.
4. To return to the direct route, set the Reverse route switch to the Off position.

6.3.4 Monitoring voyage

All important voyage monitoring information is displayed in the Route Monitoring panel, in its Basic tab.

You can display or hide some information.

To set up the Route Monitoring panel:

1. Open the options list: press the down arrow to the right of the route name.
2. Check the information you want to display.
3. Clear checks for the information you want to hide.

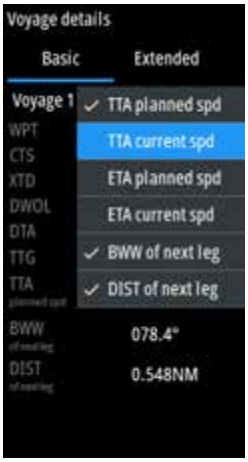


Figure 281 Voyage: route monitoring panel setup

The following information is available:

- Route name – name of the route being monitored;
- WPT – number of the next waypoint;
- CTS – course to steer to stay on the route;
- XTD – cross track distance with indication if the own vessel has deviated from the route to port or to starboard;
- DWOL – distance from the own vessel to the next wheel-over line;
- DTA – distance from the own vessel to the end waypoint of the route;
- TTG – time to go from the current position to the next waypoint; if the own vessel does not move or moves in the opposite direction to the route, TTG is unreachable;

- TTA (current spd) – time to go from the current position to the end of the route based on the current speed; if the own vessel does not move or moves in the opposite direction to the route, TTA is unreachable
- TTA (planned spd) – time to go from the current position to the end of the route based on the planned speed; if the own vessel does not move or moves in the opposite direction to the route, TTA is unreachable
- ETA (current spd) – estimated time of arrival to the end of the route based on the current speed; if the own vessel does not move or moves in the opposite direction to the route, ETA is unreachable.
- ETA (planned spd) – estimated time of arrival to the end of the route based on the planned speed; if the own vessel does not move or moves in the opposite direction to the route, ETA is unreachable.
- BWW (of next) – bearing from the next waypoint to the next but one waypoint.
- DIST (of next) – distance between the next waypoint and the next but one waypoint.

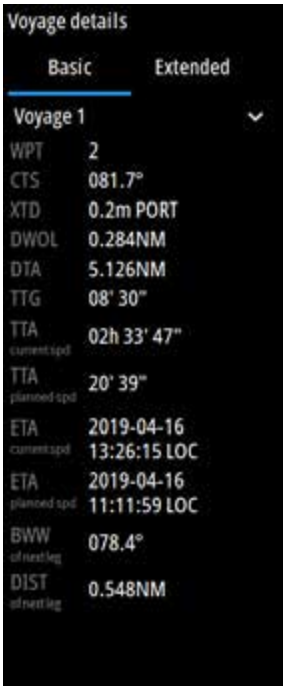


Figure 282 Voyage: route monitoring panel, Basic tab

6.3.5 Voyage monitoring calculator

With the voyage monitoring calculator, you can do the following:

- Calculate estimated time of arrival to a waypoint (WTA) and time to go (TTG) for any waypoint on the route based on planned speed or on current speed of the own vessel.
- Modify speed and recalculate WTA for any waypoint on the route.
- Set WTA for any waypoint on the route and have the required speed calculated.

To use the voyage monitoring calculator, you should first specify the start and the end positions on the route for which to perform the calculations. Then you can calculate the WTA and TTG from the start to the end position based on the planned speed or on the current speed; change the speed value to check the WTA and TTG to the end position; change the WTA to check the speed required to meet the specified WTA value.

To specify the end and the start positions:

1. While in the Voyage monitoring mode, switch to the Extended tab of the Route monitoring panel.
2. Set the start point for the calculation: select it in the From drop-down list. It can be a route waypoint not passed yet or the current position of the own vessel.
3. Set the end point for the calculation: select it in the To drop-down list. It can be any route waypoint not passed yet or the end of route.
4. If the route waypoint specified as the start or the end position has been passed, the start/end position is set to the next following waypoint.
5. You can also select the start and end points in the chart: right-click a route waypoint, select the Voyage Calc option in the pop-up menu that opens, then select the name of the route waypoint, and then select the Select as From option to set the start point, or Select as To option to set the end point.



Figure 283 Voyage monitoring calculator: setting the start position



Figure 284 Voyage monitoring calculator: setting the start/end position on the chart

6. To set the current position as the start point, right-click the route waypoint currently set as the start, select the Voyage Calc option in the pop-up menu that opens, then select the name of the route waypoint, and then select the Reset to current pos option.

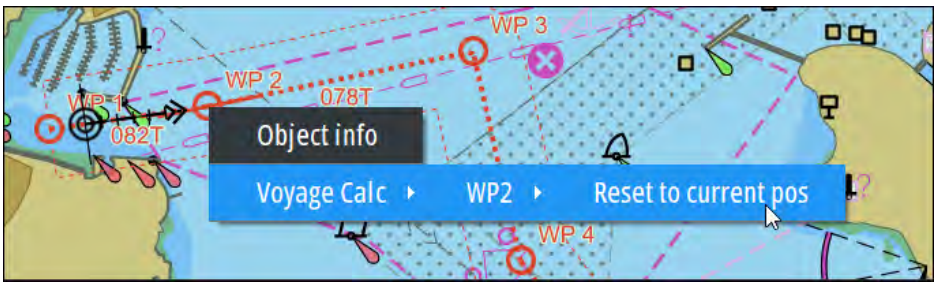


Figure 285 Voyage monitoring calculator: resetting the start to the current position

7. To set the end of route as the end point, right-click the route waypoint currently set as the end, select the Voyage Calc option in the pop-up menu that opens, then select the name of the route waypoint, and then select the Reset to end of route option.
8. If the start waypoint is already selected, and a new end waypoint is selected to be placed at an earlier point of the route than the start waypoint, the start waypoint is reset to the current position of the own vessel.
9. If the end waypoint is already selected, and a new start waypoint is selected to be placed at a later point of the route than the end waypoint, the end waypoint is reset to end of route.

To estimate WTA and TTG based on planned or current speed:

1. While in the Voyage monitoring mode, switch to the Extended tab of the Route monitoring panel.
2. Set the start and end positions for the calculation.
3. To estimate WTA and TTG based on the planned speed, select the Planned speed option in the Based on drop-down list in the Expected results section.
4. To estimate WTA and TTG based on the current speed, select the Current speed option in the Based on drop-down list in the Expected results section.
5. The estimated results are shown in the WTA and TTG lines of the Expected results section.

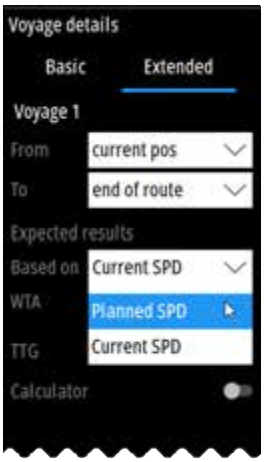


Figure 286 Voyage monitoring calculator: estimate WTA and TTG based on planned speed

To calculate WTA and TTG based on specified speed:

1. While in the Voyage monitoring mode, switch to the Extended tab of the Route monitoring panel.
2. Set the start and end positions for the calculation.
3. Turn on the calculator: set the Calculator switch to the On position.
4. Select the SPD option in the Based on drop-down list: the SPD field below becomes editable and the WTA field uneditable.



Figure 287 Voyage monitoring calculator: calculate WTA and TTG based on specified speed

5. Enter a speed value in the SPD field: the WTA and TTG fields show values calculated based on the specified speed.

To calculate required speed based on specified WTA:

1. While in the Voyage monitoring mode, switch to the Extended tab of the Route monitoring panel.
2. Set the start and end positions for the calculation.
3. Turn on the calculator: set the Calculator switch to the On position.

4. Select the WTA option in the Based on drop-down list: the WTA field below becomes editable and the SPD field uneditable.



Figure 288 Voyage monitoring calculator: calculate speed and TTG based on specified WTA

5. Enter a date and time value in the WTA field: the SPD and TTG fields show values calculated based on the specified WTA.

6.3.6 Voyage alerts

During a voyage, the ECDIS can trigger several voyage alerts. The alerts are indicated in the route monitoring panel.

The following voyage alerts can be triggered:

- Approaching an event mark – alert warning about approaching an event mark on the route; appears at the time or distance before the event mark specified for it;



Figure 289 Voyage: approaching an event mark alert

The alert is duplicated in the Alarms, warnings and cautions panel.

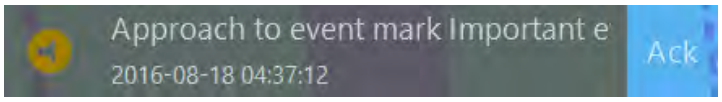


Figure 290 Voyage: duplicated event mark approach alert

- Turning –alert warning about the change of course; triggers when the own vessel crosses a wheel-over line;



Figure 291 Voyage: turning voyage alert

- Off-course – alert warning about going off course; triggers when the course of the own vessel deviates from the course to steer (CTS) by more than 70 degrees;



Figure 292 Voyage: off-course voyage alert

The alert is duplicated in the Alarms, warnings and cautions panel.

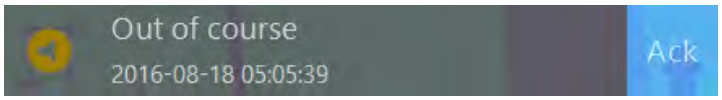


Figure 293 Voyage: duplicated off-course voyage alert

- Deviation from planned route – alert warning about deviation from the planned route; triggers when the own vessel exits the specified corridor.



Figure 294 Voyage: cross track distance exceeded voyage alert

The alert is duplicated in the Alarms, warnings and cautions panel.

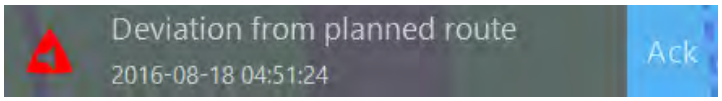


Figure 295 Voyage: duplicated cross track distance exceeded voyage alert

- End of route – alert warning about the end of the route; triggers when the own vessel passes the last waypoint of the monitored route.



Figure 296 Voyage: end of route alert

6.3.7 Finishing voyage

To finish a voyage:

1. Go to the Main menu → Voyage: the voyage monitoring tab opens.
2. To stop the voyage monitoring, press the STOP button: a confirmation dialog opens.

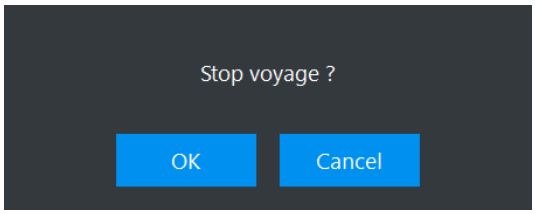


Figure 297 Voyage: stop voyage confirmation dialog

3. Press OK to confirm finishing the voyage: the voyage monitoring mode is switched off.

6.3.8 Route output

The Route output function automatically sends the currently active route to a specified sensor. The route is sent as a set of RTE/WPL sentences.

To use the route output function:

1. Go to Main Menu → Settings → Vessel → Vessel particulars → Route output: the Route output panel opens with settings for this function.



Figure 298 Voyage: Route output

2. To enable the route output function, set the Enabled switch to the On-position.
3. Select sensors to send the route to in the Select sensors list: multiple sensors can be selected. To select a sensor, left-click it: the selected sensor is highlighted in blue. To deselect a sensor, left-click it again: the blue highlight is cleared.
4. Set the interval for sending RTE/WPL sentences to the sensor in the Interval field.
5. Set the number of waypoints to send in the Waypoints field. The real number of waypoints that the application sends to the sensor is the specified number plus one: the last passed waypoint plus the specified number of coming waypoints.
6. After one or more settings are modified, the Apply button becomes active: press the Apply button to save the settings.
7. When a voyage along a route is started in the ECDIS, the application automatically sends the active route to the specified sensor. When the voyage is finished, the transmission stops.

NOTE:

If you use the automatic route output function, the output includes only a specified number of waypoints. To send the whole route to an output sensor, use the Route export function (see chapter 5.13.2, Exporting to an output sensor).

6.4 Navigational Chart Settings

6.4.1 Show vessel

The ECDIS provides a special chart view mode to constantly keep the own vessel in the chart view.

This mode is indicated with a special indicator in the upper-right corner of the chart view: when the indicator is displayed, the *show vessel* mode is OFF; when the indicator is hidden, the mode is ON.



Figure 299 Show vessel indicator

To turn on the *show vessel* mode:

1. Press the Show vessel indicator in the upper-right corner of the chart view: the indicator disappears, the chart view is panned to display the own vessel, and the own vessel now stays in the chart view constantly.

NOTE:

The show vessel mode is automatically turned off every time you scroll the chart view: the Show vessel indicator in the upper-right corner of the chart view appears; and when the own vessel moves out of the chart view, the chart view is not scrolled to display the own vessel.

6.4.2 Chart orientation

To select a chart orientation option:

2. Go to Main menu → Settings → Chart → Navigational settings.
3. Select a chart orientation option in the Chart orientation drop-down list.

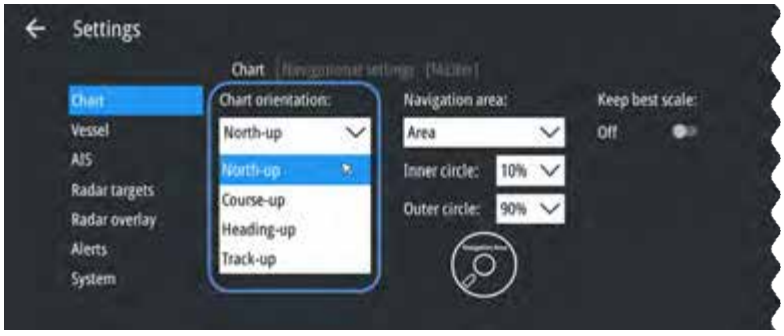


Figure 300 Chart orientation mode

4. The chart orientation set-up is also available in the shortcuts tab (Main menu → Shortcuts).

5. The third way to set up chart orientation is to use the Chart orientation indicator at the top of the chart view: press the indicator to switch between chart orientation options.

The following chart orientation options are available:

- North-up –the chart is oriented north up;
- Course-up – the chart is oriented course up; only available when the *show vessel* mode is on and the vessel is moving;
- Heading-up – the chart is oriented heading up; only available when the *show vessel* mode is on and the vessel is moving;
- Track-up – the chart is oriented route up; only available when the *route monitoring* mode is on.

NOTE:

When the SOG of the own vessel is less than 1.0 knot, chart orientation is automatically set to North-up, and other chart orientation options become unavailable.

6.4.3 Own ship motion mode

The own ship motion mode determines the way the own ship motion is displayed in the chart view.

To select the own ship motion mode:

1. Go to Main menu → Settings → Chart → Navigational settings.
2. Select an own ship motion mode option in the Own ship motion mode drop-down list.



Figure 301 Vessel motion mode

3. You can also use the Own ship motion mode indicator  at the top of the chart view: press the indicator to switch between motion mode options.

The following vessel motion options are available:

- True  –the own vessel moves across the chart and the chart stays in the same position. When the vessel reaches a predefined distance from the center of the chart view, the chart is redrawn, and the vessel is moved to its initial position in the chart view (but not in the chart). The redraw position can be set up in the Navigation area section (see description in the next chapter).
- Relative  – the own vessel stays in the same position in the chart view, and the chart moves as the position of the vessel changes. The vessel position in the chart view can be set up in the Navigation area section (see description in the next chapter).

6.4.4 Navigation area

The Navigation area setting defines where the own vessel is displayed in the chart view. The Navigation area can be set as an area or as a fixed position in the chart view.

To set up the Navigation area as an area:

1. Go to Main menu → Settings → Chart → Navigational settings.
2. Select the Area option in the Navigation area drop-down list: the area set-up options appear.



Figure 302 Navigation area: area set-up

3. Set the inner circle size in the Inner circle drop-down list (percentage of the chart view size): in the *True motion* mode, when the own vessel reaches the inner circle, the chart is redrawn, and the own vessel is moved back to the outer circle.
4. Set the outer circle size in the Outer circle drop-down list (percentage of the chart view size): in the *True motion* mode, the initial position of the own vessel lies on the outer circle; in the *Relative motion* mode, the own vessel is constantly positioned on outer circle in the chart view.

To set up the Navigation area as a fixed position:

1. Go to Main menu → Settings → Chart → Navigational settings.
2. Select the Fixed position option in the Navigation area drop-down list: the fixed position set-up options appear.

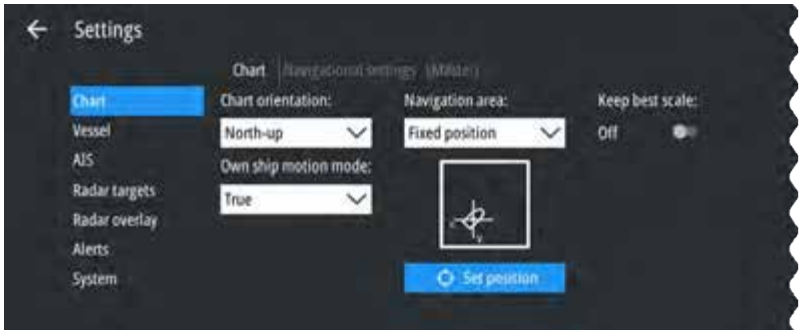


Figure 303 Navigation area: fixed point set-up

3. Press the Set position button: now you are in the position plotting mode.
4. Left-click in the chart view to plot the vessel's position: the vessel is moved to the specified position. From now on, when the Fixed position option is selected, the vessel is constantly displayed in the last specified position.

6.4.5 Keep best scale

The Keep best scale option turns on automatic display of charts with the largest scale available for the current position of the vessel in the chart view and keeps doing so as the vessel proceeds.

The Keep best scale option is only available if the *show vessel* mode is on.

To turn on the Best scale option:

1. Go to Main menu → Settings → Chart → Navigational settings.
2. Set the Keep best scale switch to the On position.

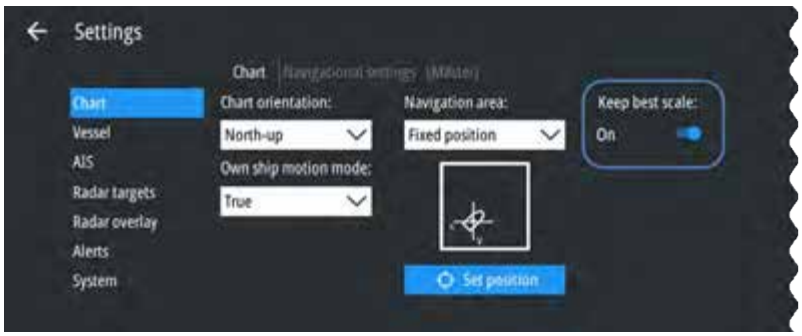


Figure 304 Keep best scale

3. The Keep best scale switch is also available in the Shortcuts tab (Main menu → Shortcuts).

NOTE:

When you change the chart scale manually, the Keep best scale option turns off.

6.4.6 Port Mode

In Port Mode, the ECDIS continues to receive and log sensor data as during normal operation. However, sensor alerts are disabled. All other alerts are raised as normal, and chart representation of dangerous targets is unaffected.

It is not possible to enter Port Mode if the vessel is in Voyage Mode, if Speed Over Ground is above a specific threshold, or if Speed Over Ground is not supplied by a valid sensor (Dead Reckoning). If attempting to enter Port Mode in these cases, a dialog will inform that Port Mode cannot be activated, and normal operation will proceed unaffected.

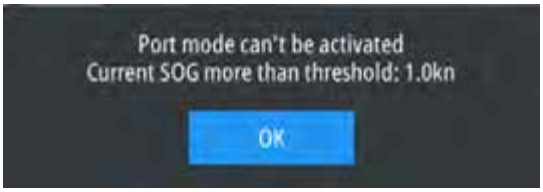


Figure 305 Port mode warning dialog

The maximum allowed Speed Over Ground for which Port Mode will be allowed can be configured between 0.1 and 2.0 knots in the Port Mode tab in the ECDIS Management Menu -> Port Mode/Hot Standby configuration.
Furthermore, Port Mode can be totally disabled using a button in the configuration page.



Figure 306 Port Mode and Hot Standby configuration

To enter Port Mode:

1. Press the Port Mode indicator  in the indicators area.

When active, Port Mode will be indicated by a bold “PORT MODE” text indication in the upper left corner of the chart.
Furthermore, the Port Mode indicator displays whether Port Mode is active or not by a green dot in the upper left corner of the indicator.



Figure 307 Indication of active Port Mode

It is possible to leave Port Mode either automatically or manually.

To manually leave Port Mode:

1. Press the Port Mode indicator  in the indicators area.

To automatically leave Port Mode:

If the vessel Speed Over Ground exceeds the configured maximum SOG threshold, if the SOG source sensor fails to supply a valid Speed Over Ground, or if a voyage is started, Port Mode will be disabled automatically.

6.4.7 Hot Standby

In Hot Standby, the ECDIS operates with a blanked monitor, but with all other functionality remaining as prior to blanking the monitor.

As for Port Mode, it is possible to enter Hot Standby only if the vessel is not in Voyage Mode, and if Speed Over Ground is below a specific threshold. If attempting to enter Hot Standby in these cases, a dialog will inform that Hot Standby cannot be activated, and normal operation will proceed unaffected.

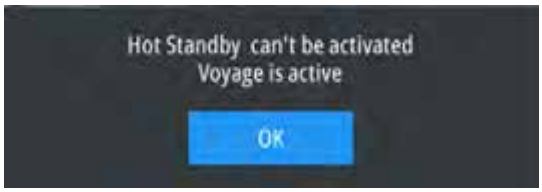


Figure 308 Hot standby warning dialog

The maximum allowed Speed Over Ground is the same as configured for Port in the ECDIS Management Menu -> Port Mode/Hot Standby configuration.
In the same configuration page, it is possible to configure a cursor deadzone, defined as the number of pixels the cursor is allowed to move per second without leaving Hot Standby.
Furthermore, Hot Standby can be totally disabled using a button in the configuration page.

To enter Hot Standby:

1. Go to the Settings → System.
2. Set the Hot Standby switch to the On position.



Figure 309 Chart underscaling set-up

3. The Hot Standby option is also available in the shortcuts tab (Main menu → Shortcuts).

When Hot Standby is active, the screen will be blanked apart from a moving indication of current time. If Port Mode is active during Hot Standby, this will be indicated in the moving indication as well.

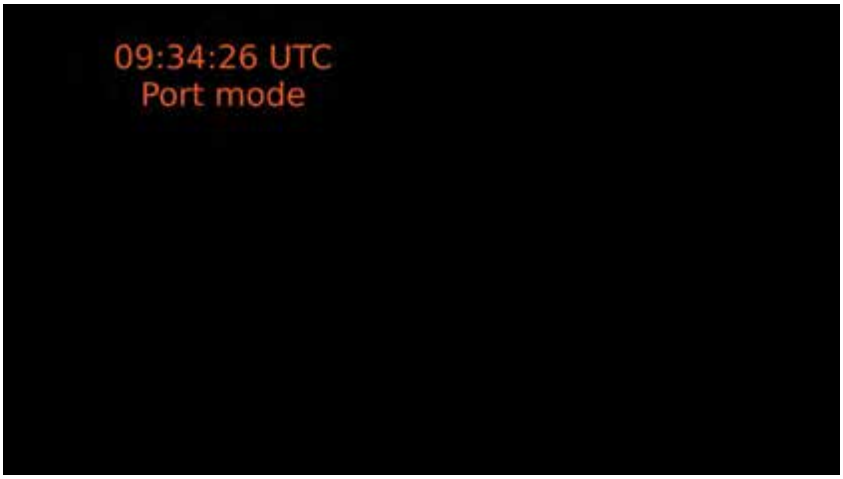


Figure 310 Hot standby indication on screen during Port Mode

To manually leave Hot Standby:

Move the cursor more than the configured deadzone, or press a key (function keys F1-F12 and PrtScn are exceptions).

Please note that there will be a two second delay after entering Hot Standby, before it is possible to manually leave it.

To automatically leave Hot Standby:

If the vessel Speed Over Ground exceeds the configured maximum SOG threshold, if an audible alert is given, or if the SOG source sensor fails to supply a valid Speed Over Ground, Hot Standby will be disabled automatically.

Apart from this, the mariner will be able to manually leave Hot Standby by moving the cursor more than what is configured as deadzone.

7 Safety of Navigation

7.1 Grounding Check

Grounding check is used to warn the user about dangerous objects inside a specified zone ahead of the own ship. Grounding check works constantly.

Grounding check can be configured in the Main menu → Settings → Alerts → Grounding check panel (*for more details, see chapter 14.1, Grounding Check Setup*).

7.1.1 Viewing grounding check results

The grounding check zone can be displayed in the chart view or hidden. If the zone is displayed, you can see its outlines. Dangerous objects inside the zone are marked with yellow outlines.



Figure 311 Guard zone display on



Figure 312 Guard zone display off

If a dangerous object is detected inside the grounding check zone, the Grounding check indicator appears in the upper-right corner of the chart view.

To view dangers and cautions:

1. Press the Grounding check indicator in the upper-right corner of the chart view: the Grounding check panel opens with the list of dangers and the list of cautions.



Figure 313 Grounding check panel

2. To expand the lists, press the expand icon in the list header.
3. To collapse the lists, press the collapse icon in the list header.

NOTE:

Dangers are objects that should be avoided at all cost; ignoring them can lead to a collision or grounding (shoreline, rocks, etc.).

Cautions are mostly areas with special navigational conditions where the mariner should exercise caution (territorial see areas, restricted areas, etc.).

4. To highlight an object in the chart view, press the highlight icon of the object. To remove highlight, press the Clear highlight button in the upper-right corner of the panel.
5. To view full information about an object, select it: the panel with information opens.



Figure 314 Grounding check: object information

6. To return to the list of dangers and cautions, press the Inspector button.
7. To close the panel, press the exit button in the upper-left corner: the previously viewed panel opens.

7.1.2 Updating grounding check information

Grounding check information is updated as the own vessel together with the grounding check zone proceeds along its route, which is displayed in

the chart view. You can specify how often the grounding check information should be updated in the Grounding check panel.

To specify grounding check data update frequency:

1. Open the Grounding check panel by clicking the Grounding check indicator: in the upper-right corner of the panel, data update controls are displayed.

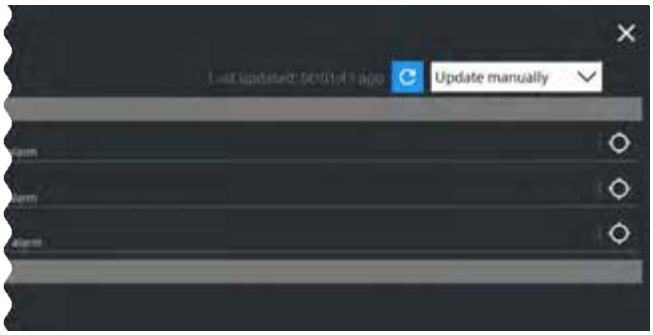


Figure 315 Grounding check: data update controls

2. Time since the last data update is indicated in the Last updated field.
3. To select time for automatic update, open the drop-down list to the right and select one of the options: the Update in field appears where time to next update is displayed.



Figure 316 Grounding check: data update options

4. To update data manually, select the Update manually option and press the update button each time you want to update information: the data is updated, and the Last updated time is set to zero.

NOTE:

If the Dangers and Cautions list in the Grounding check panel is updated too often, it can make reading the information difficult.

7.2 AIS

The ECDIS implements full support for AIS (Automatic Identification System). The AIS function includes receiving and viewing AIS data as well as displaying AIS targets in the chart view.

7.2.1 Viewing AIS information

To view information about tracked AIS targets:

1. Go to Main Menu → Layers → AIS: the AIS targets list panel opens with the list of all tracked targets with brief information.

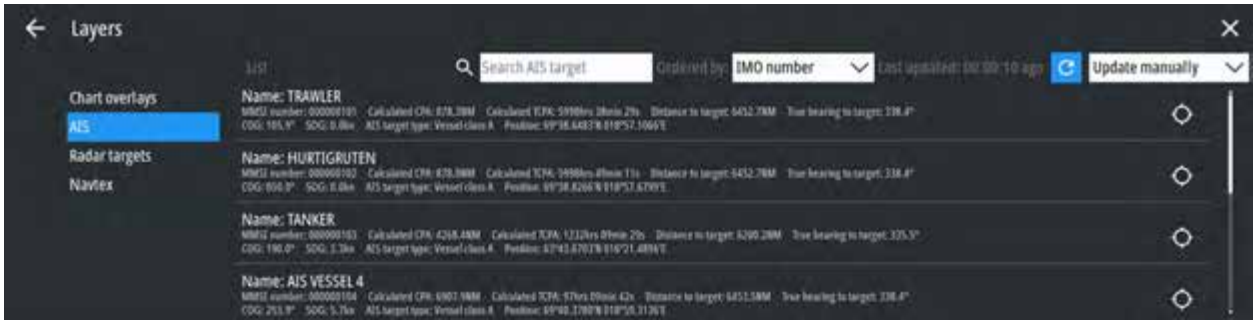


Figure 317 AIS targets list

2. To view full information of an AIS target, select it in the list: the target information table opens. Scroll down to view all parameters.



Figure 318 AIS target full information

Short AIS information contains the following data:

- Name – AIS target name;
- MMSI number – AIS target MMSI;
- Calculated CPA – distance between the AIS target and the own vessel in the closest point of approach;
- Calculated TCPA – time to CPA; if the CPA was passed, the TCPA is negative;
- Distance to target – distance between the AIS target and the own vessel;
- True bearing to target – true bearing to the AIS target from the own vessel;
- Course over ground – Course over ground of the target;
- Speed over ground – Speed over ground of the target;
- AIS target type – AIS type if available;
- Position – Position of the target (latitude and longitude).

7.2.2 Searching and ordering AIS targets list

For more convenient work with the AIS targets list, search and order functions are available.

To search AIS targets in the list:

1. Go to Main Menu → Layers → AIS: the AIS targets list panel opens.
2. Start entering the name or the MMSI number of the AIS target you want to find in the Search AIS target field: the list of AIS targets is reduced to display only the targets that have the symbols you are entering in their names or in their MMSI numbers.



Figure 319 AIS: Search AIS target

3. To exit the Search mode, clear the Search AIS target field: the full list of AIS targets is displayed.

To order AIS targets in the list:

1. Go to Main Menu → Layers → AIS: the AIS targets list panel opens.
2. Select an ordering option in the Ordered by drop-down list: the targets are ordered according with your selection. Name, MMSI, IMO Number, Distance to target, CPA, TCPA options are available.

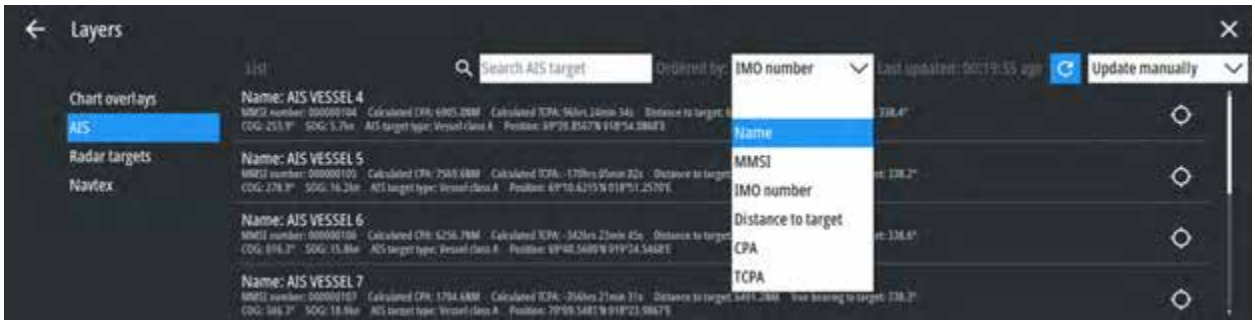


Figure 320 AIS: Order AIS targets

7.2.3 AIS full information

Full information contains the following data:

- MMSI number – Maritime Mobile Service Identity of the target;
- Name – name of the target;
- Calculated CPA – distance between the AIS target and the own vessel in the closest point of approach;
- Calculated TCPA – time to CPA; if the CPA was passed, the TCPA is negative;
- Distance to target – distance between the AIS target and the own vessel;
- True bearing to target – true bearing to the AIS target from the own vessel;
- Course over ground – course over ground of the target;
- Speed over ground – speed over ground of the target;
- AIS target type – type of the target if available;
- Position – latitude and longitude of the target;
- Relative bearing to target – relative bearing;
- ETA – estimated time of arrival of the target to its destination;
- Navigational status – navigational status of the target;
- Destination – destination of the target;
- Rate of turn – rate of turn of the target;
- Heading – heading of the target;
- Position accuracy is High flag – accuracy of the target position;

- IMO number – International Maritime Organization number of the target;
- Call sign – call sign of the target;
- Type of ship and cargo type – type of ship and cargo type of the target;
- EPFD type – type of the target's electronic position fixing device;
- Maximum draft in meters – maximum possible draft of the target;
- Dimension from CCRP to bow – distance from the target's CCRP to its bow;
- Dimension from CCRP to stern – distance from the target's CCRP to its stern;
- Dimension from CCRP to port – distance from the target's CCRP to its port side;
- Dimension from CCRP to starboard – distance from the target's CCRP to its starboard side;
- Repeat count – repeat count;
- VTS-generated target – indicates if the target is generated by the VTS.

7.2.4 Updating AIS information

AIS data coming from the AIS device is updated every second. You can specify how often AIS information displayed in the Layers → AIS panel should be updated.

To specify AIS data update frequency:

1. Go to Main Menu → Layers → AIS: the AIS targets list panel opens. In the upper-right corner of the panel, time since the last data update is indicated in the Last updated field.



Figure 321 AIS data update frequency

2. To select time for automatic update, open the drop-down list to the right and select one of the options: the Update in field appears where time to next update is displayed.

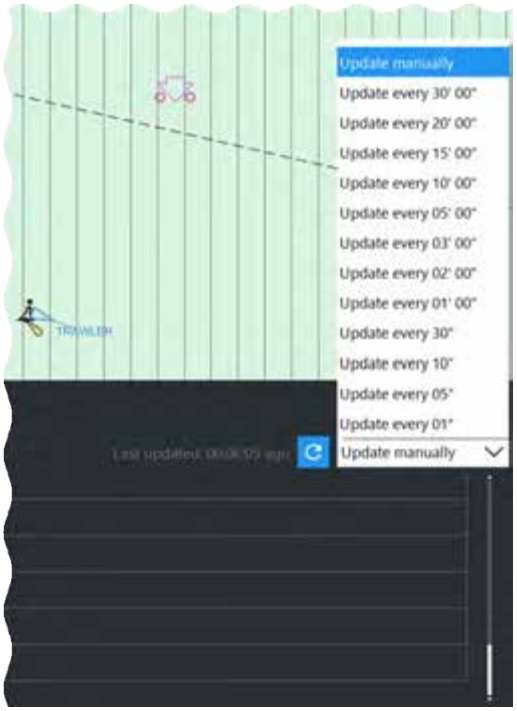


Figure 322 AIS data update options

3. To update data manually, select the Update manually option and press the update button each time you want to update information: the data is updated, and the Last updated time is set to zero.

NOTE:

If the AIS targets list in the AIS panel is updated too often, it can make reading the information difficult.

7.2.5 AIS quick info

To view information about AIS targets directly in the chart view, use the AIS quick info function.

To use the AIS quick info function:

1. Right-click an AIS target: the AIS quick info window opens with the list of all AIS targets under the mouse pointer.

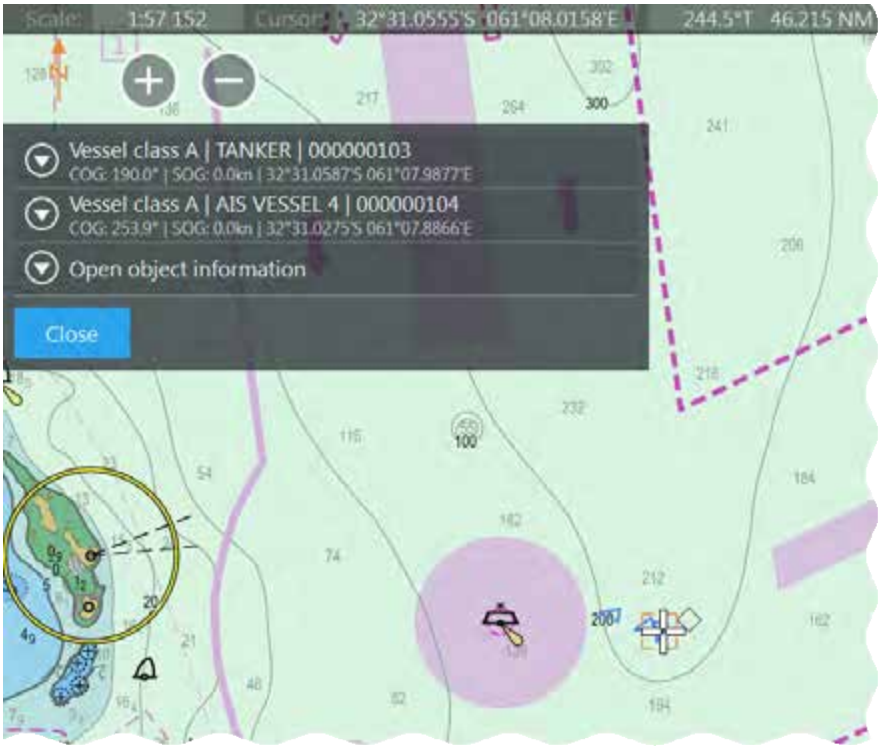


Figure 323 AIS quick info: AIS targets under mouse pointer

2. To open full information about an AIS target, select the target in the list: the full information window opens. To close the information window, press Close.



Figure 324 AIS quick info: full information window

3. To acknowledge an AIS target in the AIS quick info window, press the target's Ack 

button. It appears if the target needs to be acknowledged.
4. To open the Object information panel, select the Open object information option in the AIS quick info window.

NOTE:

Generally, the Object information panel opens when right-clicking in the chart view. However, if there is an AIS target under the mouse pointer, the AIS quick info window opens.

In this situation, you can only access the Object information panel from the AIS quick info window.

5. To close the AIS quick info window, press Close.

7.2.6 Displaying AIS targets

If display of AIS targets is turned on, you can see tracked targets in the chart view. Targets are visible if they are inside the specified visibility range.

To turn on the display of AIS targets:

1. Go to Main Menu → Layers → Chart overlays: the list of available chart overlays opens.
2. Set the AIS overlay switch to the On position.



Figure 325 Layers – Chart overlays panel

3. Another way to turn on the display of AIS targets together with radar targets is to press the Targets display indicator in the Indicators area of the chart view.
4. When display of targets is on, the indicator turns blue.

To scroll the chart view to a specified AIS target:

1. Go to Main Menu → Layers → AIS: the list of available targets opens.
2. Find the target you want to go to in the chart view and press its go to button: the chart view is scrolled to display the target.

7.2.7 AIS target activation and danger ranges

The following AIS target status range can be specified:

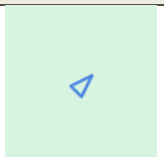
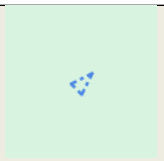
- Activation range – when a target is inside the activation range, it becomes activated: its symbol changes and additional information about the target appears in the chart view (name, COG, SOG);

NOTE:

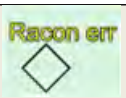
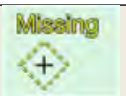
To set AIS range, see chapter 11.1.7, Activation range circle.

7.2.8 AIS symbols

The table below represents AIS symbols used in the ECDIS to display AIS targets depending on their type, presence of the target signal, distance from the own vessel. Dangerous targets will be displayed as blinking red, but no alerts will be generated.

Symbol name and description	Signal	Distance to own vessel	Image
AIS Targets			
Sleeping target A target symbol indicating the presence and orientation of an object equipped with an AIS in a certain location.	Yes	AIS target visibility range	
Sleeping target A symbol representing a sleeping AIS target If the target's CPA/TCPA cannot be calculated.	Yes	AIS target visibility range	
Active target A symbol representing the automatic or manual activation of a sleeping target for the display of additional graphically presented information, including a vector (speed and course over ground), the heading, and ROT or direction of turn indicator (if available) to display actual initiated course changes.	Yes	AIS target activation range	
Active target A symbol representing an active AIS target If the target's CPA/TCPA cannot be calculated.	Yes	AIS target activation range	
Lost target A symbol representing the last valid position of an AIS target before reception of data was interrupted.	No	AIS target visibility range	

Symbol name and description	Signal	Distance to own vessel	Image
AIS Aids to Navigation (ATON) – Physical			
Active ATON on position A basic symbol representing an active ATON on position.	Yes	AIS target visibility range	
Active ATON on position (ATON symbols depending on purpose) Purpose of ATONs is indicated only if they are selected.	Yes	AIS target visibility range	
Racon			
Emergency wreck mark			
North cardinal mark			
East cardinal mark			
South cardinal mark			
West cardinal mark			
Port hand mark			
Starboard hand mark			
Isolated danger			
Safe water			
Special mark			
Active ATON off position A symbol representing an active ATON out of position.	Yes	AIS target visibility range	
Active ATON with failed lights A symbol representing an active ATON with failed lights.	Yes	AIS target visibility range	

Symbol name and description	Signal	Distance to own vessel	Image
Active ATON with failed Racon A symbol representing an active ATON with failed Racon.	Yes	AIS target visibility range	
Lost ATON A symbol representing the last valid position of an ATON before reception of data was interrupted.	No	AIS target visibility range	
Missing ATON A charted ATON is absent.	Yes	AIS target visibility range	
AIS Aids to Navigation (ATON) – Virtual			
Active ATON on position A symbol representing an active ATON on position.	Yes	AIS target visibility range	
Active ATON on position (ATON symbols depending on purpose)	Yes	AIS target visibility range	
Emergency wreck mark			
North cardinal mark			
East cardinal mark			
South cardinal mark			
West cardinal mark			
Port hand mark			
Starboard hand mark			
Isolated danger			
Safe water			
Special mark			

Symbol name and description	Signal	Distance to own vessel	Image
Lost ATON A symbol representing the last valid position of an ATON before reception of data was interrupted.	No	AIS target visibility range	
AIS Search and Rescue Transmitters (AIS SART)			
Active AIS SART A symbol representing an active AIS SART.	Yes	AIS target visibility range	
Lost AIS SART A symbol representing the last valid position of an AIS SART before reception of data was interrupted.	No	AIS target visibility range	
AIS Search and Rescue Aircrafts			
Active AIS SAR Aircraft A symbol representing an active AIS SAR Aircraft.	Yes	AIS target visibility range	
Lost AIS SAR Aircraft A symbol representing the last valid position of an AIS SAR Aircraft.	No	AIS target visibility range	
AIS Base Stations			
Active AIS Base Station A symbol representing an active AIS Base station.	Yes	AIS target visibility range	
Lost AIS Base Station A symbol representing the last valid position of an AIS Base station.	No	AIS target visibility range	

7.2.9 Own vessel's AIS information

The ECDIS can read and display AIS information of the own vessel.

To view own vessel's AIS information:

1. Make sure the ECDIS listens to VDO sentences: go to Main menu → Settings → Vessel → Sensors and select the AIS sensor. The VDO mnemonic should be checked.

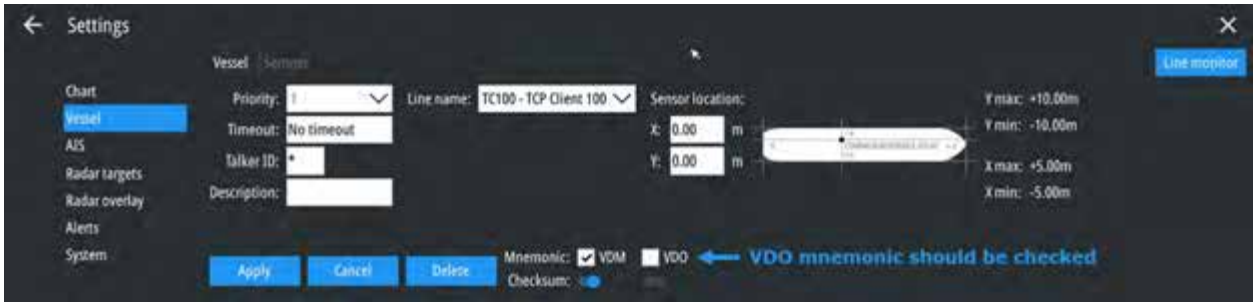


Figure 326 Own vessel's AIS: VDO mnemonic should be checked

2. To view own vessel's AIS information, go to Main menu → Layers → AIS: the own vessel's AIS information is marked with the "Own ship" label.

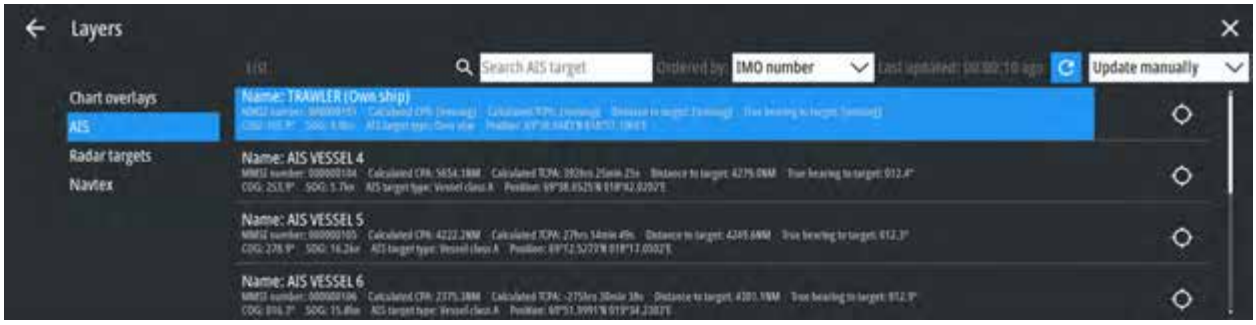


Figure 327 Own vessel's AIS: view information

3. To view detailed information, select the own vessel in the targets list: the detailed information table opens.

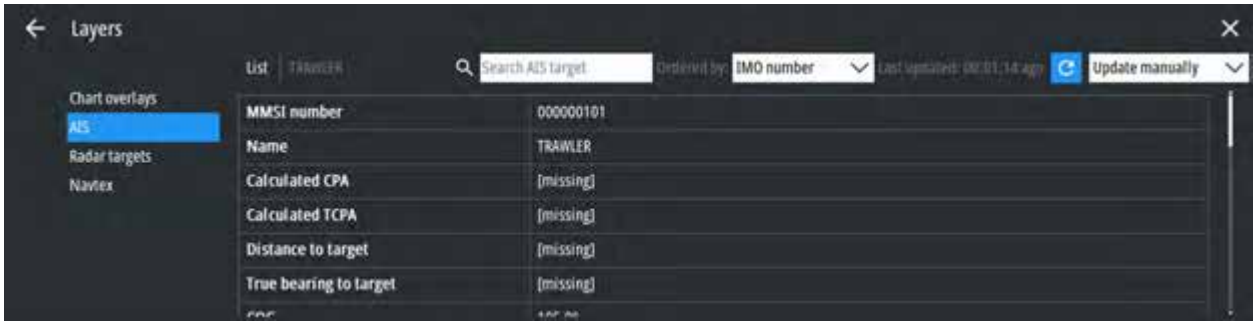


Figure 328 Own vessel's AIS: detailed information

7.2.10 Associated AIS and radar targets

If a tracked radar target and a reported AIS target have similar parameters (for example position, course, speed) that comply with the association algorithm, the two targets can be associated, i.e. displayed as one target using a single symbol.

By default, an associated target is represented with a radar target symbol. The user can select to use AIS symbols for display of associated targets.

To enable/disable associations:

1. Go to Main Menu → Settings → Radar targets → Configuration.
2. To enable targets associations, set the Enable AIS/Radar targets associations switch to the On position.

To use AIS symbols for associated targets:

1. Go to Main Menu → Settings → AIS → Display settings → Other.
2. Set the Show associated targets as AIS switch to the On position.

NOTE:

No special symbol for associated targets is provided. The same symbols as for radar or AIS targets (depending on the setting) are used. See chapters 7.2.8, AIS symbols and 7.3.4, Radar target symbols.

7.3 Radar Targets

The ECDIS implements support for radar tracked targets. The radar targets function includes receiving and viewing radar data as well as displaying radar targets in the chart view.

7.3.1 Viewing radar target information

To view information about tracked radar targets:

1. Go to Main Menu → Layers → Radar targets: the panel with the list of all tracked radar targets opens.



Figure 329 Radar targets list

2. For each target, brief information is provided consisting of the following data:
   a) Name – radar target name;
   b) Number – radar target number;
   c) Source device name – name of the source device;
   d) Reference target – indication if the target is a reference target;
   e) Course over ground – course over ground of the target;
   f) Speed over ground – speed over ground of the target;
   g) Heading – heading of the target;
   h) Calculated CPA – distance between the radar target and the own vessel in the closest point of approach;
   i) Calculated TCPA – time to CPA; if the CPA has been passed, the TCPA is negative;
   j) True bearing to target – true bearing from the own vessel's CCRP to the target;
   k) Relative bearing to target – relative bearing from the own vessel's CCRP to the target;
   l) Distance to target – distance from the own vessel's CCRP to the target;
   m) Position – latitude and longitude of the target.

7.3.2 Updating radar target information

Radar target data coming from the radar device is updated regularly. You can specify how often radar target information displayed in the Layers → Radar targets panel should be updated.

To specify radar target data update frequency:

1. Go to Main Menu → Layers → Radar targets: the radar targets list panel opens. In the upper-right corner of the panel, time since the last data update is indicated in the Last updated field.

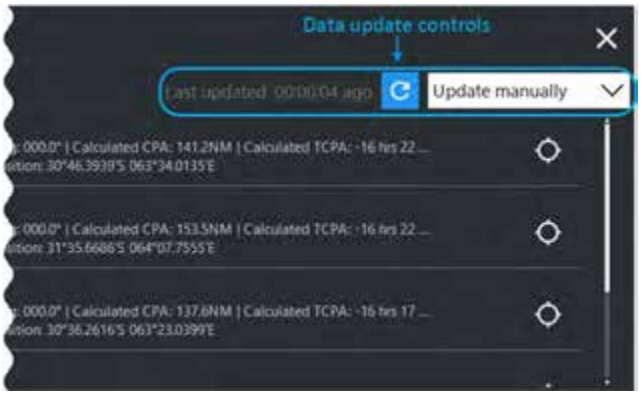


Figure 330 Radar target data update frequency

2. To select time for automatic update, open the drop-down list to the right and select one of the options: the Update in field appears where time to next update is displayed.



Figure 331 Radar target data update options

3. To update data manually, select the Update manually option and press the update button each time you want to update information: the data is updated and the Last updated time is set to zero.

NOTE:

If the radar targets list in the Radar targets panel is updated too often, it can make reading the information difficult.

7.3.3 Displaying radar targets

If display of radar targets is turned on, you can see tracked targets in the chart view. Targets are visible regardless of their distance to the own vessel.

To turn on the display of radar targets:

1. Go to Main Menu → Layers → Chart overlays: the list of available chart overlays opens.
2. Set the Radar targets overlay switch to the On position.



Figure 332 Layers – Chart overlays panel

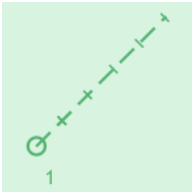
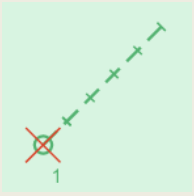
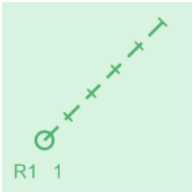
3. Another way to turn on the display of radar targets together with AIS targets is to press the Targets display indicator in the Indicators area of the chart view.
4. When display of targets is on, the indicator turns blue.

To scroll the chart view to a specified radar target:

1. Go to Main Menu → Layers → Radar targets: the list of available targets opens.
2. Find the target you want to go to in the chart view and press its go to button: the chart view is scrolled to display the target.

7.3.4 Radar target symbols

The table below represents radar target symbols used in the ECDIS to display radar targets depending on their type, presence of the target signal, distance from the own vessel, CPA and TCPA to the own vessel. Dangerous targets will be displayed as blinking red, but no alerts will be generated.

Symbol name and description	Signal	Distance to own vessel	Image
AIS Targets			
Tracked target A radar target detected and tracked.	Yes	Any distance	
Lost target A symbol representing the last valid position of a target before reception of data was interrupted.	No	Any distance	
Reference target Tracked radar targets designated as reference targets are labeled with the letter “R”.	Yes	Any distance	
Target in acquisition state Radar targets in acquisition state.	Yes	Any distance	

7.3.5 Associated AIS and radar targets

If a tracked radar target and a reported AIS target have similar parameters (for example position, course, speed) that comply with the association algorithm, the two targets can be associated, i.e. displayed as one target using a single symbol.

For more information, see chapter *7.2.10, Associated AIS and radar targets*.

7.4 Navtex Messages

The ECDIS implements support of Navtex (Navigational Telex) messages.

To receive Navtex messages, a Navtex receiver should be registered and set up in the ECDIS as one of vessel sensors.

If a Navtex message has come, the Navtex message indicator 

appears in the indicators area. Press the indicator to open the Navtex panel and to view the received message.

7.4.1 Viewing Navtex Messages

To view received Navtex messages:

1. Go to Main menu → Layers → Navtex: the Navtex panel opens with the list of all received Navtex messages.

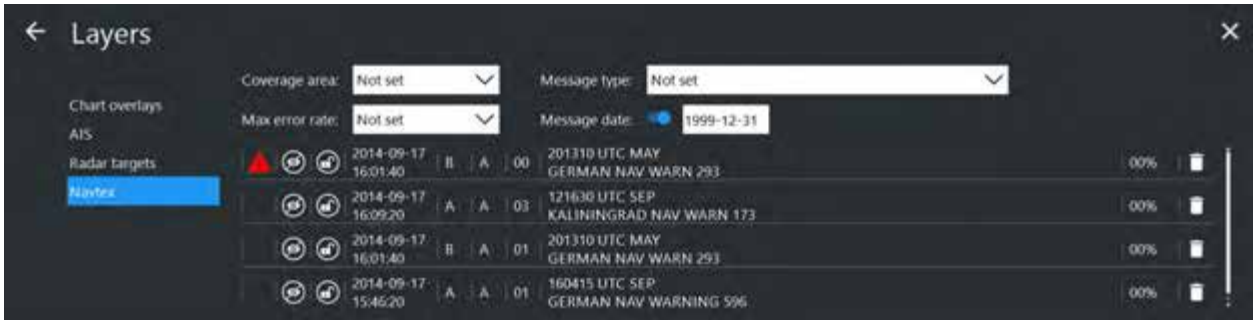


Figure 333 Navtex panel

2. You can lock a message so that it cannot be deleted. To lock a message, press its Lock button : it changes to display a closed lock . To unlock a message, press the Lock button again: the lock is open.

3. To view a full message, press its first two lines: the full message panel opens. To close the panel, press the Finish button in the lower-right corner.



Figure 334 Navtex: full message panel

4. To delete a message, press its delete button : only unlocked messages can be deleted.

The following information is displayed in the Navtex messages list:

a) Importance indicator – if a message requires immediate attention, it is marked with the Important icon .
b) Viewed/Not-viewed indicator – Messages that haven't been viewed yet are marked with the Not-viewed icon . Messages that have already been viewed are marked with the Viewed icon .
c) Locked/Unlocked indicator – if a message is locked, its Lock icon displays a closed lock ; if a message is unlocked, its Lock icon displays an open lock . To lock/unlock a message, press its Lock icon.
d) Date and time – date and time when the message was sent.
e) Coverage area – indicator of the coverage area of the message.
f) Message type – indicator of the message type of the message;
g) Message ID – ID number of the message; ID "00" is reserved for important messages.

h) Message text – first two lines of the message are displayed. Press the text to view the full message.

i) Corrupted symbols indicator – indicates percentage of corrupted symbols in the message.

j) Delete button – deletes an unlocked message.

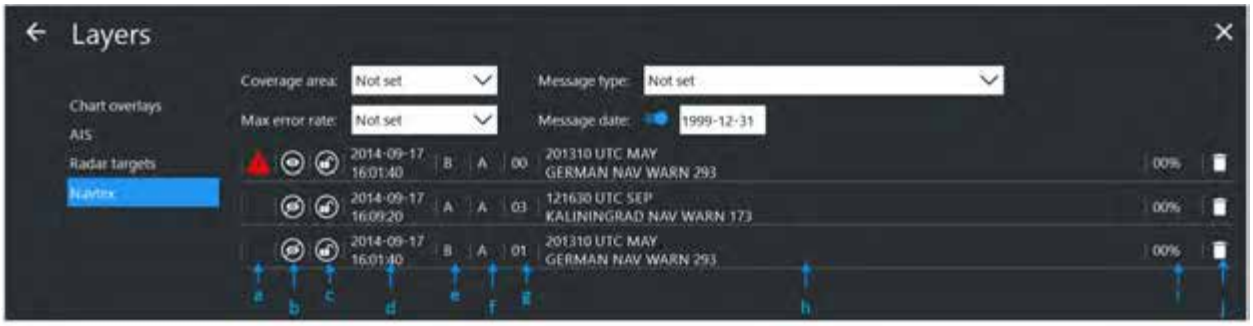


Figure 335 Navtex: message information

7.4.2 Filtering Navtex Messages

You can filter received Navtex messages by coverage area, message type, maximum error rate, and message date.

To filter received Navtex messages:

1. Go to Main menu → Layers → Navtex: the Navtex panel opens with the list of all received Navtex messages.
2. To filter messages by coverage area, select a filtering option in the Coverage area drop-down list. To remove the filter, select the Not set option.
3. To filter messages by message type, select a filtering option in the Message type drop-down list. To remove the filter, select the Not set option.
4. To filter messages by maximum error rate, select a filtering option in the Max error rate drop-down list. To remove the filter, select the Not set option.
5. To filter messages by date, set the Message date switch to the On position and enter a date to the date field. To remove the filter, set the Message date switch to the Off position.

7.4.3 Creating Navtex Chart Objects

If a Navtex message contains coordinates of an area to which it is applied, you can create a chart object and plot it in the chart view.

To create a Navtex chart object:

1. Go to Main menu → Layers → Navtex: the Navtex panel opens with the list of all received Navtex messages.
2. Open the message that you want to plot in the chart view: the full message panel opens.
3. If the message contains coordinates, the ECDIS parses them and adds to the Geometry table.



Figure 336 Navtex: Geometry table

4. You can add additional points if necessary: click twice in the Latitude field of the last empty line to make it editable and enter the latitude of the additional point, then enter the longitude to the Longitude field.
5. To delete a point, press its delete button .
6. To restore original coordinates, press the restore button .
7. To add the Navtex object to the chart view, press the Add button: the Add Mariner object from Navtex message dialog opens.



Figure 337 Navtex: Add Mariner object from Navtex message dialog

8. Enter a name of the object to the Object name field.

9. Indicate if you want the object to be an area or a line. To make it an area, set the Object has polygon geometry switch to the On position. To make it a line, set the switch to the Off position.
10. Indicate if you want the object to be canceled at a specified date: set the Cancel switch to the On position to cancel the object, and to the Off position to retain the object.
11. Specify the date and time to cancel the object: enter the date and time value to the Cancel date field and select the time standard in the drop-down list next to the field.
12. Press OK: the object is plotted in the chart view and added to the Added objects list.



Figure 338 Navtex: Added objects list

13. To scroll the chart view to display a Navtex object, select the object in the list.
14. To delete a Navtex object, press its delete button .
15. To close the full Navtex message panel, press the Finish button.

7.4.4 Displaying Navtex Chart Objects

Navtex chart objects are added to a separate chart layer. You can hide or display the layer.

To turn on the display of Navtex chart objects:

1. Go to Main Menu → Layers → Chart overlays: the list of available chart overlays opens.
2. Set the Navtex switch to the On position.

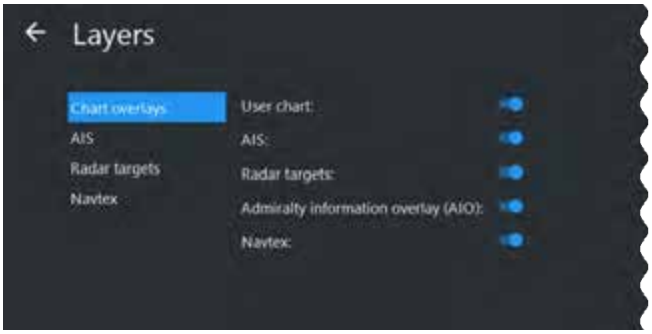


Figure 339 Navtex: display Navtex layer

3. To hide Navtex chart object, set the Navtex switch to the Off position.

7.5 Radar Overlay

If a network radar processor (NRP) is connected to the ECDIS, radar overlay can be displayed in the chart view.

NOTE:

The Radar Overlay function is designed to display radar data from existing radar systems used onboard the vessel. The radar overlay does not implement advanced automatic features such as target enhancement, radar signal correlation or automatic sea clutter reduction.

7.5.1 Displaying radar overlay

Radar information is added to a separate chart layer, which can be hidden or displayed.

To turn on the display of radar overlay:

1. Go to Main Menu → Layers → Chart overlays: the list of available chart overlays opens.
2. Set the Radar overlay switch to the On position.



Figure 340 Radar overlay: display Radar overlay layer

3. To hide the radar overlay, set the Radar overlay switch to the Off position.
4. An alternative way to turn on the display of the radar overlay is to press the Radar overlay indicator  in the indicators area of the chart view.
5. When display of the radar overlay is on, the indicator turns blue. 

7.5.2 Radar overlay indicator

The Radar overlay indicator shows the current state of the NRP data link. You can also use the indicator to display/hide the radar overlay layer in the chart view.

Right-click the indicator to select the NRP to use, or to open the radar overlay configuration parameters.

The indicator has the following states:

-  – radar overlay is not visible, and no data link is available
-  – radar overlay is not visible, but data link is available
-  – radar overlay is visible, but no data link is available
-  – radar overlay is visible, and data link is available.

When radar overlay is enabled, an additional panel with radar parameters (Gain, Sea, Rain and Range) appears below the "Notices" panel. The parameters displayed in the panel correspond to the values configured in Settings -> Radar overlay -> Configuration panel.

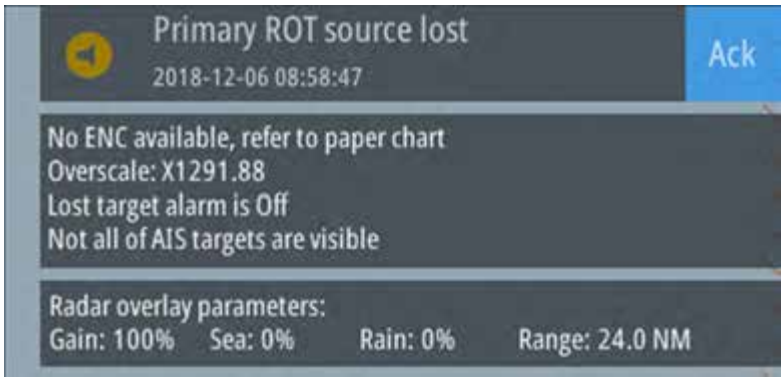


Figure 341. Radar overlay parameters

NOTE:

In case parameters cannot be retrieved, e.g. if an NRP is enabled but no RADAR is connected, parameters are replaced with a "—" symbol.

7.5.3 Selecting NRP

Up to four NRPs can be connected to the ECDIS at the same time. The NRP to be used by the ECDIS can be selected.

To select an NRP:

1. Right-click the Radar overlay indicator: a pop-up menu opens with the list of available NRPs.



Figure 342 Radar overlay: select NRP in the indicator pop-up menu

2. Select the desired NRP: the radar overlay from the selected NRP is displayed. The number of the selected NRP is indicated on the Radar overlay indicator.



3. It is also possible to select an NRP in the radar overlay Configuration panel. To open the panel, go to Main Menu → Settings → Radar overlay → Configuration or right-click the Radar overlay indicator and select the Configure option from the pop-up menu: the Configuration panel opens.

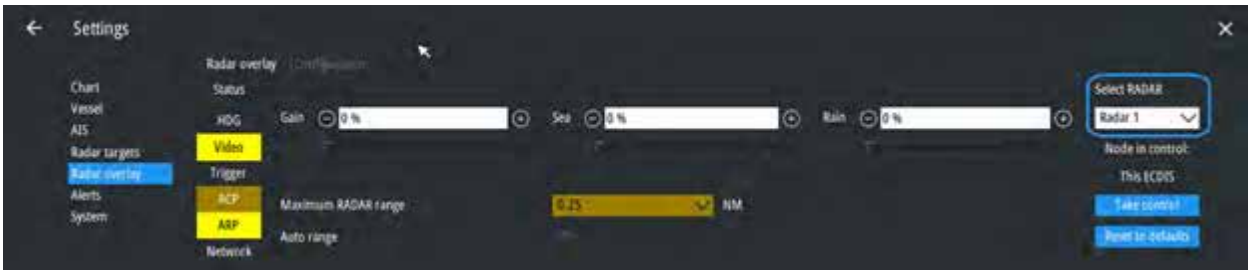


Figure 343 Radar overlay: select NRP in the Configuration panel

4. Select an NRP in the Select RADAR drop-down list: the radar overlay from the selected NRP is displayed. The number of the selected NRP in the list is indicated on the Radar overlay indicator.

7.6 Alerts: Alarms, Warnings, and Cautions

The ECDIS has various alerts to warn you of potentially dangerous situations. Alerts are divided into three priorities: alarms, warnings and cautions.

Alarms are alerts of the highest priority that announce a situation or condition requiring immediate attention, decision and - if necessary - action from the bridge team to maintain the safe navigation of the vessel.

Warnings are alerts of lower priority announcing a situation or condition requiring attention or action from the bridge team. Warnings are presented for precautionary reasons to make the bridge team aware of changed conditions, which are not immediately hazardous, but may become so, if no forward-looking decision is made or action is taken.

Cautions are alerts of the lowest priority. They raise the bridge team's awareness of a condition, which does not warrant an alarm or warning condition, but still requires attention due to the nature of the situation or the given information.

7.6.1 Alert announcement

When an alert is triggered, the alert indicator appears in the upper-right corner of the chart view and audible signal sounds. Also, alert indicators are displayed in the Alarms, warnings and cautions panel and in the Alerts quick acknowledge panel. Appearance and behavior of the indicator depend on the priority of the alert and on its state.

The table below describes possible alert announcements as they are presented by the Alerts indicator and in the Alarms, warnings, and cautions and Alert quick acknowledge panels.

Priority	State	Indicator	Sound	Condition
Alarm	Active - unacknowledged	 Flashing	3 short audible signals, repeated every 10 sec.	Alert condition still present, alert not acknowledged
	Active - acknowledged	 Steady	Audible signal silent	Alert condition still present, alert acknowledged by the operator

Priority	State	Indicator	Sound	Condition
	Active - silenced	 Flashing	Audible signal silent	Alert condition still present, alert silenced by the operator
	Rectified - unacknowledged	 Flashing	Audible signal silent	Alert condition rectified, alert still acknowledged
	Rectified - acknowledged	None	None	Alert condition rectified, alert acknowledged
Warning	Active - unacknowledged	 Flashing	2 short audible signals	Alert condition still present, alert not acknowledged
	Active - acknowledged	 Steady	Audible signal silent	Alert condition still present, alert acknowledged by the operator
	Active – silenced	 Flashing	Audible signal silent	Alert condition still present, alert silenced by the operator
	Rectified - unacknowledged	 Flashing	Audible signal silent	Alert condition rectified, alert still unacknowledged
	Rectified - acknowledged	None	None	Alert condition rectified, alert acknowledged
Caution	Active	Steady	Audible signal silent	Alert condition still present, no acknowledgment required
	Rectified	None	None	Alert condition rectified

NOTE:

All warnings are repeated as warnings every 60 seconds.

The following warning is escalated to alarm after a time-out:

Outside the anchor watch swing circle – 120 seconds

NOTE:

In case of a failure of the Central Alarm Management interface on the vessel, the ECDIS will present its alerts individually, and a system failure of the Central Alarm Management will not lead to the loss of the alert announcement functionality of the ECDIS).

7.6.2 Viewing alerts and alert information

You can view all alerts and alert information in the Alarms, warnings and cautions panel.

To view the list of alerts:

1. Press the alerts indicator in the upper-right corner of the chart view: the Alarms, warnings and cautions panel opens.



Figure 344 Alarms, warnings and cautions panel

1. Alerts are divided into groups depending on their source; the list of alert groups is displayed in the left part of the panel.

2. The number of alarms, warnings and cautions is displayed in brackets to the right of the group's name: first pair of numbers is the number of all alarms and of unacknowledged alarms; second pair is the number of all warnings and unacknowledged warnings, and third number is the number of cautions. For example, "Sensors (0(0)/9(8)/0)" means that there are zero alarms, nine warnings, eight of which are unacknowledged, and zero cautions in the Sensors group.
3. To view alerts for a group, select it in the groups list: the list of alarms, warnings, and cautions for the selected group is displayed. First in the list are alarms, then warnings, and last are cautions in the order they were triggered.
4. For each alert, short description and date and time of appearance are provided.

7.6.3 Acknowledging alerts

When an alert is triggered, the alerts indicator flashes and the alert audio sounds. To show that you are aware of the alert, you must acknowledge it.

To acknowledge alerts:

1. Press the alerts indicator in the upper-right corner of the chart view: the Alarms, warnings, and cautions panel opens.
2. Select the alerts group to which the alert to be acknowledged belongs: the list of alerts opens.
3. Find the alert you want to acknowledge and press its Ack 

button: the alert state changes to "acknowledged."

NOTE:

Some alerts are cleared automatically as soon as the condition that triggered them has been rectified.

7.6.4 Alerts quick acknowledge

Along with adding new alerts to the Alarms, warnings and cautions panel, the ECDIS opens the Alert quick acknowledge panel where all unacknowledged alarms are stacked in the order of their priority.

The Alert quick acknowledge panel appears in the upper-right corner of the chart view.



Figure 345 Alerts: Alert quick acknowledge panel

To quickly acknowledge alerts:

1. Press the Ack button in the Alerts quick acknowledge panel: the displayed alert is acknowledged and removed from the panel. The next in priority unacknowledged alert is displayed.
2. Once all unacknowledged alerts have been acknowledged, the Alerts quick acknowledge panel disappears from the chart view.

7.6.5 Alerts list

All alarms and warnings are divided into groups.

The following alarm and warning groups are available:

- System – alerts related to the system operation;
- Sensors – alerts related to the sensors data and connection;
- AIS targets – alerts related to monitoring AIS targets;
- Radar targets – alerts related to monitoring radar targets;
- Route monitor – alerts related to route monitoring;
- External alerts – alerts coming from sensors.

The table below describes available alerts. Apart from sensor alerts, all alerts are only generated by the ECDIS on which they are displayed.

Alert ID	Alert title	Alert text	Priority, category	Condition
			System	
3031	Threshold	Crossing safety contour	Alarm, A	Anti-grounding guard zone crossed the specified safety contour.
3035	Look ahead	Cross boundary of area with special conditions	Warning, A	Cross boundary of area with special conditions.
3062	System fault	Primary system lost	Warning, B	Primary system has been lost during synchronization.
3062	System fault	Backup synchroni-zation failure	Warning, B	Backup synchronization has failed.
3002	Lost Backup	Backup system lost	Warning, B	Backup system has been lost during synchronization.
3032	Threshold	Outside the anchor watch swing circle	Warning, A	The own vessel is outside the anchor watch swing circle.
3031	Threshold	Outside the anchor watch swing circle	Alarm, A	The own vessel is outside the anchor watch swing circle.
3002	Lost VDR	VDR lost	Warning, B	Connection with VDR is lost.
			Sensors	
3006	Invalid CRC	Invalid CRC	Caution, B	A specified NMEA sentence has an invalid CRC.
3006	Invalid format	Invalid format	Caution, B	A specified NMEA sentence has an invalid format.
3005	Invalid datum	Different geodetic datum	Warning, B	The position source uses a geodetic datum different from the datum of SENC (WGS-84).

Alert ID	Alert title	Alert text	Priority, category	Condition
3015	Lost sensor	XXX sensor lost	Warning, B	Connection with a specified sensor was lost.
3015	Lost source	XXX source lost	Warning, B	The source of specified data was lost.
3056	Input quality	XXX navigational status is Unsafe	Caution, B	Navigational status of a specified sentence is 'Unsafe.'
3056	Input quality	XXX navigational status is Caution	Caution, B	Navigational status of a specified sentence is 'Caution.'
		AIS targets		
3043	Target store	AIS targets capacity is about to be exceeded – 95%	Caution, A	Number of processed AIS targets is close to 95% of the ECDIS capacity to process AIS targets.
3042	Target store	AIS targets capacity has been exceeded – 100%	Warning, A	Number of processed AIS targets is more than 95% of the ECDIS capacity to process AIS targets.
		Radar targets		
3043	Target store	Radar targets capacity is about to be exceeded – 95%	Caution, A	Number of processed radar targets is close to 95% of the ECDIS capacity for processing radar targets.
3042	Target store	Radar targets capacity has been exceeded – 100%	Warning, A	Number of processed radar targets is more than 95% of the ECDIS capacity for processing radar targets.

Alert ID	Alert title	Alert text	Priority, category	Condition
			Route monitor	
3024	Control limit	Deviation from planned route	Alarm, A	The own vessel is out of the route corridor.
3038	Critical point	Approach to critical point	Warning, A	The own vessel approached an event mark at a specified distance/time.
3026	Control limit	Route is beyond maximum/ minimum latitude	Caution, B	A specified route falls within a region beyond the maximum latitude.
			Hardware	
10203	Disk issue	Disk problem - x devices found, 1 expected	Caution, B	No or more than one internal disk has been detected. This indicates a defective system.
10213	Trackball issue	Trackball problem - x devices found, 1 expected	Caution, B	No or more than one pointing device has been detected. If x=0, connect a mouse/trackball (or keyboard with integrated trackball). If already connected, the mouse/trackball may be defective. If x > 1, and only one mouse/trackball is connected, it may be an indication of faulty operation.

Alert ID	Alert title	Alert text	Priority, category	Condition
10223	Keyboard issue	Keyboard problem - x devices found, 1 expected	Caution, B	No or more than one keyboard has been detected. If x=0, connect a keyboard. If already connected, the keyboard may be defective. If x > 1, and only one keyboard is connected, it may be an indication of faulty operation.
10233	DVD drive issue	DVD-drive problem - x devices found, 1 expected	Caution, B	(DM800 only) No or more than one DVD-Drive has been detected. If x=0, make sure the USB cable (gray cable) for the DVD-Drive is connected to USB port 5 (alternatively port 1). If already connected, the DVD-drive may be defective. If x > 1, and only one CD-ROM/DVD-drive is connected, it may be an indication of faulty play.
10243	USB key issue	USB key problem - x devices found, 1 expected	Caution, B	No or more than one USB hardware key has been detected. If x=0, insert USB hardware key in any USB port. If already connected, the hardware key may be defective. Other alerts may also indicate this. If x > 1, remove any extra hardware keys inserted.
10246	USB key issue	USB key not connected to the ECDIS	Caution, B	Insert a hardware key in the ECDIS

Alert ID	Alert title	Alert text	Priority, category	Condition
10249	USB key issue	Communication problem with primary USB key	Caution, B	Will only occur in a cluster configuration. The primary USB hardware key is not present in the cluster, or the ECDIS with the primary hardware key has been turned off for more than 1 day. Turn on the ECDIS with the primary hardware key. If the primary hardware key is defective, contact support and order a replacement.
10253	USB key issue	Primary USB key issue may affect charts	Caution, B	Will only occur in a cluster configuration. The primary USB hardware key is not present in the cluster and has not been for 14 days. If the primary hardware key is defective, contact support and order a replacement.
10256	USB key issue	Charts stopped working due to USB key problem	Caution, B	Will only occur in a cluster configuration. The primary USB hardware key is not present in the cluster and has not been for 90 days. The charts are no longer valid anymore. If the primary hardware key is defective, contact support and order a replacement.
10259	USB key issue	Cluster contains multiple primary USB keys	Caution, B	Will only occur in a cluster configuration Use the USB hardware key management tool to inspect the cluster and remove the unwanted primary hardware key.
10263	Monitor issue	Incorrect monitor type connected	Caution, B	The monitor connected is not the configured model/type. Connect the correct monitor.

Alert ID	Alert title	Alert text	Priority, category	Condition
10266	Monitor issue	Unable to get color profile from monitor	Caution, B	The monitor connected should contain the color profile, but the system could not download it from the monitor. Contact support.
10313	Network issue	No network connection to ECDIS 1	Caution, B	The network connection has been lost to ECDIS node 1 (ECDIS 1). Possibly a disconnected or defective network cable. Verify all networks cables are connected correctly, and check that link is present for both Ethernet ports 1 and 2.
10323	Network issue	No network connection to ECDIS 2	Caution, B	The network connection has been lost to ECDIS node 2 (ECDIS 2). Possibly a disconnected or defective network cable. Verify all networks cables are connected correctly, and check that link is present for both Ethernet ports 1 and 2.
10333	Network issue	No network connection to ECDIS 3	Caution, B	The network connection has been lost to ECDIS node 3 (ECDIS 3). Possibly a disconnected or defective network cable. Verify all networks cables are connected correctly, and check that link is present for both Ethernet ports 1 and 2.
10343	Network issue	No network connection to ECDIS 4	Caution, B	The network connection has been lost to ECDIS node 4 (ECDIS 4). Possibly a disconnected or defective network cable. Verify all networks cables are connected correctly, and check that link is present for both Ethernet ports 1 and 2.

Alert ID	Alert title	Alert text	Priority, category	Condition
10402	Disk issue	No space left on disk	Caution, B	The disk is full. The operational state of the ECDIS is now compromised. Remove all unused chart databases, routes, logbooks, etc.
10403	Disk issue	Low disk space Less than x MB left on disk	Caution, B	The disk is almost full. The operational state of the ECDIS will soon be compromised. Remove unused chart databases.
10613	Network issue	No network connection to NRP 1	Caution, B	The network connection has been lost to Network RADAR Processor 1 (NRP 1). Possibly a disconnected or defective network cable. Verify all networks cables are connected correctly, and check that link is present for both Ethernet ports 1 and 2.
10623	Network issue	No network connection to NRP 2	Caution, B	The network connection has been lost to Network RADAR Processor 2 (NRP 2). Possibly a disconnected or defective network cable. Verify all networks cables are connected correctly, and check that link is present for both Ethernet ports 1 and 2.

Alert ID	Alert title	Alert text	Priority, category	Condition
10633	Network issue	No network connection to NRP 3	Caution, B	The network connection has been lost to Network RADAR Processor 3 (NRP 3). Possibly a disconnected or defective network cable. Verify all networks cables are connected correctly, and check that link is present for both Ethernet ports 1 and 2.
10643	Network issue	No network connection to NRP 4	Caution, B	The network connection has been lost to Network RADAR Processor 4 (NRP 4). Possibly a disconnected or defective network cable. Verify all networks cables are connected correctly, and check that link is present for both Ethernet ports 1 and 2.

7.7 Man Overboard

Use the Man overboard (MOB) function to mark a position on the chart where someone or something has fallen over board and to monitor this position.

To use the MOB function:

1. Press the MOB indicator  in the indicators area – the MOB mode is switched on:
   a) A MOB symbol is plotted in the current position of the own vessel.
   b) The indicator turns red and starts flashing .
   c) As the own vessel moves, the bearing and distance to the MOB symbol are updated and shown on the range and bearing line connecting the symbol and the own vessel.

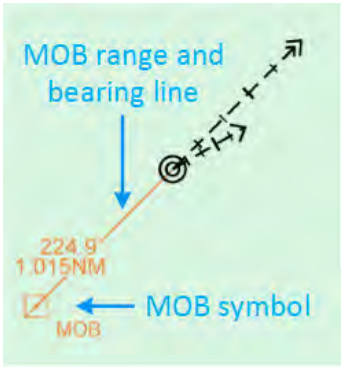


Figure 346 MOB on the chart

2. To switch off the MOB mode, press the MOB indicator again and confirm the operation:
   a) The MOB symbol and the range and bearing line are removed from the chart.
   b) The MOB indicator turns blue and stops flashing.

7.8 Anchor Watch

Use the Anchor Watch function to raise an alert in case any part of the own vessel drifts outside a specified anchor watch swing area.

To use the function, first, you should set up anchor watch parameters (the center of the swing circle relative to CCRP and the default swing circle radius) and, second, activate the function.

7.8.1 Setting up anchor watch parameters

To set up anchor watch parameters:

1. Go to Settings → Vessel → Vessel particulars → Vessel dimensions and performance characteristics and press the Vessel devices settings button: the Vessel devices settings panel opens with the list of available devices.
2. Select the anchor1 device in the list of devices in the left part of the panel: settings for the selected device are displayed in the right part of the panel.

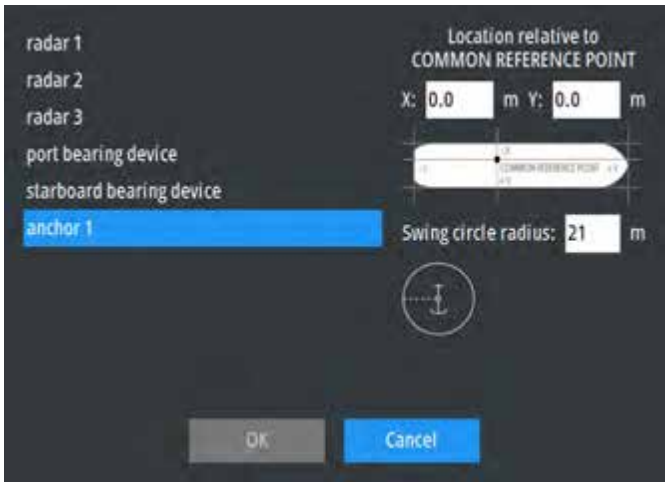


Figure 347 Anchor watch: specifying the swing circle radius

3. Specify the location of the anchor relative to CCRP:
   - X– a positive X value indicates the position of the device between the CCRP and the starboard; a negative X value between the CCRP and the port board;
   - Y – a positive Y value indicates the position of the device between the CCRP and the bow; a negative Y value between the CCRP and the stern;
4. Enter the swing circle radius in the Swing circle radius field.
5. To apply the settings, press OK: a dialog opens prompting you to enter the Master password.
6. Enter the password and press OK: the new settings are applied.

7.8.2 Activating/deactivating anchor watch

To activate/deactivate the Anchor Watch function:

1. Press the Anchor Watch indicator  in the indicators area: the Enter swing circle radius dialog opens with the default radius value.

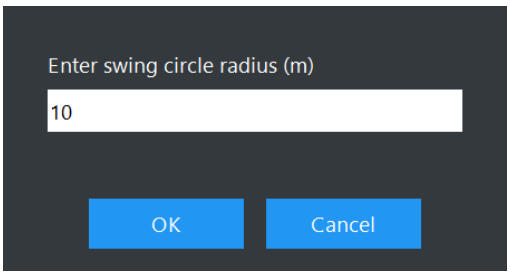


Figure 348 Anchor Watch: Enter swing circle radius

2. Leave the default value or enter a new one in the dialog and press OK: the Anchor watch mode is on.
   a) An Anchor watch symbol is plotted in the current position of the own vessel.
   b) A green light appears on the Anchor Watch indicator .
3. If any part of the own vessel now drifts outside the specified swing circle, an alert will be raised.
4. To deactivate the Anchor watch mode, press the Anchor Watch indicator again and confirm the operation.
   a) An Anchor watch symbol is removed from the chart view.
   b) The green light disappears from the Anchor Watch indicator .

8 Log Book

The ECDIS keeps a log book where all events occurring during a voyage are recorded. The log book keeps record of system-related events, track events, AIS and radar target events and alarms.

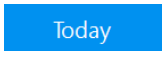
8.1 Viewing Log Book

To view the log book:

1. Go to Main menu → Log: the Log panel opens.



Figure 349 Log book: Log panel

2. Events are divided in groups. To view records of a group, select it in the groups list in the left part of the panel.
3. To view records for a specified date, enter the date to the date field.
4. To return to records for the current day, press the Today 

button.
5. To refresh data, press the refresh  button.
6. If more than 100 events are logged in a group, the events will be split up in pages to make display of the log faster. The newest events are displayed on the first page.



Figure 350 Log book: Log panel with several pages of events

7. To move between pages, use the arrows next to the page numbers or type the desired page number in the control.



Figure 351 Log book: Navigating between log pages

8.2 Printing Log Book

To print the log book:

1. Go to Main menu → Log: the Log panel opens.
2. Select the log book you want to print out: 12-hour log book or 3-month log book.
3. Specify the date in the Date field.
4. Select the log book group you want to print out: the list with records of the selected group opens.
5. Press the print button: the Print panel opens with preview of data to be printed.

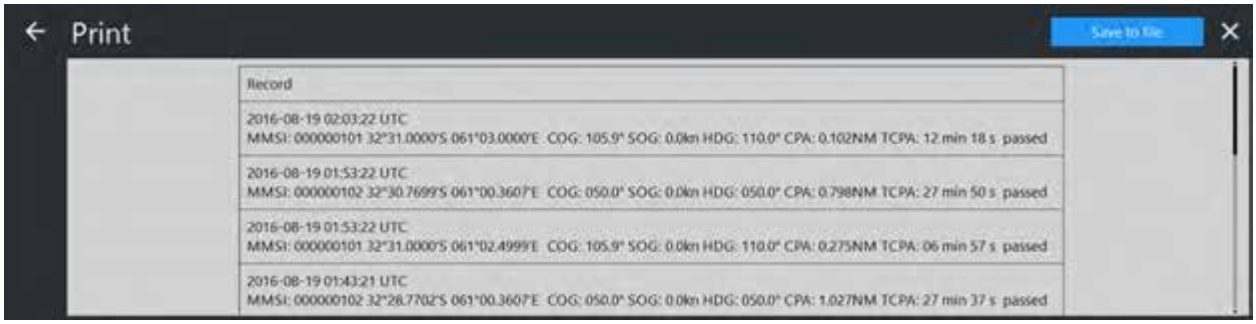


Figure 352 Log book: print preview

6. Press the Save to file button: the Choose file format dialog opens.

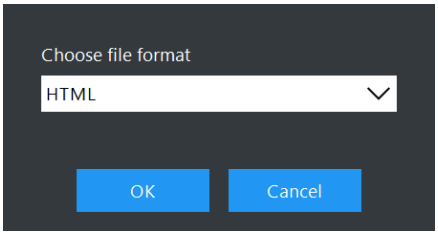


Figure 353 Log book: Choose file format

7. Choose a format option in the drop-down list and press OK: the Save to file dialog opens with the list of all available removable devices.

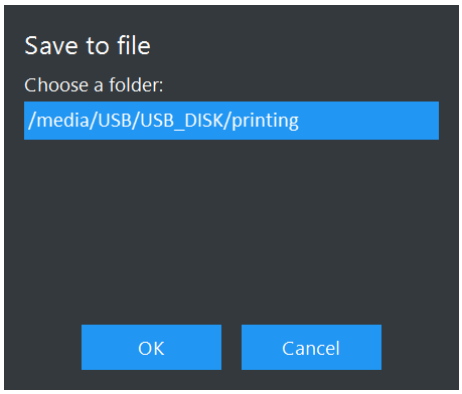


Figure 354 Log book: choose folder to save data

8. Select a removable device and press OK: the log book data is saved as a file to the printing folder in the root of the selected device.

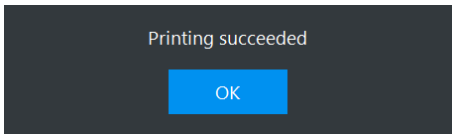


Figure 355 Log book: printing succeeded

8.3 Log Book Record Groups

Log book records are divided into groups. The table below describes the groups and their record types.

Record type	Record information
System	
Shutdown	Date and time UTC Event
Start	Date and time UTC Event
MOB activated	Date and time UTC Event Position
MOB deactivated	Date and time UTC Event MOB ID
LOP	Date and time UTC Event Calculation time, discrepancy Measurement time, position, device

Record type	Record information
Track	
Position record	Date and time UTC Position source sensor COG, SOG HDG, STW Depth ENC in use (under own vessel or in the center of the chart view if the own vessel is off screen) ENC edition number ENC issue date ENC last update date
AIS targets	
AIS target position record	Date and time UTC MMSI number Position COG, SOG, HDG CPA, TCPA – if available
Radar targets	
Radar target position record	Date and time UTC Number Position Course, Speed CPA, TCPA – if available
Alarms	
Alarm record	Date and time UTC Event (Raised, Removed) Alarm status (Acknowledged, Not-acknowledged) Alarm group (system, sensor, AIS, radar, route, external alarm) Alarm class (Alarm, Warning, Caution) Alarm description line

8.4 Alarm log filtering

The alarm log is equipped with a filter functionality. By typing relevant words in the filter control and pressing the Filter button, only alarm log entries matching the filter will be displayed. To disable the filtering, press the Clear button.

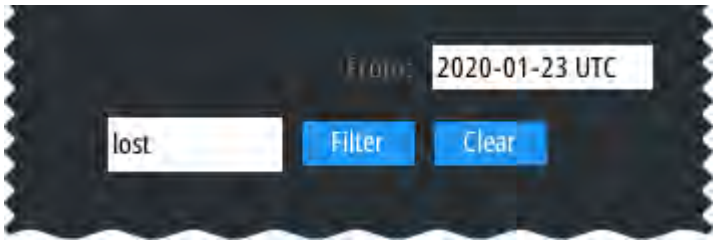


Figure 356 Log panel: Alarm log filtering

8.5 *12-hour and 3-month Log Books*

Two log books are recorded at the same time: the 12-hour log book where records are done at 1-minute intervals and the 3-month log book where records are done at 15-minute intervals.

To switch between log books:

1. Go to Main menu → Log: the Log panel opens.
2. Select the log book you want to view in the log books drop-down list.

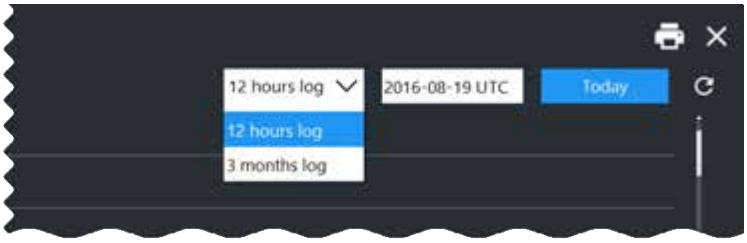


Figure 357 Log panel, log books drop-down list

NOTE:

Records of the 12-hour log book are available two days back from the current date.

Records of the 3-month log book are available 90 days back from the current date.

8.6 *Show past positions from 3-month log*

Using the Show past positions from 3-month log function of the Log Book, you can display past track of the own vessel for a specified period.

To display past positions from 3-month log:

1. Go to Main menu → Log: the Log panel opens.
2. Specify the period to display the past positions start and end date fields in the header of the Log panel.
3. Set the past positions from 3-month log switch to the On position: the past track for the specified period is displayed in the chart view.

9 Tools

9.1 Navigational Calculator

Using navigational calculator, you can solve direct and inverse geodetic problems as well as make a great circle approximation.

9.1.1 Geodesic calculation

To solve the direct geodetic problem:

1. Go to Main Menu → Tools → Navigational calculator → Geodesic calculation.



Figure 358 Navigational calculator: Geodesic calculation, Direct geodetic problem

2. Select the mode of calculation in the modes drop-down list: Great Circle and Rhumb Line modes are available.
3. Select Direct in the problem type drop-down list.
4. Enter the latitude and longitude of the original point to the Latitude and Longitude fields.
5. Enter direction to the second point to the Direction field.
6. Enter distance to the second point to the Distance field.
7. Resulting coordinates of the second point are displayed in the Latitude and Longitude fields of the Result section while you are entering input data.

To solve the inverse geodetic problem:

1. Go to Main Menu → Tools → Navigational calculator → Geodesic calculation.
2. Select the mode of calculation in the modes drop-down list: Great Circle and Rhumb Line modes are available.
3. Select Inverse in the problem type drop-down list: the tab changes to the inverse geodetic problem interface.



Figure 359 Navigational calculator: Geodesic calculation, Inverse geodetic problem

4. Enter coordinates of Point #1 to the Latitude and Longitude fields.
5. Enter coordinates of Point #2 to the Latitude and Longitude fields.
6. Resulting distance is calculated while entering point coordinates and is displayed in the Distance field.
7. Resulting direction is calculated while entering point coordinates:
   a) direction from Point #1 to Point #2 is displayed in the Direction #1/#2 section in the upper field;
   b) direction from Point #2 to Point #1 is displayed in the Direction #1/#2 section in the lower field.

9.1.2 Great circle approximation

Use the Great circle approximation function if you plan to travel along the great circle line to calculate waypoints.

To calculate waypoints of a great circle line:

1. Go to Main Menu → Tools → Navigational calculator → Great circle approximation.

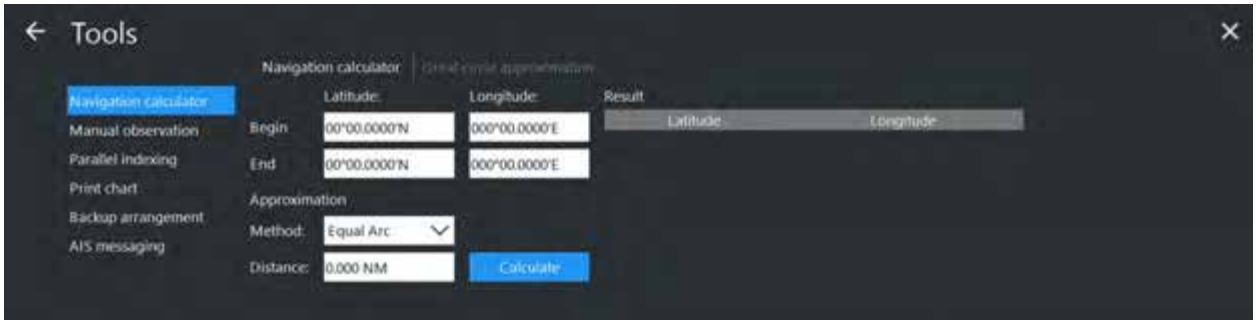


Figure 360 Navigational calculator: Great line approximation

2. Enter coordinate of the beginning point to the Begin Latitude and Longitude fields.
3. Enter coordinate of the end point to the End Latitude and Longitude fields.
4. Select the approximation method in the Method drop-down list: Equal Arc and Equal Distance methods are available.
5. Enter distance between waypoints to the Distance field in nautical miles.
6. Press Calculate: resulting coordinates of waypoints are displayed in the Result table.



Figure 361 Navigational calculator: Great line approximation results

9.1.3 Datum transformation

Use the Datum transformation function if you need to transform coordinates from the WGS84 datum to coordinates in some other datum, as well as to transform coordinates from some datum other than WGS84 to the WGS84 datum.

To transform coordinates from the WGS84 datum:

1. Go to Main Menu → Tools → Navigational calculator → Datum transformation.



Figure 362 Navigational calculator: Datum transformation

2. Enter coordinate of the point you want to transform in the Source Latitude and Longitude fields.
3. Select the target datum in the Target Datum drop-down list.
4. Press the Forward button: the source coordinates are transformed to coordinates in the specified datum. The resulting coordinates are displayed in the Target Latitude and Longitude fields.



Figure 363 Navigational calculator: transformation from WGS84

To transform coordinates to the WGS84 datum:

1. Go to Main Menu → Tools → Navigational calculator → Datum transformation.
2. Select the source datum in the Target Datum drop-down list.
3. Enter coordinate of the point you want to transform to WGS84 in the Target Latitude and Longitude fields.
4. Press the Inverse button: the coordinates are transformed from the specified datum to the WGS84 datum. The resulting coordinates are displayed in the Source Latitude and Longitude fields.

9.2 Parallel index lines

The ECDIS provides the possibility to display parallel index lines and range rings.

To display and set up parallel index lines and range rings:

1. Go to Main Menu → Tools → Parallel indexing: the Parallel indexing panel opens.



Figure 364 Tools: Parallel indexing panel

2. To display a parallel index line, set the Parallel index line switch of the line to the On position.
3. To specify the distance between the own vessel and the index line, enter a value into the Line range field: the distance is measured along the perpendicular dropped from the own vessel's CRP to the index line.

4. To specify the bearing of the index line, enter a value into the Line true bearing field: the bearing is measured from 0° to 360°from the true North direction; lines with reciprocal bearings are drawn on opposite sides of the own vessel.

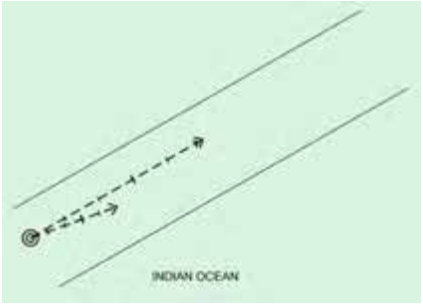


Figure 365 Parallel index lines display

5. To specify the length of the index line to be displayed in the chart view, enter a value into the Line length field.
6. To display range rings, set the Range rings switch to the On position.
7. To specify the number of range rings, select a value in the Number of range rings drop-down list.
8. To specify the distance of the first range ring, enter a value into the First range ring field.
9. To specify the step between range rings, enter a value into the Range rings step field.

9.3 Print Chart

In the ECDIS, you can save the area of chart currently displayed in the chart view as a PDF file.

To save a chart to a file:

1. Go to Main Menu → Tools → Print chart: the Print chart panel opens.



Figure 366 Print chart panel

2. Select the resolution of the image in the Resolution drop-down list.
3. Press the Print chart button: the Print panel opens with the preview of the chart area to be saved.

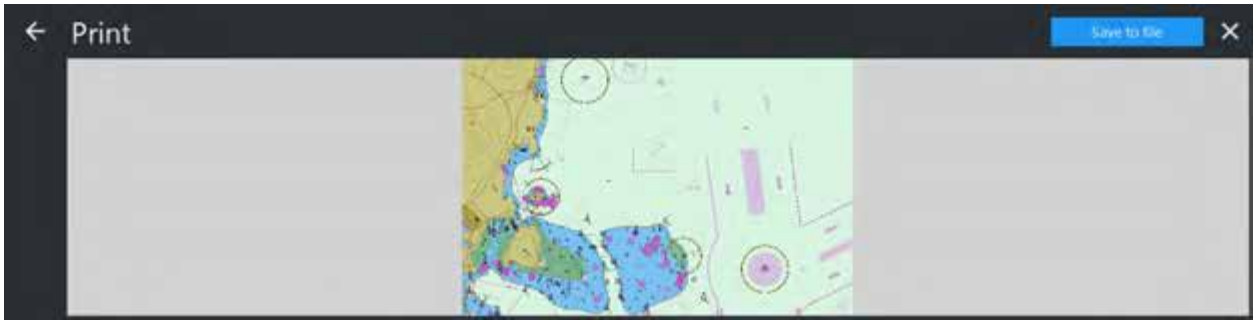


Figure 367 Print panel with the chart preview

4. Press the Save to file button and confirm the operation: the destination folder dialog opens.

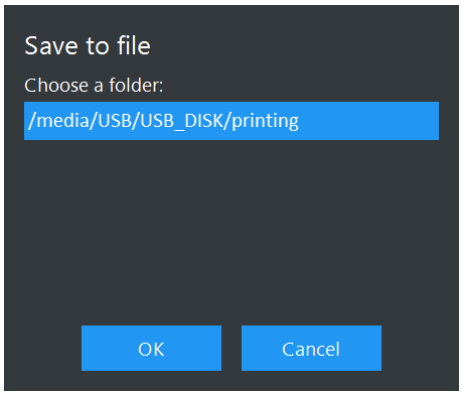


Figure 368 Print chart: destination folder dialog

5. Select the data storage device where you want to save the file in the devices list and press OK.
6. Once the file is saved, the operation status message appears. Press OK to close it: you are back to the Print chart panel.

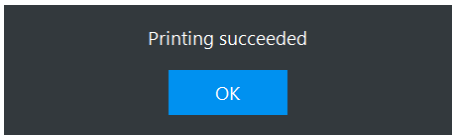


Figure 369 Print chart: operation status message

9.4 Back-up Arrangement

The ECDIS can back up its data with other ECDIS's connected into a network. Data that can be backed up are SENC geodatabases including manual updates, mariner objects, routes, data permits, and configuration files.

NOTE:

During back-up, data that is being updated on the receiving ECDIS is not available for use. Make sure to back-up data at an appropriate time.

To back up data with another ECDIS:

1. Go to Main Menu → Tools → Backup arrangement: the Backup arrangement panel opens with a list of data categories available for back-up.

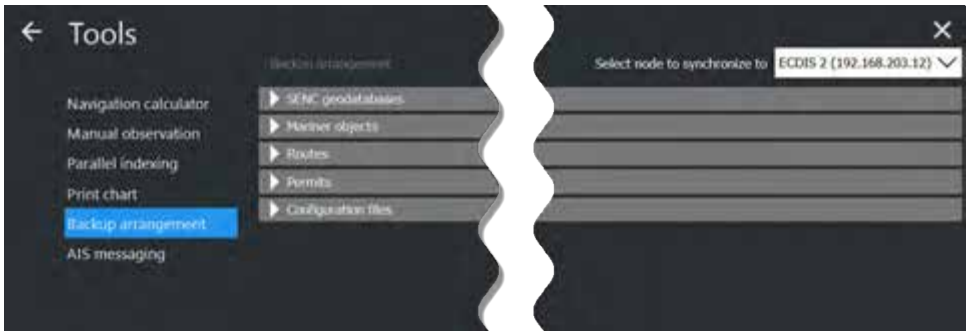


Figure 370 Backup arrangement panel

2. To expand a category, press its expand button.
3. Select a node to back up with in the Choose node to back up drop-down list.

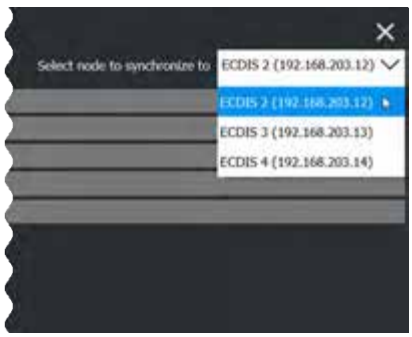


Figure 371 Backup arrangement: selecting a node

4. Find the data object you want to back up in the data object lists and press its Synchronize button: back-up starts, the object status changes to Uploading and the Synchronize button changes to Cancel.



Figure 372 Backup arrangement: start back-up

5. To interrupt the back-up, press Cancel and confirm the operation.
6. At the end of the procedure, a message appears notifying its successful completion.

Data objects can have the following back-up statuses:

- Idle – the data object is not being uploaded to or downloaded from another system;
- Uploading – the data object is being uploaded to another system; it is available for use but cannot be edited;
- Downloading – the data object is being downloaded from another system; it is neither available for use nor for editing.

NOTE:

When backing up data, both the sending ECDIS and the receiving ECDIS must be up and running.

If connection with the primary ECDIS is lost, the "Primary system lost" warning is triggered.

If connection with the back-up ECDIS is lost, the "Back-up system lost" warning is triggered.

NOTE:

If any synchronization actions have failed, a warning "Synchronization failure" is issued.

9.5 Measuring Distance and Bearing

To measure distance and bearing from the own vessel to a point or an object in the chart view, you can use either mouse pointer or the EBL / VRM tool.

To measure distance between several points, use the Dividers tool.

9.5.1 Mouse pointer coordinates and distance and bearing from the own vessel

Mouse pointer coordinates and distance and true bearing from the own vessel are displayed in the status bar. The parameters are constantly updated as you move the mouse pointer.



Figure 373 Mouse pointer coordinates and distance and true bearing from the own vessel

9.5.2 EBL/VRM tool

To mark range and bearing to objects in the chart view, use the electronic bearing line (EBL) and variable range marker (VRM).

To use EBL and VRM:

1. To start the EBL/VRM tool, press the EBL / VRM indicator  at the top of the chart view OR go to Main Menu → Shortcuts: and turn the EBL / VRM switch to the On position.



Figure 374 EBL/VRM tool

2. The EBL/VRM range and bearing lines are displayed in the chart view with the center in the own vessel's conning station position.

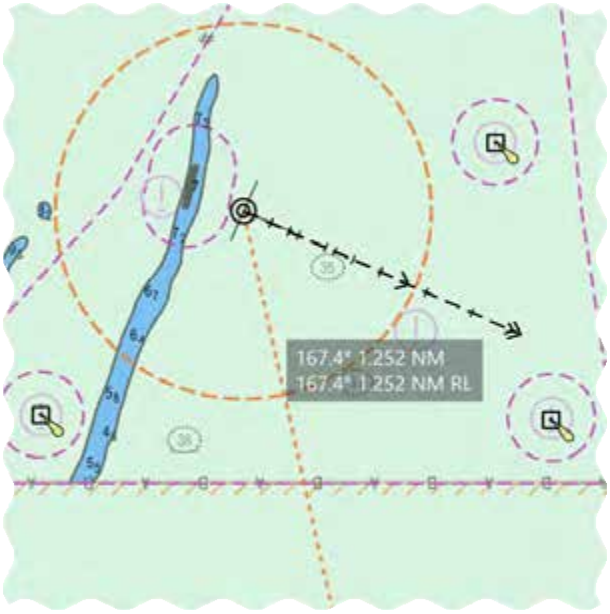


Figure 375 EBL/VRM range and bearing lines display

3. Point the mouse pointer to an object: bearing and distance from the own vessel to the object are displayed near the pointer. First line shows bearing and range along the great circle line; second line shows bearing and range along the rhumb line.
4. To measure range and bearing from an object in the chart view to the own vessel or to another chart object, left-click the object: the center of the EBL/VRM range and bearing lines is fixed in the indicated object.

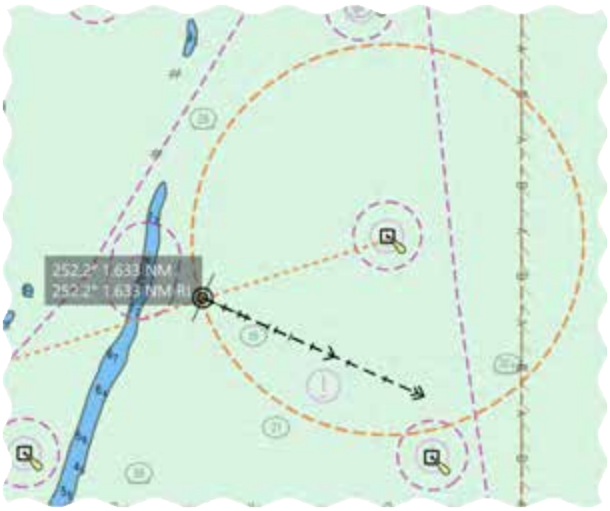


Figure 376 EBL/VRM from a chart object

5. Move the mouse pointer to another object and read bearing and range to the object near the mouse pointer.
6. To return the EBL/VRM center to the own vessel, left-click in the chart view.
7. To close the EBL/VRM tool, press the EBL/VRM indicator once more OR go to Main menu → Shortcuts and turn the EBL/VRM switch to the Off position.

9.5.3 Fixed VRM tool

You can fix two variable range markers in the chart view to constantly mark distance from the own vessel.

To use the fixed VRM tool:

1. To set a fixed VRM, press the Fixed VRM indicator  in the indicators area and select a Fixed VRM #1 or Fixed VRM #2 option in the drop-down menu that opens: the EBL/VRM range and bearing lines are displayed in the chart view with the center in the own vessel's CCRP.

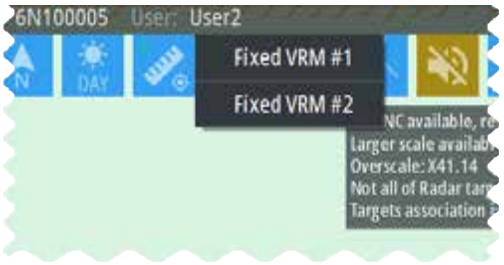


Figure 377 Fixed VRM options menu

2. Specify the range using the EBL/VRM lines: move the range line to the required distance and left-click in the chart view to fix the line. The dialog opens where you can fine-tune the distance.

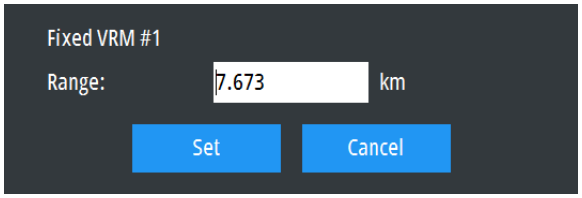


Figure 378 Fixed VRM: fine-tuning the range

3. Enter the precise value you need into the Range field and press the Set button: the VRM circle is fixed in the chart view.

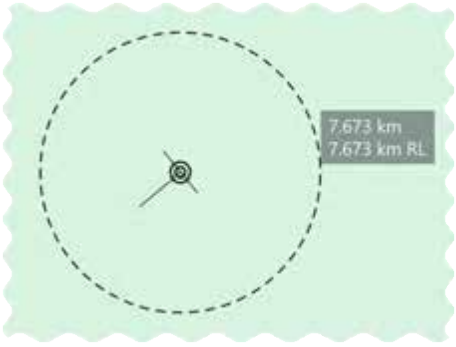


Figure 379 Fixed VRM: fixed VRM circle in the chart view

4. The Fixed VRM indicator displays a green light  showing that the tool is active.
5. To remove a fixed VRM, press the Fixed VRM indicator and select the Remove fixed VRM #1 or Remove fixed VRM #2 option: the specified VRM circle is removed from the chart view.

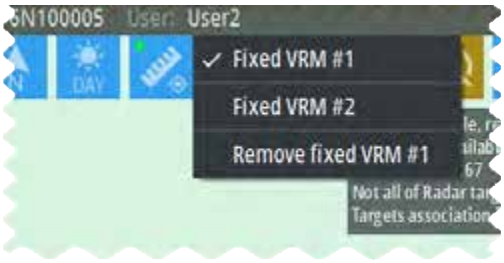


Figure 380 Fixed VRM: Remove fixed VRM option

9.5.4 Dividers tool

Use the Dividers tool to measure distance between several points in the chart.

To use the Dividers tool:

1. Turn on the Dividers tool: press the Dividers indicator  in the indicators area.

NOTE:

The ERBL and Divider tools cannot work at the same time. If the ERBL tool is active and you turn on the Dividers tool, the ERBL tool is deactivated and vice versa.

2. When the Dividers tool is on, the Dividers indicator has a green light on it . Now you can start plotting the line you want to measure.
3. To plot the line, left-click in the chart view: the first point of the line is plotted. Left-click again to plot the next point.

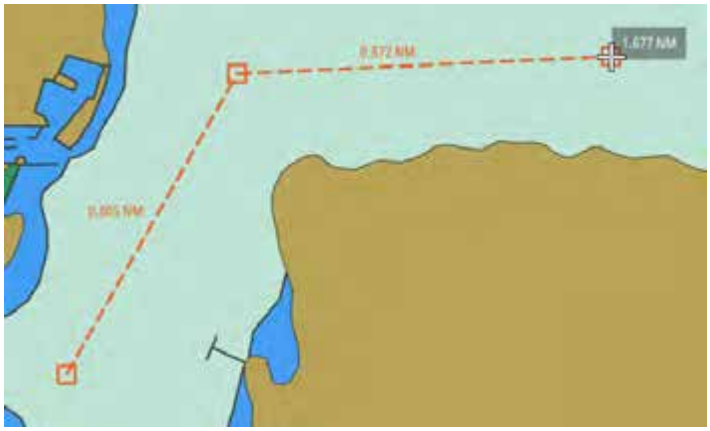


Figure 381 Dividers: plotting the line to measure

4. When you plot two points, the distance between them is displayed above the line stretch connecting the points. The overall length of the plotted line is displayed next to the mouse pointer.

NOTE:

All distance calculations are rhumb line.

5. To move a plotted point to a different place, hover the mouse pointer over it and left-click the point where a yellow frame appears: the point is attached to the mouse pointer. Move the point to a different location and left-click to fix it there: the line stretches containing this point are redrawn, the distances of the line stretches are recalculated together with the overall distance of the whole line. If you want to cancel the operation, press the ESC button before you fix the point in the new position.
6. To delete a point, right-click it and select the Delete point option in the pop-up menu the opens: the point is deleted, the line stretches that contained this point are redrawn and their distances are recalculated as well as the overall distance of the whole line.



Figure 382

7. To quit the Dividers tool, press the Dividers indicator and confirm the operation: the Dividers tool is off, the green light on the indicator is off, and the line with distances is cleared.

9.6 AIS Messaging

Using the AIS messaging tool, you can send and receive text messages over the AIS channel.

NOTE:

If the AIS sensor is not configured or configured as a receiver only, the AIS Messaging function is not available. You can only view message history.

9.6.1 Sending messages

You can send a message that will be available for any vessel over the AIS channel or an addressed message that will only be available for a specified vessel.

To send a non-addressed AIS message:

1. Go to Main Menu → Tools → AIS messaging → Send message: the Send message panel opens.

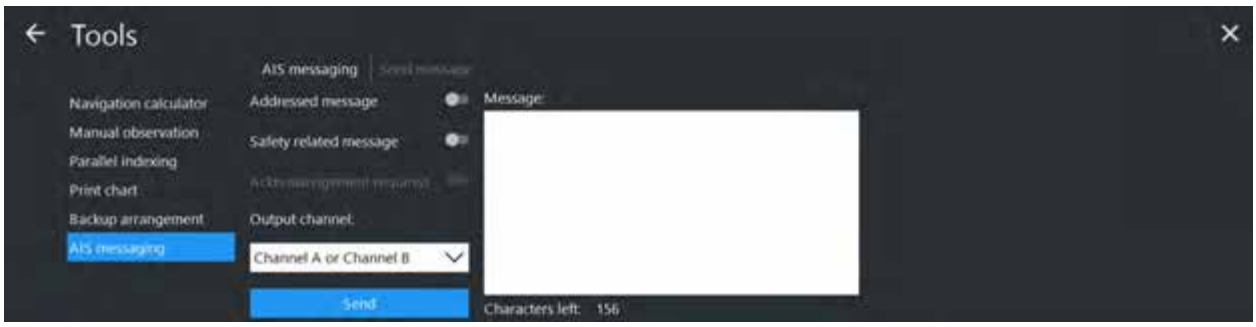


Figure 383 AIS messaging: Send message panel

2. Enter the message to the Message field.
3. If it is a safety related message, set the Safety related message switch to the On position.
4. Select an output channel in the Output channel drop-down list.
5. After specifying all parameters, press the Send button: the message is sent.

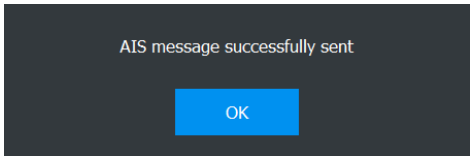


Figure 384 AIS messaging: AIS message successfully sent

To send an addressed AIS message:

1. Go to Main Menu → Tools → AIS messaging → Send message: the Send message panel opens.
2. Set the Addressed message switch to the On position: the list of available AIS recipients appears in the right part of the panel. To refresh the list, press the Update recipients button.

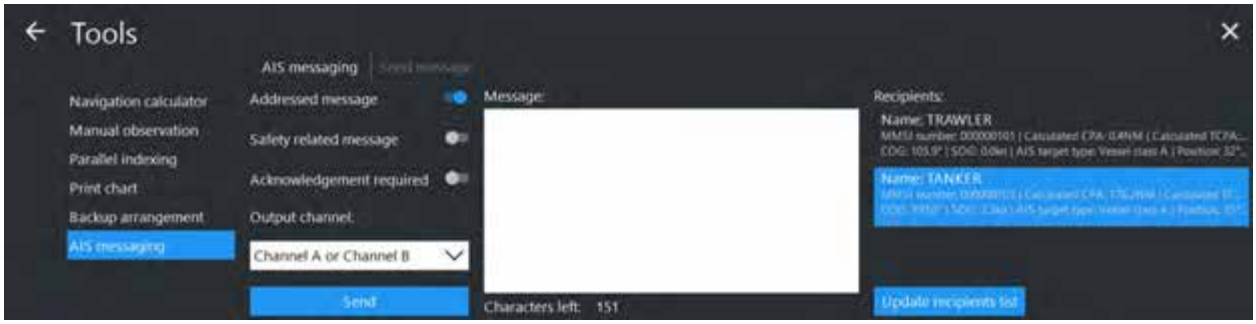


Figure 385 AIS messaging: Send message panel, addressed message

3. Select a recipient to which the message is addressed in the Recipients list.
4. Enter the message to the Message field.
5. If it is a safety related message, set the Safety related message switch to the On position.
6. If an acknowledgement is required, set the Acknowledgement required switch to the On position.
7. Select an output channel in the Output channel drop-down list.
8. After specifying all parameters, press the Send button: the message is sent to the specified recipient.

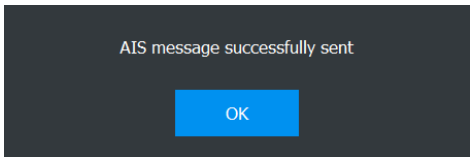


Figure 386 AIS messaging: AIS message successfully sent

9.6.2 Receiving AIS messages

When a new AIS message comes to the ECDIS, the AIS message indicator appears at the top of the chart view 

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To view a new AIS message:

1. Press the AIS message indicator: Message history panel opens with the list of incoming messages
2. OR go to Main Menu → Tools → AIS messaging → Message history: and select the Incoming messages option in the drop-down list at the top of the panel: the list of incoming messages opens.
3. Select a message to view its text in the Message text field.



Figure 387 AIS messaging: incoming messages

9.6.3 Viewing message history

To view AIS message history:

1. Go to Main Menu → Tools → AIS messaging → Message history: the Message history panel opens.
2. To view the list of received messages, select the Incoming messages option in the drop-down list at the top of the panel.
3. To view the list of sent messages, select the Outgoing messages option in the drop-down list at the top of the panel.
4. To view the text of a message, select the message: the text is displayed in the Message text field.

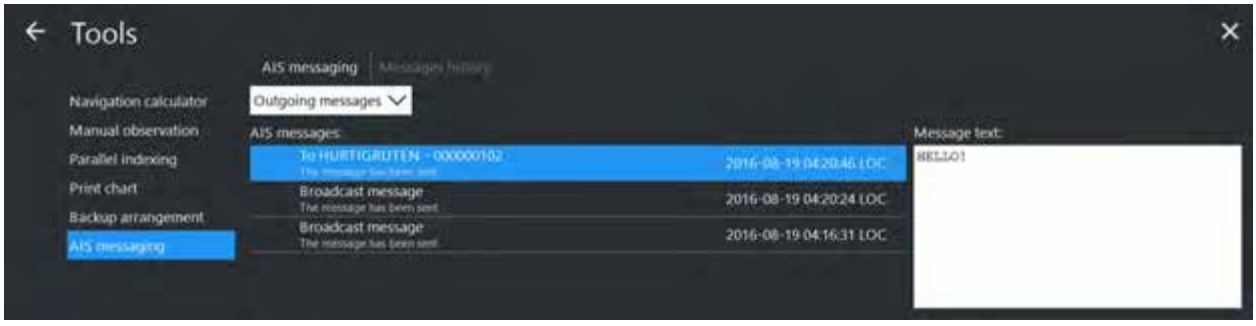


Figure 388 AIS messaging: outgoing message history

10 Vessel Setup

10.1 Vessel Display Setup

10.1.1 Velocity vector

Velocity vector of the vessel is a vector predicting position of the vessel in a specified period based on the current speed and course. Two velocity vectors are available: Velocity vector over ground based on speed over ground and course over ground, and Velocity vector through water based on speed through water and heading.

To display and set up velocity vectors:

1. Go to Main Menu → Settings → Vessel → Display settings: the Display settings panel opens.

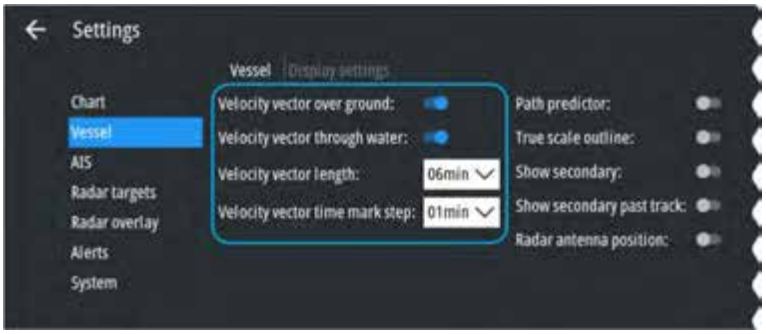


Figure 389 Vessel display set up: velocity vectors

2. To display the velocity vector over ground, set the Velocity vector over ground switch to the On position.
3. To display the velocity vector through water, set the Velocity vector through water switch to the On position.

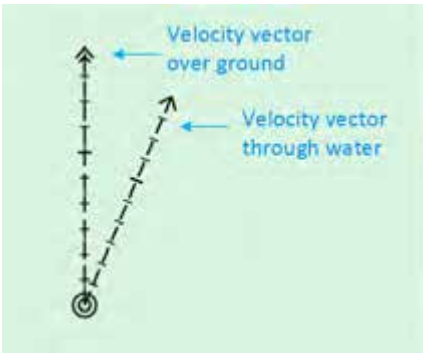


Figure 390 velocity vector over ground and velocity vector through water (vector length = 10 min, time mark step = 1 min)

4. To specify the length of both velocity vectors, select a value in the Velocity vector length drop-down list.
5. To specify the time mark step for both velocity vectors, select a value in the Velocity vector time mark step drop-down list.

10.1.2Path predictor

Along with the velocity vectors you can display a path prediction vector (or path predictor). Path predictor is based on speed over ground, course over ground and rate of turn.

NOTE:

Path predictor is only available if information about the vessel's rate of turn is coming to the ECDIS from external sensors.

To display and set up path predictor:

1. Go to Main Menu → Settings → Vessel → Display settings: the Display settings panel opens.
2. To display the path predictor, set the Path predictor switch to the On position.
3. The length of the path predictor is the same as set for velocity vectors in the Velocity vector length field.
4. No time step marks are available for the path predictor.
5. To hide the path predictor, set the Path predictor switch to the Off position.



Figure 391 Path predictor (vector length = 10 min)

10.1.3True scale outline

At a large scale, the vessel can be displayed as a true scale symbol based on dimensions derived from the position of the conning station specified in

the Main menu → Settings → Vessel → Performance characteristics tab.

To display the vessel symbol as a true scale symbol:

1. Go to Main Menu → Settings → Vessel → Display settings: the Display settings panel opens.
2. To display the vessel symbol as a true scale symbol, set the True scale outline switch to the On position.
3. Now, at a large scale, the vessel's symbol will be displayed as a true-scale symbol.
4. To display the vessel symbol as a point symbol at all scales, set the True scale outline switch to the Off position.

NOTE:

Position of the true scale symbol of the vessel is defined by the vessel's heading.

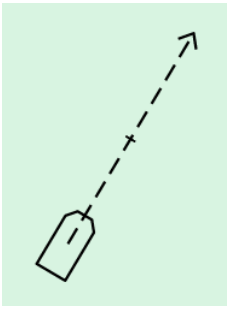


Figure 392 True scale vessel symbol

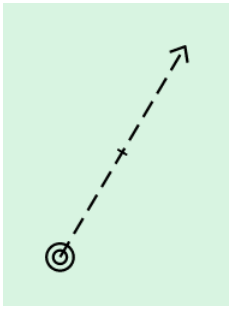


Figure 393 Point vessel symbol

10.1.4 Secondary position symbol and past track

If you have two positioning devices, one primary and the other secondary, connected to the ECDIS, you can display the vessel symbol and its past track based on data coming from the secondary positioning device.

To display and set up secondary position and past track:

1. Go to Main Menu → Settings → Vessel → Display settings: the Display settings panel opens.
2. To display the secondary position, set the Show secondary switch to the On position.
3. To display the secondary past track, set the Show secondary past track switch to the On position.
4. All settings for the secondary past track are the same as those for the primary past track (past track length, past track time marks, past track time mark step).
5. To reset the secondary past track and to start drawing it all over again, press the Reset past track button: both the old secondary and the old primary past tracks disappear, and new past tracks start drawing.

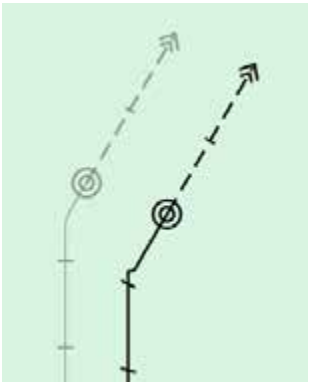


Figure 394 Secondary position and secondary past track

NOTE:

Velocity vector over ground, velocity vector through water, and prediction vector are also available for the vessel symbol based on the secondary position data. Settings of the vectors (display on/off, velocity vector length, velocity vector time mark step) are the same as those for the primary position symbol.

10.1.5Past track

To monitor vessel's track over time, use the Past track function.

To display and set up past track:

1. Go to Main Menu → Settings → Vessel → Display settings: the Display settings panel opens.



Figure 395 Vessel display set up: past track

2. To display the past track, set the Past track switch to the On position.
3. To specify the length of the past track, select a value in the Past track length drop-down list.
4. To display time marks on the past track, switch the Past track time marks to the On position.
5. To specify the step of time marks, select a value in the Past track time mark step drop-down list.
6. To reset the past track and to start drawing it all over again, press the Reset past track button: the old past track disappears, and a new past track starts drawing.

10.1.6Radar antenna position

The ECDIS provides the option of displaying the position of the radar antenna.

To display the radar antenna position:

1. Go to Main Menu → Settings → Vessel → Display settings: the Display settings panel opens.
2. To display the radar antenna position, set the Radar antenna position switch to the On position.

10.2 Vessel Particulars Setup

NOTE:

To change vessel particulars, Master user privileges are required.

10.2.1 Draught and height

Many safety functions of the ECDIS are based on the vessel's draught and height.

To specify vessel's draught and height:

1. Go to Main Menu → Settings → Vessel → Vessel particulars → Vessel dimensions and performance characteristics: the Vessel dimensions and performance characteristics panel opens.

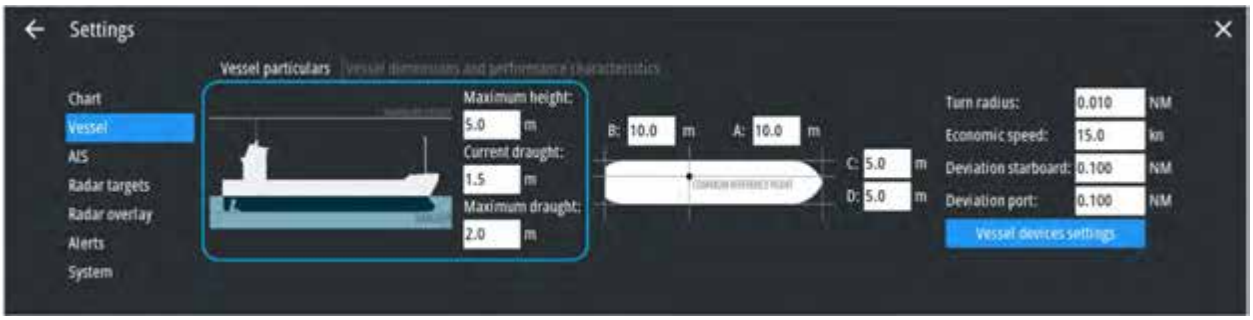


Figure 396 Vessel particulars: draft and height

2. Set the following parameters:
   - Maximum height;
   - Current draught;
   - Maximum draught;
3. When parameters are changed, the OK and Cancel buttons appear.



Figure 397 Vessel particulars: confirmation

4. Press OK to save the changes: a dialog opens prompting you to enter the Master password.
5. Enter the password and press OK: the new settings are applied.

10.2.2 Consistent common reference point

Position of all sensors is defined relative to the position of the common reference point (CCRP). Position of the CCRP is also the starting point of the vessel's velocity vectors and past track.

To specify the CCRP:

1. Go to Main Menu → Settings → Vessel → Vessel particulars → Vessel dimensions and performance characteristics: the Vessel dimensions and performance characteristics panel opens.

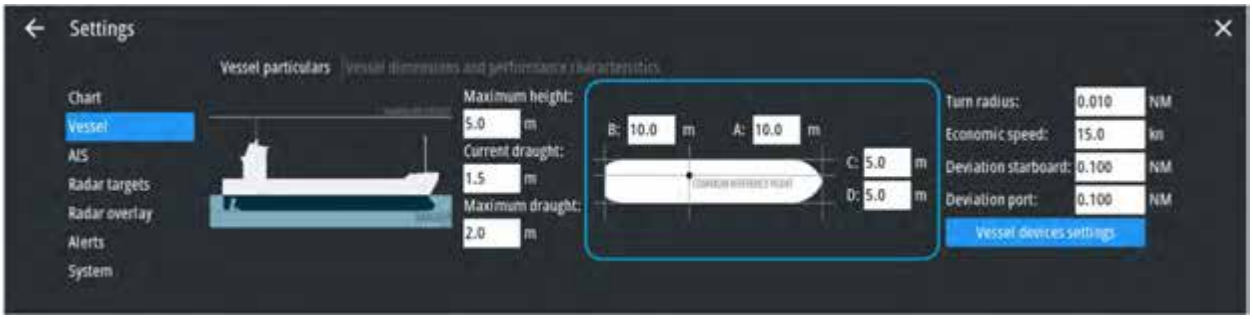


Figure 398 Vessel particulars: common reference point

2. Set the following parameters:
   - distance between the CCRP and the bow (A);
   - distance between the CCRP and the stern (B);
   - distance between the CCRP and the port side (C);
   - distance between the CCRP and the starboard side (D);
3. When parameters are changed, the OK and Cancel buttons appear.
4. Press OK to save the changes: a dialog opens prompting you to enter the Master password.
5. Enter the password and press OK: the new settings are applied.

10.2.3 Route planning parameters

Route planning uses vessel performance characteristics such as turn radius, economic speed, and deviation starboard and port.

To specify default values for route planning parameters:

1. Go to Main Menu → Settings → Vessel → Vessel particulars → Vessel dimensions and performance characteristics: the Vessel dimensions and performance characteristics panel opens.
2. Set the following parameters:
   - Turn radius – enter a value to the Turn radius field;
   - Economic speed – enter a value to the Economic speed field;
   - Deviation starboard – enter a value to the Deviation starboard field;
   - Deviation port – enter a value to the Deviation port field;
3. When parameters are changed, the OK and Cancel buttons appear.
4. Press OK to save the changes: a dialog opens prompting you to enter the Master password.
5. Enter the password and press OK: the new settings are applied.

10.2.4 Vessel devices settings

Certain ECDIS functions, for example manual observation, require additional information about measuring devices onboard the own vessel

such as their precise position, angle and distance errors. To specify these parameters, set vessel device settings for the own vessel.

To specify vessel device settings:

1. Go to Main Menu → Settings → Vessel → Vessel particulars → Vessel dimensions and performance characteristics: the Vessel dimensions and performance characteristics panel opens.
2. Press the Vessel devices settings button: the Vessel device settings panel opens.



Figure 399 Vessel particulars: advanced characteristics

3. The left part of the window shows the list of devices for which advanced characteristics are available.
4. Select a device: the right part of the window displays characteristics that you can set for the device.
   - Location relative to CCRP X– a positive X value indicates the position of the device between the CCRP and the starboard; a negative X value between the CCRP and the port board;
   - Location relative to CCRP Y – a positive Y value indicates the position of the device between the CCRP and the bow; a negative Y value between the CCRP and the stern;
   - Angle error – angle error of the device in degrees;
   - Distance error – distance error of the device;
5. To apply the settings, press OK: a dialog opens prompting you to enter the Master password.
6. Enter the password and press OK: the new settings are applied.

10.2.5Vessel registration information

To set up vessel registration information:

1. Go to Main Menu → Settings → Vessel → Vessel particulars → Vessel registration: the Vessel registration panel opens.



Figure 400 Vessel particulars: Vessel registration panel

2. Enter parameters to corresponding fields.
3. To apply the parameters, press the Apply button: a dialog opens prompting you to enter the Master password.
4. Enter the password and press OK: the new settings are applied.

10.2.6Ship static data

To set up ship static data:

1. Go to Main Menu → Settings → Vessel → Vessel particulars → Ship static data: the Ship static data panel opens.



Figure 401 Vessel particulars: Ship static data panel

2. Enter source identifier to the Source identifier field. Source identifier is the talker ID of the primary GPS device used for positioning the own vessel.
3. Other parameters are filled with values specified in the Principal particulars panel and in the Dimensions and performance characteristics panel.
4. To apply the parameters, press the Apply button: a dialog opens prompting you to enter the Master password.
5. Enter the password and press OK: the new settings are applied.

10.2.7Voyage static data

To set up voyage static data:

1. Go to Main Menu → Settings → Vessel → Vessel particulars → Voyage static data: the Voyage static data panel opens.



Figure 402 Voyage static data panel

2. To apply the parameters, press the Apply button: a dialog opens prompting you to enter the Master password.
3. Enter the password and press OK: the new settings are applied.

The following voyage static data can be set:

- Navigational status – navigational status of the own vessel;
- Type of ship and cargo – type of the own vessel and of the cargo;
- Persons on board – number of persons on board;
- Voyage destination – destination of the voyage;
- Voyage ETA – estimated time of arrival;
- ECDIS talker ID – ID of the ECDIS talker, taken from the Settings → Vessel → Vessel particulars → Vessel registration panel;
- Maximum draught – maximum draught of the own vessel, taken from the Settings → Vessel → Vessel dimensions and performance characteristics panel.

10.2.8NAVTEX Receiver Mask

To request NAVTEX receiver mask:

1. Go to Main Menu → Settings → Vessel → Vessel particulars → NAVTEX: the NAVTEX panel opens.

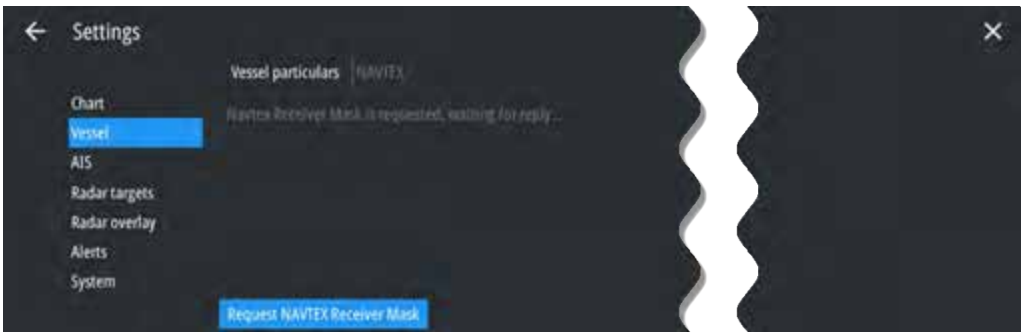


Figure 403 NAVTEX panel, requesting NAVTEX Receiver Mask

2. Press the Request NAVTEX Receiver Mask button: the request is sent to NAVTEX.

10.2.9Conning output

The ECDIS can be connected to a Conning Station. In case relevant parameters are not calculated or otherwise available in the Conning Station, the ECDIS can transmit appropriate data in IEC 61162-1 format.

The following information can be transmitted from the ECDIS:

- Wind data - recalculated to “True”, or originally received sentences if recalculation is impossible;
- Bearing and distance data - till next wheel-over-line of route in “voyage” mode;
- Route monitoring information - about next legs and destination waypoint.

To enable Conning output:

1. add a “Generic output” sensor with a communication line which can transmit data from ECDIS (“TX” mode)



Figure 404 Adding a generic output sensor

2. Go to Settings → Vessel → Vessel particulars → Conning output: the Conning output panel opens.
3. Select the desired output sensor and configure output data for it.



Figure 405 Conning output panel, configuring output data

4. Apply changes.

It is possible to add several “Generic output” sensors and to select more than one of them in the Conning Output Panel. The output data configuration specified in the Conning Output Panel is applied to all selected sensors.

To transmit True Wind:

1. Ensure that a “Generic output” sensor is added to the configuration.
2. Ensure that wind data is received and displayed in the Sensors panel.

3. Enable the appropriate parameter in Settings → Vessel → Vessel particulars → Conning Output.

The following sentences will be transmitted from the ECDIS:

- MWD (only when the ECDIS receives MWD sentences, or MWV sentences with “relative”/”theoretical” flag which can be recalculated into “true”)
- MWV with “relative” flag (only when the ECDIS receives MWV sentences with “relative” flag that can’t be recalculated into “true”)
- MWV with “theoretical” flag (only when the ECDIS receives MWV sentence with “theoretical” flag that can’t be recalculated into “true”).

The sentences are transmitted, whenever updated wind sensor data is received by the ECDIS.

To transmit Bearing and Distance to next WOL:

1. Ensure that a “Generic output” sensor is added to the configuration.
2. Enable the appropriate parameter in Settings → Vessel → Vessel particulars → Conning Output.

The following sentences will be transmitted from the ECDIS:

- PDANBWOL (not all fields will be filled when own vessel’s SOG = 0 kn).

The sentences are transmitted, when a route is in Voyage mode, if own vessel is not located before first waypoint and last waypoint has not been reached. The transmission rate will correspond to the Interval value set in Settings → Vessel → Vessel particulars → Conning Output.

To transmit Route monitoring information on upcoming legs:

1. Ensure that a “Generic output” sensor is added to the configuration.
2. Enable the appropriate parameter in Settings → Vessel → Vessel particulars → Conning Output.

3. Set the “Number of legs to output” parameter to determine for how many upcoming legs, information will be transmitted (maximum number of legs = 99).

The following sentences will be transmitted from the ECDIS:

- PDANRMLEG.

The sentences are transmitted, when a route is in Voyage mode, if last waypoint has not been reached. The transmission rate will correspond to the Interval value set in Settings → Vessel → Vessel particulars → Conning Output. The number of legs, for which information is transmitted, is determined by the “Number of legs to output”.

To transmit Route monitoring information on destination:

1. Ensure that a “Generic output” sensor is added to the configuration.
2. Enable the appropriate parameter in Settings → Vessel → Vessel particulars → Conning Output.

The following sentences will be transmitted from the ECDIS:

- PDANRMDST (not all fields will be filled when own vessel’s SOG = 0 kn).

The sentences are transmitted, when a route is in Voyage mode, if last waypoint has not been reached. The transmission rate will correspond to the Interval value set in Settings → Vessel → Vessel particulars → Conning Output.

10.3 Sensors Setup

All information about the current position of the own vessel (its heading and speed, as well as information about various external conditions of the voyage) comes to the ECDIS from external sensors connected to and registered in the ECDIS.

NOTE:

To change vessel sensor parameters, Master user privileges are required.

10.3.1 Creating a new sensor

To create a new sensor:

1. Go to Main Menu → Settings → Vessel → Sensors: the Sensors panel opens.
2. Press the New button: the drop-down list of available sensors opens.

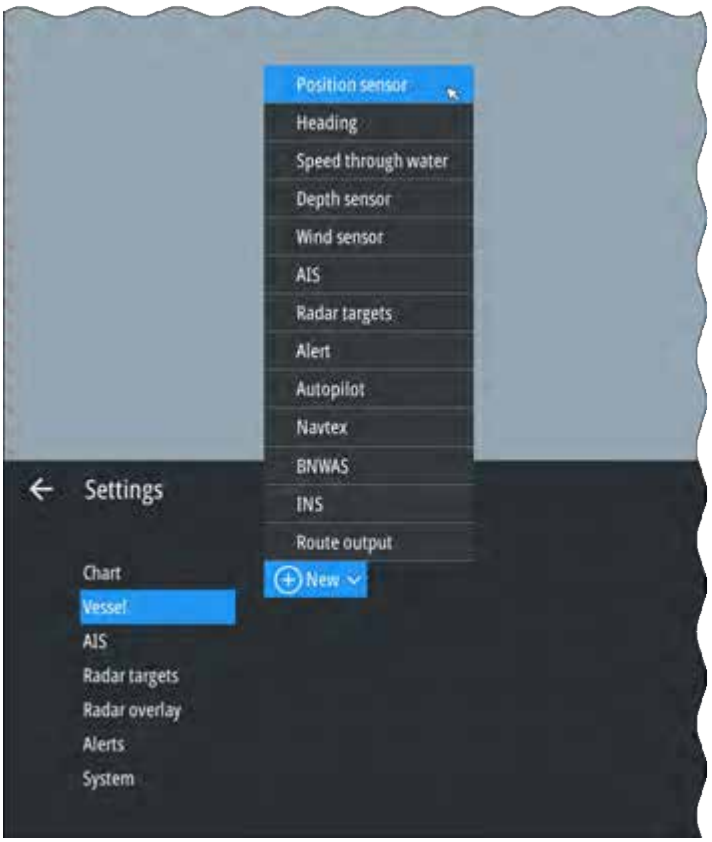


Figure 406 Sensors: selecting a sensor to create

3. Select the sensor you want to create in the list: the sensor is added to the panel and indicators of its main NMEA sentences appear in the Sensors panel.



Figure 407 Sensors: new sensor is added to the panel

4. Select the sensor to open the sensor parameters panel.
5. Specify the parameters and save the sensor: press Apply.
6. A dialog opens prompting you to enter the Master password.
7. Enter the password and press OK: the settings are applied.

10.3.2Sensor parameters

To set up sensor parameters:

1. Go to Main Menu → Settings → Vessel → Sensors: the Sensors panel opens.
2. Select the sensor to open its parameters panel.

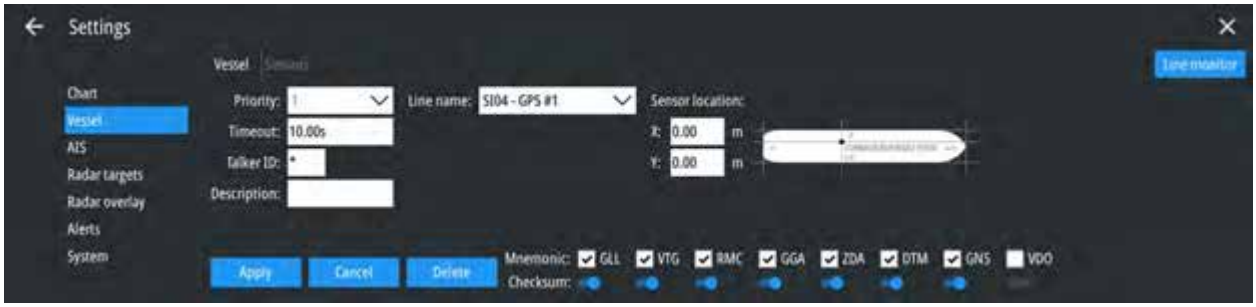


Figure 408 Sensors: parameters

3. Set new values to sensor parameters.
4. To save changes, press Apply: a dialog opens prompting you to enter the Master password.
5. Enter the password and press OK: the settings are applied.

Sensor has the following parameters:

- Priority – Priority of the sensor if several sensors of the same type are registered; if the sensor with the highest priority is lost, sensor with the next priority is used instead;
- Timeout – Time period between the loss of connection with the sensor and triggering the alarm “Invalid data”;
- Talker ID – ID of the sensor used to distinguish between sensors of the same type, or sensors sending the same NMEA sentences;
- Description – Description of the sensor;
- Line name – Name of the connection line;
- Sensor location – Position of the sensor on board the own vessel relative to the conning station:
    - a positive X value indicates the position of the sensor between the conning station and the starboard;
    - a negative X value indicates the position of the sensor between the conning station and the port board;
    - a positive Y value indicates the position of the sensor between the conning station and the bow;
    - a negative Y value indicates the position of the sensor between the conning station and the stern;
- Mnemonic – NMEA sentences to listen to;
- Checksum – Indicates that checksum of the sentences should be checked: if the checksum of a sentence is wrong, the sentence is ignored; if the option is off, all sentences are processed.

10.3.3Line monitor

To check if the communication line of a sensor operates, use line monitor.

To use the line monitor:

1. Go to Main Menu → Settings → Vessel → Sensors: the Sensors panel opens.
2. Select the sensor whose communication line you want to check: the sensor parameters panel opens.
3. Press the Line monitor Line monitor button in the upper-right corner of the panel: the Line monitor panel opens. If the communication line is operating, NMEA sentences coming from the sensor are displayed in the panel.



Figure 409 Line monitor panel

4. To pause NMEA sentences, press the Pause button: new sentences are not displayed anymore and the Pause button changes to Resume.
5. To resume NMEA sentences, press the Resume button: if the communication line is operating, new NMEA sentences are displayed.
6. To clear all sentences from the panel, press the Clear button: the panel is cleared.
7. To close the Line monitor panel, press the Close button: the panel is closed.

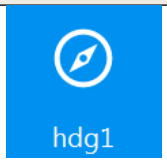
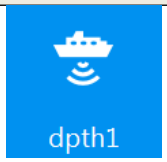
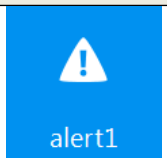
10.3.4Deleting a sensor

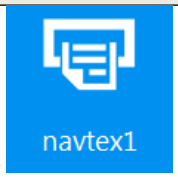
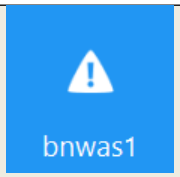
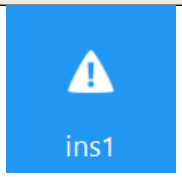
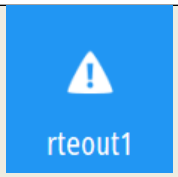
To delete a sensor:

1. Go to Main Menu → Settings → Vessel → Sensors: the Sensors panel opens.
2. Select the sensor you want to delete: the sensor parameters panel opens.
3. Press the Delete button: a dialog opens prompting you to enter the Master password.
4. Enter the password and press OK: the sensor is deleted.

10.3.5Available sensors

In the table below, you can see a list of sensors available for registration in the ECDIS with their NMEA sentences that can be processed in the ECDIS.

Sensor	Messages	Image
Position sensor	GLL VTG RMC GGA ZDA DTM GNS VDO	
Heading	HDT VHW THS ROT VBW VDO	
Speed through water	VHW VBW	
Depth sensor	DBT DPT	
Wind sensor	MWV MWD	
AIS	VDM VDO	
Radar targets	TTM TLL TLB TTD	
Alert	ALF ACM ALC ARC HBT	

Sensor	Messages	Image
Autopilot	APB	
Navtex	NRX NRM	
BNWAS	EVE	
INS	NSR	
Route output	RTE WPL	
Generic output	MWD MWV PDANNBWOL PDANRMDST PDANRMLEG	

NOTE:

The ECDIS can use VDO messages coming from an AIS sensor as a source of the position/heading of the own vessel (coordinates, COG, SOG, HDG). You can add a positioning/heading sensor and set it up to listen to VDO sentences over a specified line.

10.3.6 Position correction

If the currently used positioning device provides coordinates in a coordinate system different from the chart coordinate system, a position correction is required.

For example, the positioning device provides coordinates in the S-42 coordinate system (for plotting the own ship on a paper chart), and the electronic chart is made in the WGS-84 coordinate system: in this case, the own ship position in the chart view is incorrect. A coordinate correction should be provided to the ECDIS to display the own ship symbol in the correct position.

To introduce a coordinate correction:

1. Go to Main Menu → Settings → Vessel → Sensors: the Sensors panel opens.
2. In the upper-right corner of the panel, coordinate correction fields are displayed.



Figure 410 Position correction set-up

3. To correct the latitude, enter a correction value to the Latitude field.
4. To correct the longitude, enter a correction value to the Longitude field.
5. Position corrections are applied immediately.
6. Positive values are added to the latitude and the longitude and indicated with a 'plus' sign in the sensors panel.
7. Negative values are subtracted from the latitude and the longitude and indicated with a 'minus' sign in the Sensors data panel.



Figure 411 Position correction indication in the Sensors data panel

8. You can also specify a position correction in the Sensors panel. Press the Expand options button near coordinates and select the Position correction option: the Primary position correction window opens.



Figure 412 Position correction set-up in the Sensors panel

9. Enter position correction values into the Latitude and Longitude fields and press Close: the window is closed, and the position correction is applied.

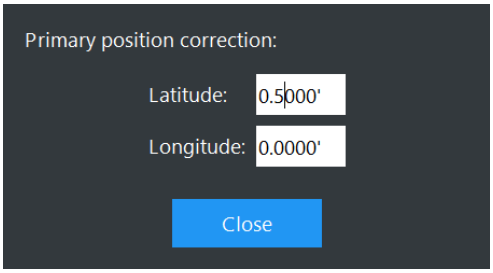


Figure 413 Position correction set-up dialog

11 AIS Setup

11.1 AIS Display Setup

11.1.1 Velocity vector

Velocity vector of an AIS target is a vector predicting position of the target in a specified period based on the current speed and course. The target's speed and course over ground (SOG and COG) are used.

To display and set up the velocity vector:

1. Go to Main Menu → Settings → AIS → Display settings → Velocity vector.



Figure 414 AIS display set up: velocity vector

2. To display the velocity vector, set the Velocity vector switch to the On position.
3. The length of the velocity vector is synchronized with the own vessel. The value is displayed in the Velocity vector length drop-down list.
4. To display time marks on the velocity vector, set the Velocity vector time marks switch to the On position.
5. The time mark step for the velocity vector is synchronized with the own vessel. The value is displayed in the Velocity vector time mark step drop-down list.

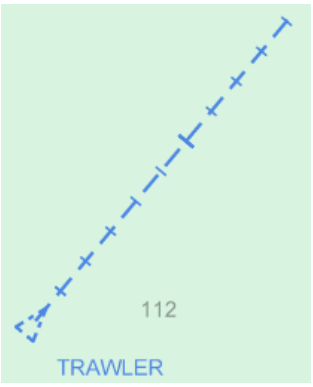


Figure 415 velocity vector (vector length = 12 min, time mark step = 1 min)

11.1.2Path predictor

Along with the velocity vector, you can display a path prediction vector (or path predictor). Path predictor is based on speed over ground (SOG), course over ground (COG) and rate of turn.

To display and set up path predictor:

1. Go to Main Menu → Settings → AIS → Display settings → Velocity vector.
2. To display the path predictor, set the Path predictor switch to the On position.
3. The length of the path predictor is the same as set for the velocity vector in the Velocity vector length field.
4. No time step marks are available for the path predictor.

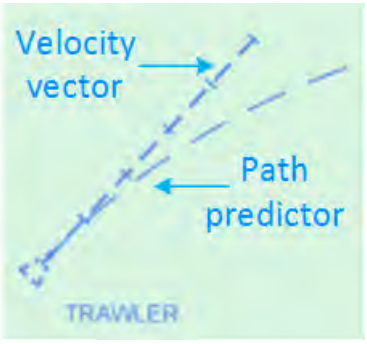


Figure 416 Path predictor and Velocity vector (vector length = 5 min)

11.1.3Past track

To monitor track of AIS targets over time, use the Past track function.

To display and set up past track:

1. Go to Main Menu → Settings → AIS → Display settings.



Figure 417 AIS display set up: past track

2. To display the past track, set the Past track switch to the On position.
3. To specify the length of the past track, select a value in the Past track length drop-down list.
4. To specify the step of time marks, select a value in the Past track time mark step drop-down list.
5. To reset the past track and to start drawing it all over again, press the Reset targets past track button: the old past track disappears, and a new past track starts drawing.

11.1.4AIS targets filter

The ECDIS has no limitation on the number of targets shown on the chart. If the system works slowly due to the number of displayed AIS targets, you can reduce the number of displayed targets using the AIS targets filter.

You can filter display of AIS targets by type and set up display of sleeping targets (targets outside the specified activation range).

NOTE:

If at least one filter is set, a notice appears in the notices area in the chart view notifying that "Not all of AIS targets are visible."

To filter AIS targets display:

1. Go to Main Menu → Settings → AIS → Display settings → Filter.



Figure 418 AIS targets filters

2. To display AIS targets of a specific type, set the corresponding switch to the On position.
3. To hide AIS targets of a specific type, set the corresponding switch to the Off position.

To set up display of sleeping targets:

1. Go to Main Menu → Settings → AIS → Display settings → Filter.
2. To show sleeping targets, set the Show sleeping targets switch to the On position.
3. To hide sleeping targets further from the own vessel than a specified value, set the Hide sleeping targets further than switch to the On position and enter a distance value into the field that becomes editable.
4. To hide sleeping targets with the distance between the own vessel and the target in the CPA greater than a specified value, set the CPA (hide sleeping targets further than) switch to the On position and enter a distance value into the field that becomes editable.
5. To hide sleeping targets with the TCPA greater than a specified value, set the TCPA (hide sleeping targets further than) switch to the On position and enter a time value into the field that becomes editable.
6. To show sleeping targets of class A, set the Show sleeping targets of class A switch to the On position.
7. To show sleeping targets of class B, set the Show sleeping targets of class B switch to the On position.

11.1.5 True scale outline

At a large scale, AIS targets can be displayed as true scale symbols based on dimensions coming from them in AIS messages.

To display AIS symbols as true scale symbols:

1. Go to Main Menu → Settings → AIS → Display settings → Other.



Figure 419 AIS display set up: other settings

2. To display AIS symbols as true scale symbols, set the True scale outline switch to the On position.
3. Now, at a large scale AIS symbols will be displayed as true-scale symbols.
4. To display AIS symbol as point symbols at all scales, set the True scale outline switch to the Off position.

NOTE:

Position of the true scale symbol of an AIS target is defined by the target's heading.

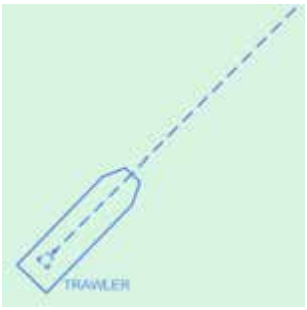


Figure 420 True scale AIS target symbol

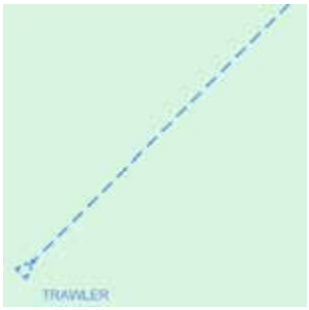


Figure 421 Point AIS target symbol

11.1.6 Heading line and turn indicator

To demonstrate the heading of an AIS target, heading line is used. To demonstrate that an AIS target is turning, the turn indicator is used pointing in the direction of the turn.

To display the heading line and the turn indicator:

1. Go to Main Menu → Settings → AIS → Display settings → Other.
2. To display the heading line, set the Heading line switch to the On position.
3. To display the turn indicator, set the Heading line turn indicator switch to the On position.
4. To hide the heading line and the turn indicator, set their switches to the Off position.

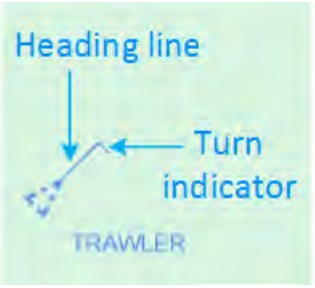


Figure 422 AIS heading line and turn indicator

11.1.7 Activation range circle

Activation range circle: when an AIS target is within this circle, it is activated.

The range of the circle is set in the Main Menu → Settings → AIS → Configuration tab.

To turn on the display of the circle:

1. Go to Main Menu → Settings → AIS → Display settings → Other.
2. To display the activation range circle, set the Activation range circle switch to the On position.
3. To hide the range, set the switch to the Off position.



Figure 423 Display of activation and range circle

11.1.8 Target label display

You can choose to display or hide labels of AIS targets in the chart view.

To turn on the display of target labels:

1. Go to Main Menu → Settings → AIS → Display settings → Other.
2. To display the labels, set the Target label switch to the On position.
3. To hide the labels, set the Target label switch to the Off position.

11.1.9 Associated targets

You can choose to display associated targets with the AIS target symbol. By default, the radar target symbol is used for associated targets.

NOTE:

An associated target is a target simultaneously representing a tracked target and a reported AIS target with similar parameters (for example, position, course, speed) which comply with an association algorithm.

To display associated targets with the AIS symbol:

1. Go to Main Menu → Settings → AIS → Display settings → Other.
2. Set the Show associated targets as AIS switch to the On position.
3. To display associated targets with the radar target symbol again, set the Show associated targets as AIS switch to the Off position.

11.2 AIS Configuration

11.2.1 Activated target

A tracked AIS target is activated when it reaches a specified distance from the own vessel. An activated AIS target means that additional graphical information such as the target's name and heading line is displayed in the chart view, as well as more information is available in the full information table of the target.

To specify the activation distance:

1. Go to Main Menu → Settings → AIS → Configuration.
2. Specify the distance to the own vessel in the Target is activated when distance to own vessel ≤ field.
3. You can disable automatic activation of AIS targets. To do so, set the switch to the right of the Target is activated when distance to own vessel ≤ field to the Off position: automatic activation is turned off and a notice warning about this appears in the notices area.
4. The setting is applied immediately.

NOTE:

To display the activation limit in the chart view, go to Main Menu → Settings → AIS → Display setup → Other and switch the Activation range circle option on.

11.2.2 Lost target removal timeout

You can specify when a lost AIS target should be removed from the chart view.

To specify the lost target removal timeout:

1. Go to Main Menu → Settings → AIS → Configuration.
2. Specify the timeout period in the Lost target removed timeout field, seconds.
3. The setting is applied immediately.

12 Radar Targets Setup

12.1 Radar Targets Display Setup

12.1.1 Velocity vector

Velocity vector of a radar target is a vector predicting position of the target in a specified period based on the current speed and course. The target's speed and course over ground (SOG and COG) are used.

To display and set up the velocity vector:

1. Go to Main Menu → Settings → Radar targets → Display settings.

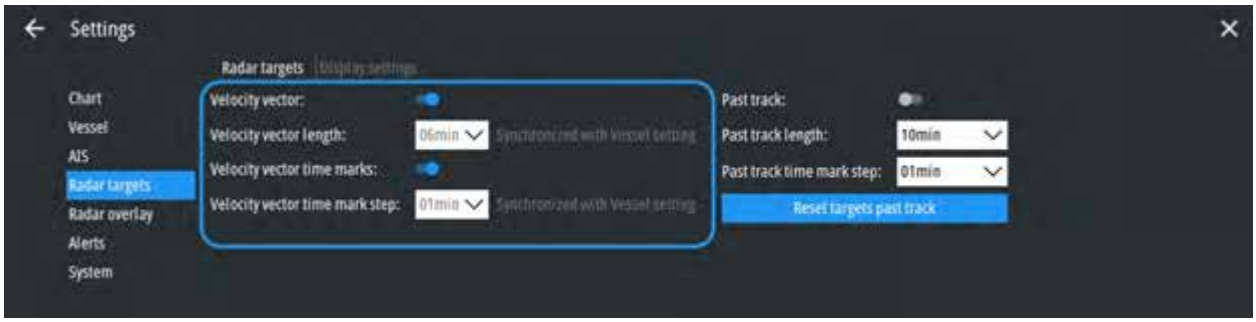


Figure 424 ARPA display set up: velocity vector

2. To display the velocity vector, set the Velocity vector switch to the On position.
3. The length of the velocity vector is synchronized with the own vessel. The value is displayed in the Velocity vector length drop-down list.
4. To display time marks on the velocity vector, set the Velocity vector time marks switch to the On position.
5. The time mark step for the velocity vector is synchronized with the own vessel. The value is displayed in the Velocity vector time mark step drop-down list.

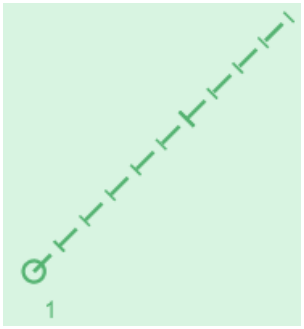


Figure 425 velocity vector (vector length = 10 min, time mark step = 1 min)

12.1.2Past track

To monitor track of radar targets over time, use the Past track function.

To display and set up past track:

1. Go to Main Menu → Settings → Radar targets → Display settings.

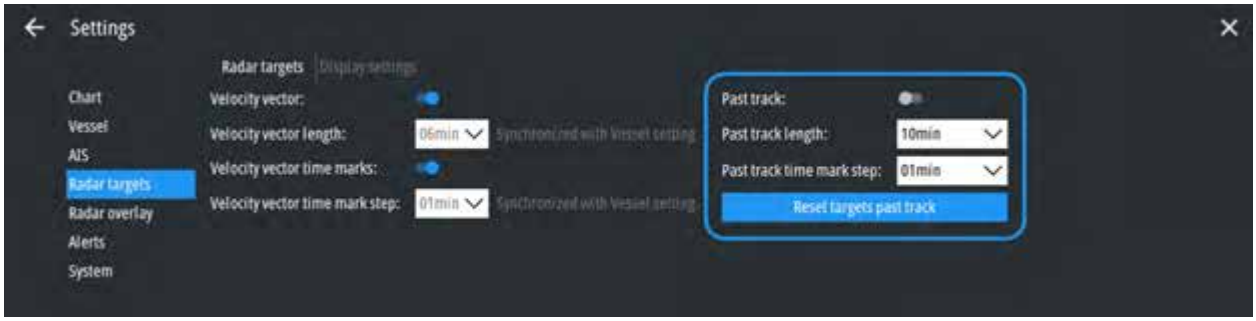


Figure 426 ARPA display set up: past track

2. To display the past track, set the Past track switch to the On position.
3. To specify the length of the past track, select a value in the Past track length drop-down list.
4. To specify the step of time marks, select a value in the Past track time mark step drop-down list.
5. To reset the past track and to start drawing it all over again, press the Reset targets past track button: the old past track disappears, and a new past track starts drawing.

12.2 Radar Target Configuration

12.2.1Targets distance filter

The ECDIS has no limitation on the number of targets shown on the chart. If the system works slowly due to the number of displayed targets, you can reduce the number of displayed radar targets using the radar targets distance filter.

With the radar targets distance filter, you can hide targets that are further from the own vessel than a specified distance.

To set up the targets distance filter:

1. Go to Main Menu → Settings → Radar targets → Configuration.
2. Set the Target is visible when distance to own vessel ≤ switch to the On position: the distance value field becomes editable.
3. Enter a value into the distance field: radar targets further from the own vessel than the specified distance are hidden. A notice appears in the notices area saying that *Not all Radar targets are visible*.

12.2.2Lost target timeout

You can specify when a lost radar target should be assigned the lost status.

To specify the lost target timeout:

1. Go to Main Menu → Settings → Radar targets → Configuration.
2. Specify the timeout period in the Lost target timeout field, seconds.
3. The setting is applied immediately.

12.2.3Lost target removal timeout

You can specify when a lost radar target should be removed from the chart view.

To specify the lost target removal timeout:

1. Go to Main Menu → Settings → Radar targets → Configuration.
2. Specify the timeout period in the Lost target removed timeout field, seconds.
3. The setting is applied immediately.

12.2.4AIS/Radar targets associations

If a tracked radar target and a reported AIS target have similar parameters (for example position, course, speed) that comply with the

association algorithm, the two targets can be associated, that is displayed as one target using a single symbol.

To enable/disable targets associations:

1. Go to Main Menu → Settings → Radar targets → Configuration.
2. To enable targets associations, set the Enable AIS/Radar targets associations switch to the On position.
3. To disable targets associations, set the Enable AIS/Radar targets associations switch to the Off position.
4. The setting is applied immediately.

13 Radar Overlay Setup

13.1 Taking Control

Only one ECDIS station can have run-time control of one NRP at a time.

If the ECDIS is not in control of the NRP used to display the radar overlay, NRP settings are disabled. It is possible to take run-time control of the NRP.

To take control of an NRP:

1. Go to Main Menu → Settings → Radar overlay → Configuration.
2. Select the NRP to use in the Select RADAR drop-down list.
3. If the ECDIS is not in control of the selected NRP, all settings are disabled.
4. The current controller of the NRP is shown in the Node in control field. If this is the ECDIS station on which the operation is taking place, the field says “This ECDIS”, if no ECDIS has claimed ownership of the NRP, the field says “None.”



Figure 427 Radar overlay configuration panel, settings are disabled

5. Press the Take control button: the ECDIS takes control of the selected NRP and settings become enabled.

13.2 Gain, Sea and Rain

The radar image can be adjusted by adjusting the gain (of the Radar image), sea (the elevation above sea level under which the RADAR video signal will be cut) and rain (offset of the RADAR video signal).

To adjust gain, sea and rain:

1. Go to Main Menu → Settings → Radar overlay → Configuration.
2. Adjust the gain value in the Gain field.
3. Adjust the sea value in the Sea field.
4. Adjust the rain value in the Rain field.
5. To adjust values, you can enter a new value, use the Plus and Minus buttons in the corresponding fields, or use sliders under the corresponding fields.
6. New values are applied immediately.
7. If a new value is not correctly applied to the NRP for some reason, the value field will be brown until the value is applied.

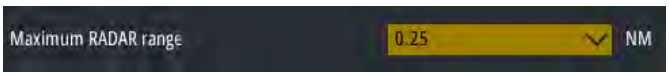


Figure 428 Radar overlay: value not set

13.3 Radar Range

A radar range can be selected from a list of predefined ranges, or the Auto range option can be selected, causing the application to calculate the optimal range automatically based on the zoom level of the chart view.

To set the radar range:

1. Go to Main Menu → Settings → Radar overlay → Configuration.
2. To use the Auto range option, set the Auto range switch to the On-position. To disable the Auto range option, set the Auto range switch to the Off-position. The automatically calculated radar range is displayed in the Maximum RADAR range field.



Figure 429 Radar overlay: Auto range option

3. To select a predefined radar range, disable the Auto range option and select a range value in the Maximum RADAR range drop-down list.



Figure 430 Radar overlay: preset range options

4. The value is applied immediately.
5. If a new value is not correctly applied to the NRP for some reason, the value field will be brown until the value is applied.
6. Measurement units for the range are specified in the Settings → System → Units, date & time → Distance setting.

13.4 Resetting to Defaults

You can reset all radar overlay settings to their default values.

To reset radar overlay settings to defaults:

1. Go to Main Menu → Settings → Radar overlay → Configuration.
2. Press the Reset to defaults button: settings are reset to their default values.

13.5 RADAR/NRP Link Status

The ECDIS displays link status of the specified NRP.

To view the link status:

1. Go to Main Menu → Settings → Radar overlay → Configuration.
2. Status of the NRP channels is displayed in the Status list.



Figure 431 Radar overlay: link status

The following statuses are used:

- OK – data is being received over the link channel without errors; the channel in the Status list has no colored background.
- Error rectified – an error has occurred on the link channel but has already been rectified; the channel in the Status list has a brown background. To clear the background, click on the channel.
- Error exists – an error has occurred on the link channel; the channel in the Status list has a yellow background.

The following link channels are monitored:

- HDG – shows if there is a valid heading value from the sensors. If ECDIS is in the DR mode, the HDG status is “Error exists.”
- Video – shows if the video signal is being received correctly.
- Trigger – shows if the trigger signal is being received correctly. The trigger is the signal indicating when to sample the RADAR video.
- ACP – shows if the ACP signal is being received correctly. ACP (Azimuth Change Pulse) is a pulse train where the interval between pulses is a fixed angle.
- ARP – shows if the ARP signal is being received correctly. ARP (Azimuth Reset Pulse) is a reset pulse that occurs at a reference point, once for each rotation of the radar scanner.
- Network – shows if there is a network connection to the NRP.

13.6 Parameter display

Whenever a radar overlay is displayed on the chart, the user configuration parameters (gain, sea, rain and range) are listed for the mariner's overview in the information display.



Figure 432 Radar overlay: parameter display

14 Alerts Setup

14.1 Grounding Check Setup

The Grounding Check function is used to set a grounding check zone ahead the own vessel to warn you if dangerous objects are found inside the zone.

To configure the grounding check zone:

1. Go to Main menu → Settings → Alerts → Grounding check: the Grounding check panel opens.



Figure 433 Grounding check panel

2. Specify the height the own vessel needs to pass under an overhead object crossing its path: set the value in the Height clearance field.

NOTE:

All height values are related to the vertical datum of the chart under the own vessel. Tides ARE NOT taken into consideration.

3. Select a method to calculate the length of the grounding check zone in the methods adrop-down list and enter a value into the value field. The following methods are available:

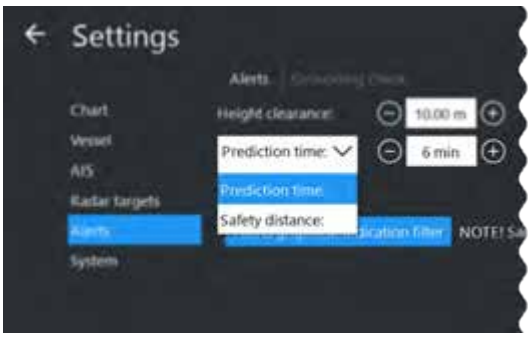


Figure 434 Length of the grounding check zone

   a) Prediction time – the zone length is calculated based on the predicted position of the own vessel after a specified period;
   b) Safety distance – the zone length is calculated based on the specified distance.

4. Select a shape for the grounding check zone in the Guard zone shape drop-down list. Three shapes are available:

a) Cardioid
b) Sector
c) Rectangle

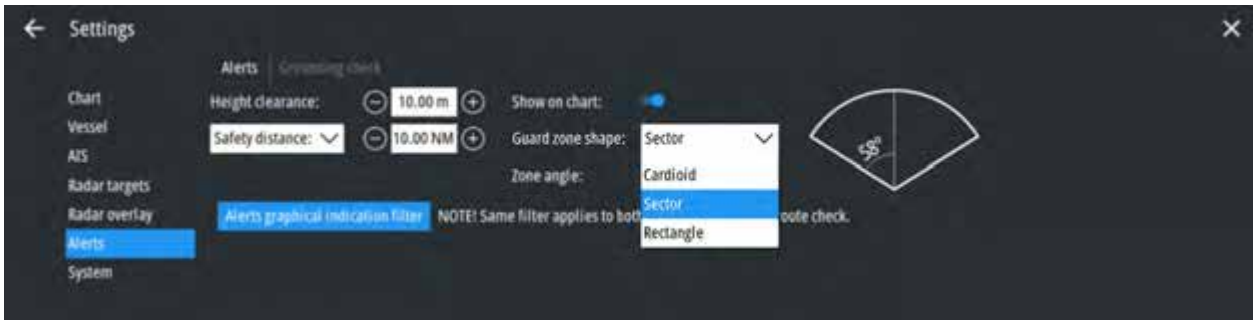


Figure 435 Shape of the grounding check zone

5. If the Sector shape is selected, specify the angle of the sector in the Zone angle field.



Figure 436 Grounding check zone: sector

6. If the Rectangle shape is selected, specify the width of the rectangle in the Rectangle width field.



Figure 437 Grounding check zone: rectangle

7. To display the zone on the chart, set the Show on chart switch to the On position. To hide the zone, set the switch to the Off position.

NOTE:

If the guard zone display is on, dangerous objects inside the zone are marked with yellow outlines. If the display is off, objects are not marked.



Figure 438 Guard zone display on



Figure 439 Guard zone display off

8. To filter graphical indication, press the Alerts graphical indication filter button: the Alerts graphical indication filter window opens. Select types of dangerous objects you want to highlight and unselect those you want to hide. To close the window, press Close.

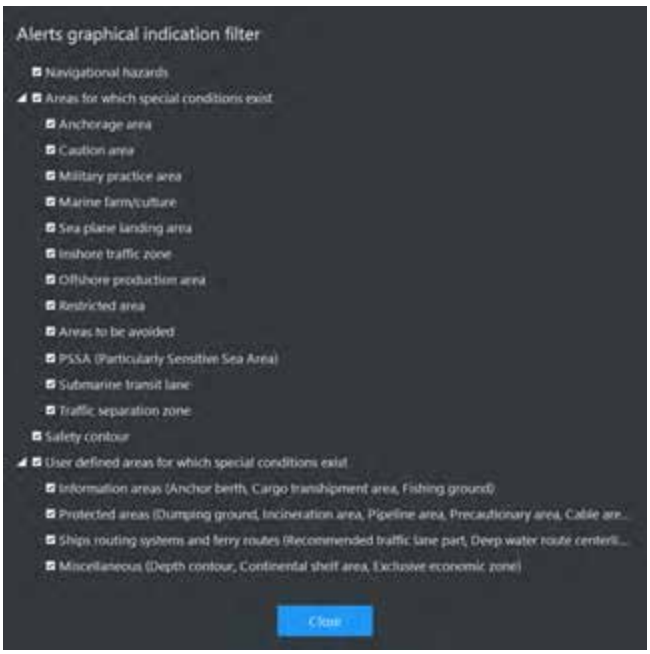


Figure 440 Grounding check: Alerts graphical indication filter

9. If at least one alerts graphical indication filter is set, a warning appears in the notices area saying that *Indication of the specified type of objects is Off*.

15 System Setup

15.1 Display Setup

Display settings allow selecting a display mode for day, dusk, and night conditions as well as setting up brightness, contrast and backlight of the screen.

15.1.1 Day/Night Mode

Switching between the Day and the Night mode provides better display for light and dark times of day.

To switch between the Day and Night modes:

1. Go to the Main Menu → Settings → System → Display.
2. Select the Day, Dusk or Night mode in the Day/Night mode drop-down list.
3. The new setting value is applied immediately.

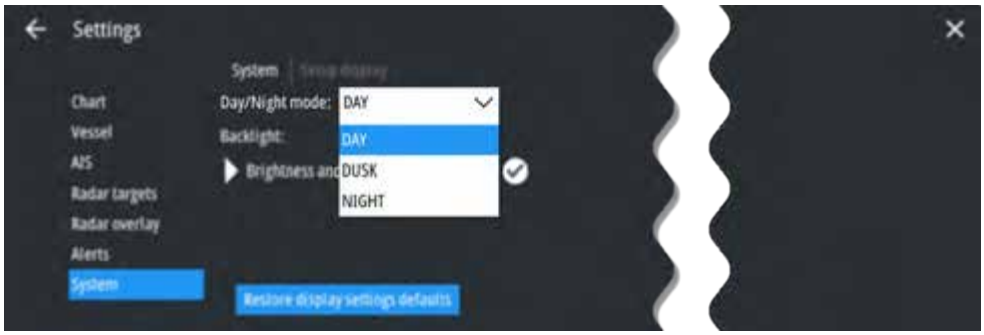


Figure 441 Day/Night mode

4. The Day/Night setting is also available in the Main menu → Shortcuts panel.

15.1.2Backlight

You can set up backlight of the screen.

To set up backlight:

1. Go to the Main Menu → Settings → System → Display.

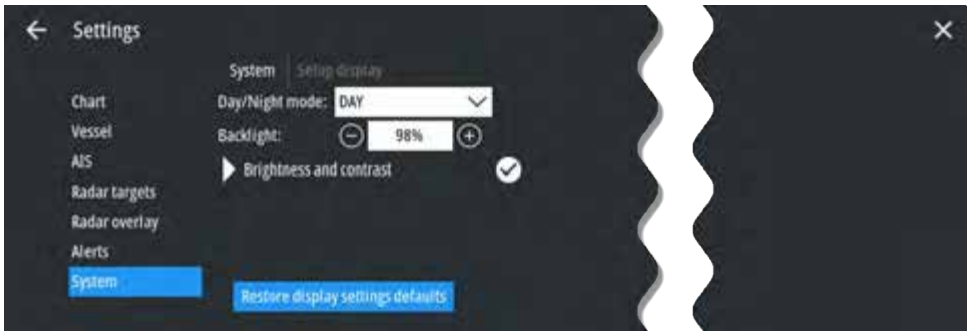


Figure 442 Backlight setup

2. Specify Backlight in the Backlight field.
3. If the default value is set, the check indicator is displayed to the right of the Brightness and contrast field. If the value has been changed, the minus indicator is displayed.
4. The settings are applied immediately.
5. To restore default settings, press the Restore display settings defaults button or the F8 key.
6. The Backlight setting is also available in the Main menu → Shortcuts panel.
7. The backlight can also be controlled via hot keys: to increase the backlight by 1 unit, press ALT+ARROW UP; to decrease the backlight by 1 unit, press ALT+ARROW DOWN.

15.1.3 Brightness and contrast

You can set up brightness and contrast of the screen.

To set up brightness and contrast:

1. Go to the Main Menu → Settings → System → Display.
2. Expand the Brightness and contrast section.



Figure 443 Brightness and contrast setup

3. Specify brightness in the Brightness field.
4. Specify contrast in the Contrast field.
5. If the default value is set, the check indicator is displayed to the right of the Brightness and contrast field. If the value has been changed, the minus indicator is displayed.
6. The settings are applied immediately.
7. To restore default settings, press the Restore display settings defaults button or the F8 key.
8. The Brightness and contrast setting is also available in the Main menu → Shortcuts panel.

15.2 Sound

To set the buzzer level, set a value in the Buzzer level field (only available for DM700 with monitors that support volume adjustment).



Figure 444 Sound set-up

15.3 On-screen Keyboard

The ECDIS provides an on-screen keyboard to use when entering values into setting fields.

To turn the on-screen keyboard on:

1. Go to the Main Menu → Settings → System.



Figure 445 On-screen keyboard setting

2. Set the On-screen keyboard switch to the On position.
3. The new setting value is applied immediately: now, every time when you set the entry focus to a value field, the on-screen keyboard will appear.



Figure 446 On-screen keyboard

15.4 Units, Date and Time

Using the Units, Date and time setup you can set measurement units for distances, horizontal and vertical measurements, for depths, for vessel speed, and for wind speed; specify your Time zone and daylight saving

time; if necessary, switch on the use of time correction from GPS; and select the date display format.

To set up units, date and time parameters:

1. Go to the Main Menu → Settings → System → Units, Date and time: the Units, Date and time panel opens.



Figure 447 Units, Date and time set-up

2. Select a measurement unit for distances in the Distance drop-down list. Nautical miles and kilometers are available.
3. Select a measurement unit for horizontal measurements in the Horizontal Measurements drop-down list. Centimeters, meters, and kilometers are available.
4. Select a measurement unit for vertical measurements in the Vertical Measurements drop-down list. Centimeters, meters, and kilometers are available.
5. Select a measurement unit for depths in the Depth drop-down list. Feet and meters are available.
6. Select a measurement unit for vessel speed in the Vessel speed drop-down list. Knots and kilometers per hour are available.
7. Select a measurement unit for wind speed in the Wind speed drop-down list. Meters per second, knots and kilometers per hour are available.
8. Select a time offset from the UTC time in the Time zone drop-down list.
9. To use daylight saving time, set the Daylight saving time switch to the On position.
10. To use correction from GPS, set the Use correction from GPS switch to the On position.
11. Select a date display format in the Choose date format drop-down list.
12. The new setting values are applied immediately.

NOTE:

Regardless whether "Use correction from GPS" and "System time correction" are configured, messages generated by the ECDIS do not contain a "time of last change".

15.5 User Accounts

The ECDIS implements a system of user accounts. It allows protection of important settings such as vessel performance characteristics and vessel sensors against unauthorized modification.

Using user accounts, users can keep their own preferred chart settings for next sessions.

15.5.1 Master user

Master user is a user who has unlimited rights in operating the ECDIS. A Master password is required to set up user accounts as well as to apply modifications of vessel performance characteristics and sensor parameters.

To set a master password:

1. Go to the Main Menu → Settings → System → Users: the Users panel opens.



Figure 448 Users panel

2. Press the Set Master password button: the Modify user dialog opens where you can set a new Master password.

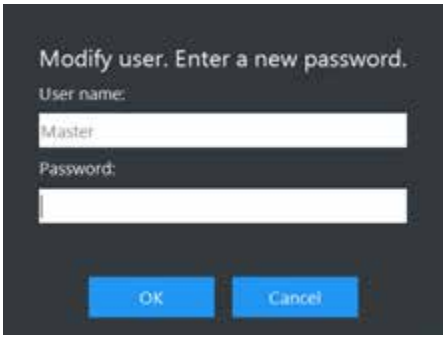


Figure 449 Users: Modify user dialog

3. Enter the new password to the Password field and press OK: the dialog opens requesting you to enter the current Master password.

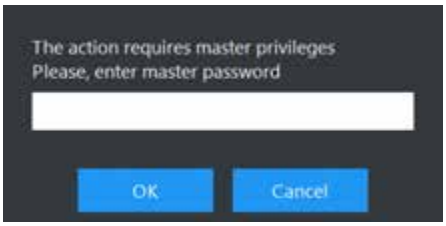


Figure 450 Users: Master password request dialog

4. Enter the password and press OK: the password is changed. Now you should use the new Master password.

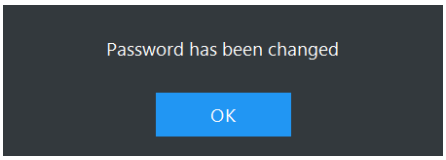


Figure 451 Users: password is changed successfully

15.5.2Adding/deleting users

To add or delete users, the Master password is required.

To add a user account:

1. Go to the Main Menu → Settings → System → Users: the Users panel opens.
2. Press the Add User button: the Add new user dialog opens.

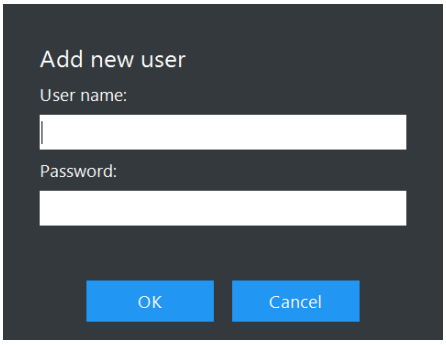


Figure 452 User accounts: Add new user dialog

3. Enter the user name to the User name field.

4. Enter the user password to the Password field.
5. Press OK: the Master password request dialog opens.

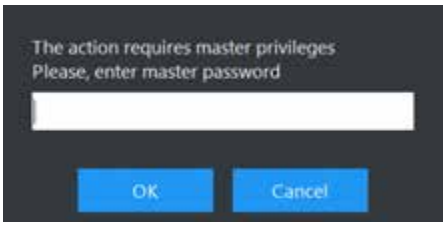


Figure 453 Users: Master password request dialog

6. Enter the Master password and press OK: the new user account is created and added to the User accounts table.

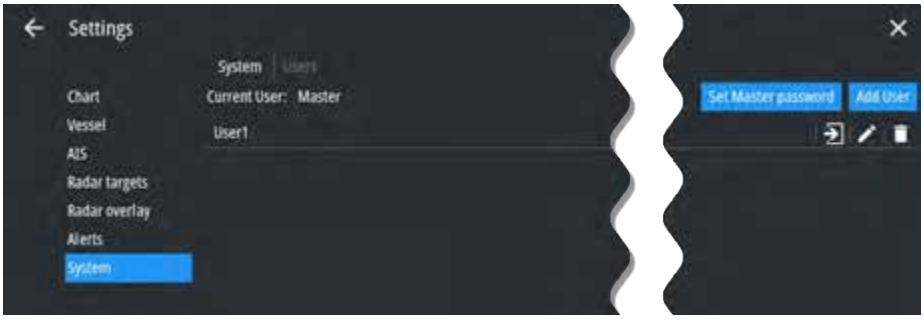


Figure 454 Users: new user added

To delete a user:

1. Go to the Main Menu → Settings → System → Users: the Users panel opens with all users listed in the table.



Figure 455 Users: deleting a user

2. Find the account you want to delete and press its delete button: the confirmation dialog opens.

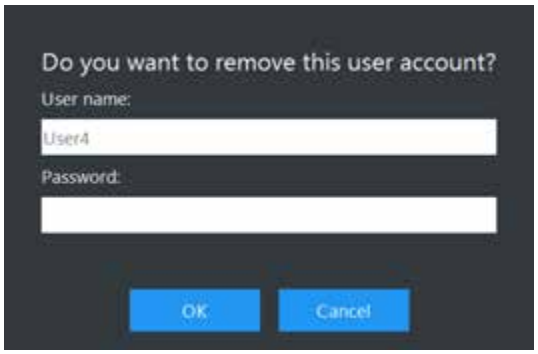


Figure 456 Users: confirm deleting a user

3. Enter the user password into the Password field and press OK: the Master password request dialog opens.

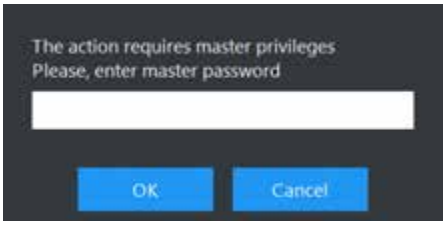


Figure 457 Users: Master password request dialog

4. Enter the Master password and press OK: the user is deleted.

15.5.3Logging in

To log in as a user:

1. Go to the Main Menu → Settings → System → Users: the Users panel opens with all users listed in the table.
2. Find the user you want to log in to and press its log in button: the Log in dialog opens.

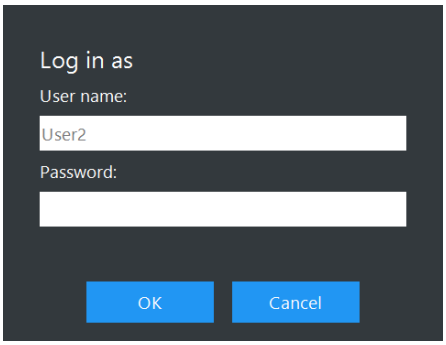


Figure 458 Users: logging in

3. Enter the user password to the Password field and press OK: you are logged in. The user name is indicated in the Current user indicator in the status bar of the ECDIS.

15.5.4Changing user passwords

To change the password of a user:

1. Go to the Main Menu → Settings → System → Users: the Users panel opens with all users listed in the table.
2. Find the user whose password you want to change and press its edit button: the Enter a new password dialog opens.

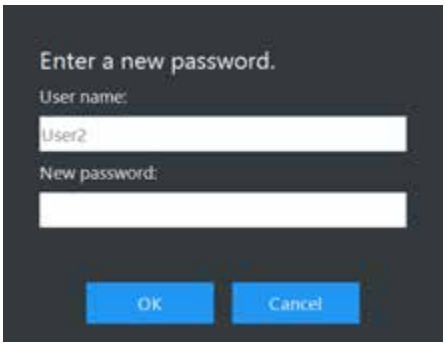


Figure 459 Users: modifying user password

3. Enter the new user password into the New password field and press OK: the password is changed.

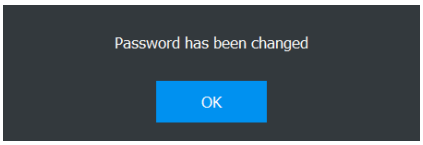


Figure 460 User accounts: user password changed

4. If logged in as Master, you can change passwords of other users: press the edit button of the user, enter a new password in the Enter a new password dialog and press OK: the Master password request dialog opens.

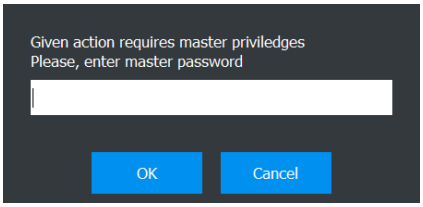


Figure 461 User accounts: Master password request

5. Enter the Master password and press OK: the user password is changed.

NOTE:

When setting the ECDIS to standby, the current user account is saved in the settings. Next time you start the ECDIS, it automatically logs into the last-used user account.

15.6 SA Certificate

The S-63 data protection scheme requires a Scheme Administrator certificate, or public key, to be installed on the system. Usually it is pre-installed, but if the System Administrator issues a new certificate, you must be able to install it on the system.

15.6.1 Installing SA certificate

To install an SA certificate:

1. Go to the Main menu → Settings → System → SA certificates the SA certificates panel opens with the list of currently installed SA certificates and SA certificates found on removable data storage devices connected to the ECDIS.
2. When the SA certificates panel is opened for the first time after the ECDIS launch, SA certificates search starts automatically. To refresh the SA certificates list manually, press the refresh button in the upper-right corner of the panel.



Figure 462 SA certificates panel

3. To install an SA certificate, press its install button: the window with the certificate data opens.

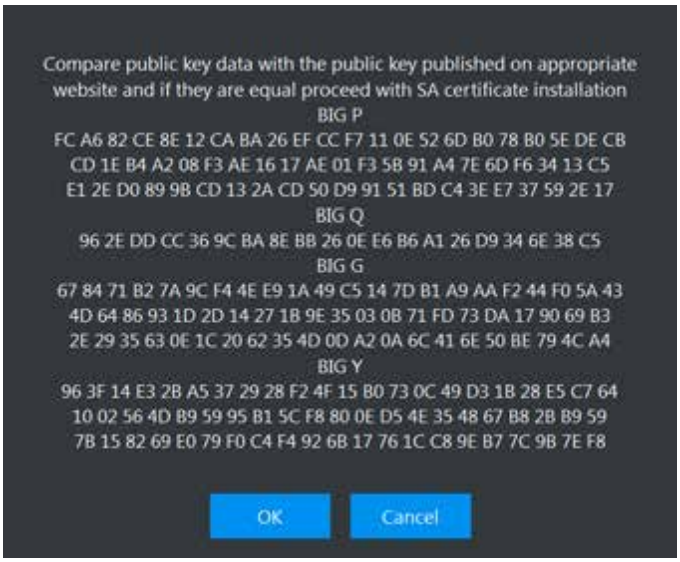


Figure 463 SA certificate data to be compared

4. Compare the displayed data with the SA certificate published on the website of the Scheme Administrator and press OK if the data is identical or Cancel if you find any discrepancies.
5. After you have pressed OK, the certificate is installed in the system and a notification message appears.

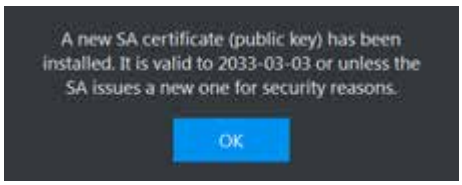


Figure 464 SA certificate installation end message

NOTE:

If you install a newly issued SA certificate, it overwrites the old certificate. If you install an SA certificate of a different Scheme Administrator, it is installed alongside the previously installed certificates.

15.6.2 Deleting SA certificates

To delete an installed SA certificate:

1. Go to the Main menu → Nav Data → Settings → System → SA certificates the SA certificates panel opens with the list of currently installed SA certificates and SA certificates found on removable data storage devices connected to the ECDIS.
2. To delete an installed certificate, press its delete button and confirm the operation: the certificate is removed.

15.6.3 Restoring last deleted SA certificate

You can restore the last deleted SA certificate in the ECDIS.

To restore a deleted SA certificate:

1. Go to the Main menu → Nav Data → Settings → System → SA certificates the SA certificates panel opens.
2. Press the Restore *.CRT button and confirm the operation: the last deleted SA certificate is restored.

15.7 System Information

System information for the ECDIS includes data such as the ECDIS name and version, the SDK version and the Presentation library version.

In the System information panel, you can also save the user permit to a file.

15.7.1 Viewing system information

To access system information:

1. Go to the Main Menu → Settings → System → System information: the System information panel opens.



Figure 465 System Information

15.7.2 Saving user permit to a file

User permit is the unique identifier of your ECDIS system. Cell permits are created exclusively for your system using the user permit and cannot be used on any other system.

To save the user permit to a file:

1. Go to the Main menu → Settings → System → System information: in the panel, the user permit code is displayed.



Figure 466 Save user permit

2. Press the Save button: the Save user permit dialog opens with a list of removable media connected to the system.

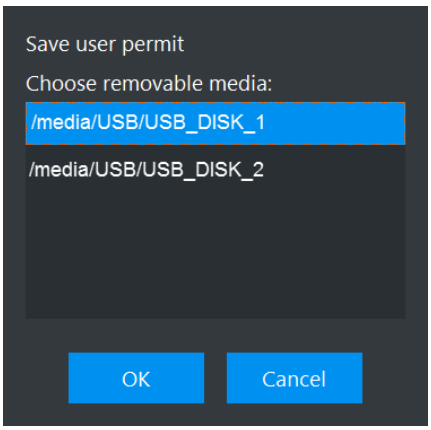


Figure 467 Save user permit dialog

3. Select a removable device in the list and press OK, the user permit is saved as a TXT file to the root folder of the selected device.
4. Now you can send the file to your data distributor.

15.8 Synchronization Setup

The ECDIS can synchronize data such as SENC geodatabases, mariners' objects, routes, permits, and configuration files with other ECDIS's connected to a network.

The synchronization can be automated or manual.

To specify synchronization type:

1. Go to the Main menu → Settings → System → Synchronization: the Synchronization panel opens with all nodes available for synchronization.

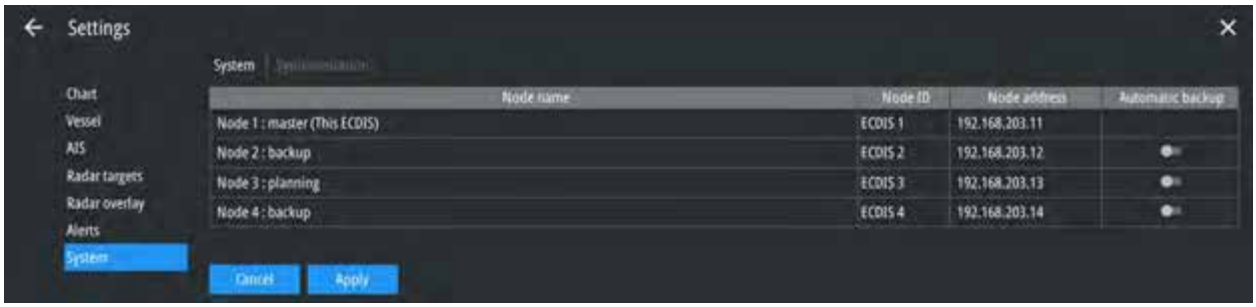


Figure 468 Synchronization panel

2. If you want all data to synchronize automatically to a node, set the Automatic backup switch of this node to the On position.
3. If you want to synchronize data to a node manually, set the Automatic backup switch of this node to the Off position.
4. To save the synchronization set-up, press the Apply button: the action requires master privileges and you will be asked to enter the master password.
5. Enter the password and press OK: the synchronization setup is saved.

NOTE:

For manual synchronization, use the Backup arrangement tool in the Main Menu → Tools panel.

15.9 Backup and Restore User Settings

The ECDIS provides the option of saving its current settings to a file and then loading them from this file. With this function, you can also revert to

user settings that were set before the Restore default function has been applied.

15.9.1 Backing up user settings

To save user settings to a file:

1. Go to the Main menu → Settings → System → Backup and restore user settings: the Backup and restore user settings panel opens.

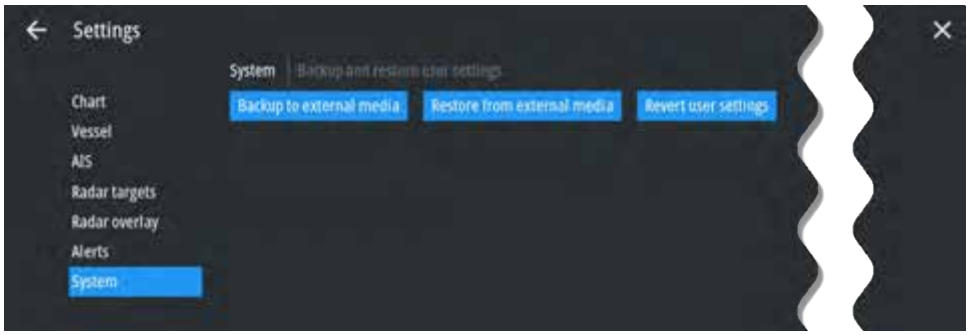


Figure 469 Backup and restore user settings panel

2. Press the Backup to external media button: the Backup user settings dialog opens, where all removable media connected to the ECDIS are listed.

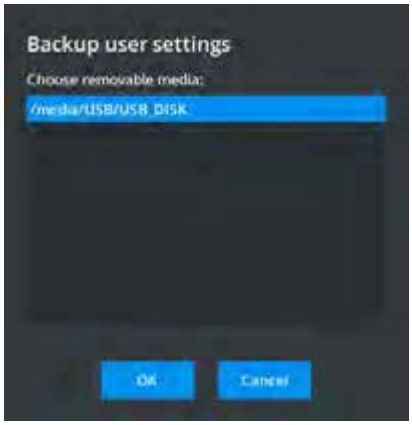


Figure 470 Backup and restore user settings: Choose removable media

3. Select the removable media where you want to save the settings file and press OK: the settings file is saved to the root folder of the selected media.

15.9.2 Restoring user settings

To load user settings from a file:

1. Go to the Main menu → Settings → System → Backup and restore user settings: the Backup and restore user settings panel opens.
2. Press the Restore from external media button: the Restore user settings dialog opens where settings files found on all removable media connected to the ECDIS are listed.

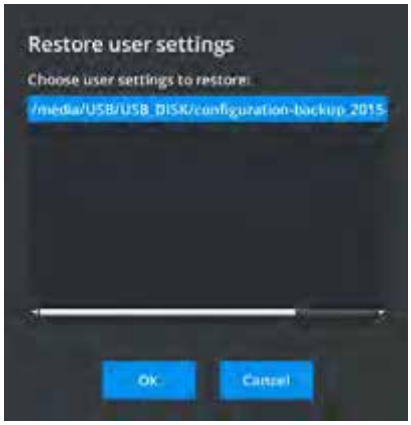


Figure 471 Backup and restore user settings: Choose user settings to restore

3. Select the settings file you want to restore and press OK: the settings are restored from the selected file.

15.9.3 Reverting to previous user settings

Use the Revert user settings function to restore settings that were set before the Restore default function has been used.

To revert user settings:

1. Go to the Main menu → Settings → System → Backup and restore user settings: the Backup and restore user settings panel opens.
2. Press the Revert user settings button and confirm the operation: the settings are restored.

15.10 Dump for Support

During operation, the ECDIS saves certain diagnostic information to log files. You can copy these files to removable media.

To copy diagnostic files to removable media:

1. Go to the Main menu → Settings → System and select the Dump for support option: the Choose removable media dialog opens with the list of all removable media connected to the ECDIS.

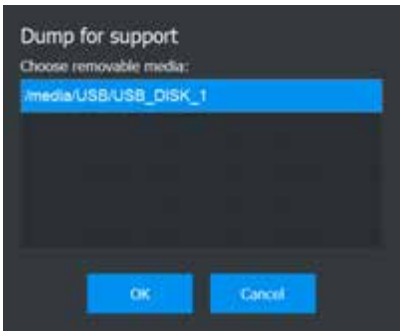


Figure 472 Dump for support: Choose removable media dialog

2. Select the removable media where you want to save diagnostic files and press OK: the files are saved to the selected media.



Figure 473 Dump for support succeeded message

15.11 Management Menu

NOTE:

Access to the management menu requires Master user privileges.

To open the management menu:

1. Go to the Main menu → Settings → System and select the Management menu option.

15.12 Service Menu

NOTE:

Access to the Service menu requires service technician privileges.

To open the service menu:

1. Go to the Main menu → Settings → System and select the Service menu option.

15.13 Restoring Control Settings

The ECDIS provides the option of restoring control settings to their default values in one click.

To restore control settings:

1. Press the Default 

indicator in the indicators area.
2. Confirm the operation in the confirmation dialog that opens.

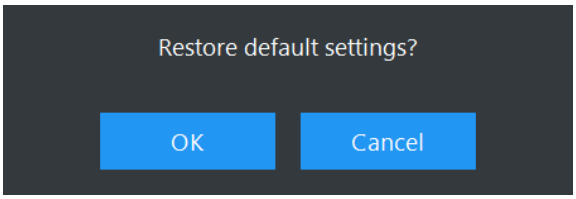


Figure 474 Restore default settings confirmation

3. The settings are restored to their default values.
4. You can also use a hot key to restore control settings: press F7 and confirm the operation.

NOTE:

See the list of control settings that can be restored to their default values in the Control settings configured in response to Default selection chapter.

Input NMEA Messages

The following input messages are available:

ACM	Alert command
APB	Heading/track controller (autopilot) sentence B
DBT	Depth Below Transducer
DPT	Depth
DTM	Datum Reference
EVE	General event message
GGA	Global positioning system (GPS) fix data
GLL	Geographic Position – Latitude/Longitude
GNS	GNSS Fix Data
HBT	Heartbeat supervision sentence
HDT	Heading true
MWD	Wind direction and speed
MWV	Wind speed and angle
NRM	NAVTEX receiver mask
NSR	Navigation status report
RMC	Recommended minimum specific GNSS data
ROT	Rate of turn
THS	True heading and status
TLB	Target label
TTD	Tracked target data
TTM	Tracked target message
VBW	Dual ground/water speed
VDM	AIS VHF data link message
VDO	AIS VHF data-link own-vessel report
VHW	Water speed and heading
VTG	Course over ground and ground speed
ZDA	Time and date

ACM – Alert command

Standard: IEC 61924-2 Ed.1, 2012

This sentence is used for acknowledge, silence, responsibility transfer and to request repeat of alert details in case the reception process has detected, based on ALC, that ALF has been missed.

Responsibility transferred is used for a special conditional state of an alert. In this state, the source of an alert indicates the alert visually as an acknowledged alert (i.e. no flashing indication or audible signal). In this state, the source of an alert re-raises an unacknowledged alert if the source of the alert is unable to receive heartbeat (HBT) sentences from the sender of the sentence.

This sentence cannot be queried.

$--ACM, hhmmss.ss[1], aaa[2], x.x[3], x.x[4], c[5], a[6]*hh<CR><LF>

No.	Field	Description
1	hhmmss.ss	Time (see Note 1)
2	aaa	Manufacturer mnemonic code (see Note 2)
3	x.x	Alert Identifier (see Note 3)
4	x.x	Alert Instance, 1 to 999999 (see Note 4)
5	c	Alert command, A, Q, O or S (see Note 5)
6	a	Sentence status flag (see Note 6)

NOTE 1: Release time of the alert command. (e.g. for VDR purposes), optional can be a null field. The sender can use all alternatives defined in IEC 61162-1:2010, Table 5, Field type summary. The receiver can ignore the content of this field. If the receiver does not ignore this field, it should support all alternatives defined in IEC 61162-1:2010, Table 5, Field type summary.

NOTE 2: Used for proprietary alerts defined by the manufacturer. For standardized alerts this should be a null field. For list of standardized alerts, see IEC 61924-2:2012, Annex J.

NOTE 3: The alert identifier is unique within a single alert source. The alert identifier is a variable length integer field of maximum 7-digit integer. It identifies the type of the alert e.g. a “lost target” alert. For standardized alerts, see list of Alert identifiers in Annex J. Number range 10000-9999999 is reserved for proprietary alerts. Alert Identifier examples: “001”, “2456789”, “245.”

NOTE 4: The alert instance identifies the current instance of an alert to distinguish alerts of the same type (Alert identifier) and from the same source (e.g. dangerous target). Alert instance is maximum 6-digit integer from 1 to 999999. The number of alert instance can be freely defined by the manufacturer as long as it is unique for one type of alert (alert identifier). It is not permitted to modify the alert instance within a life cycle of a distributed alert (from 'active-unacknowledged' state until 'normal' state is reached). It can also be a null field, when there is only one alert of that type.

NOTE 5: This should not be null field acknowledge: A; request / repeat information: Q; responsibility transfer: O; silence: S.

NOTE 6: This field should be "C" and should not be null field. This field indicates a command. A sentence without "C" is not a command.

APB – Heading/track controller (autopilot) sentence B

Standard: IEC 61162-1 Ed.4, 2010-11

Commonly used by autopilots, this sentence contains navigation receiver warning flag status, cross-track-error, waypoint arrival status, initial bearing from origin waypoint to the destination, continuous bearing from present position to destination and recommended heading to steer to destination waypoint for the active navigation leg of the journey.

$--APB, A[1], A[2], x.x[3], a[4], N[5], A[6], A[7], x.x[8], a[9], c--c[10], x.x[11], a[12], x.x[13], a[14], a[15]*hh<CR><LF>

No.	Field	Description
1	A	Status: A = Data valid V = LORAN-C blink or SNR warning (see Note 2) V = general warning flag for other navigation systems when a reliable fix is not available
2	A	Status: A = OK or not used V = LORAN-C cycle lock warning flag (see Note 2)
3	x.x	Magnitude of XTE (cross-track-error)
4	a	Direction to steer, L/R
5	N	XTE units, nautical miles
6	A	Status: A = arrival circle entered V = arrival circle not passed
7	A	Status: A = perpendicular passed at waypoint V = perpendicular not entered
8	x.x	Bearing origin to destination
9	a	Bearing type: M/T
10	c--c	Destination waypoint ID
11	x.x	Bearing, present position to destination

No.	Field	Description
12	a	Bearing type: magnetic or true
13	x.x	Heading to steer to destination waypoint
14	a	Heading type: magnetic or true
15	a	Mode indicator (see Notes 1 and 2)

NOTE 1 Positioning system mode indicator:

A = Autonomous mode;
D = Differential mode;
E = Estimated (dead reckoning) mode;
M = Manual input mode;
S = Simulator mode;
N = Data not valid.

NOTE 2 The positioning system mode indicator field supplements the positioning system status fields (fields 1 and 2), the status fields should be set to V = invalid for all values of mode indicator except for A = Autonomous and D = Differential. The positioning system mode indicator should not be null fields.

DBT – Depth Below Transducer

Standard: IEC 61162-1 Ed.4, 2010-11

Water depth referenced to the transducer.

$--DBT, x.x[1], f[2], x.x[3], M[4], x.x[5], F[6]*hh<CR><LF>

No.	Field	Description
1	x.x	Water depth
2	f	Measurement unit: ‘f’ for feet
3	x.x	Water depth
4	M	Measurement unit: ‘M’ for meters
5	x.x	Water depth
6	F	Measurement unit: F for fathoms

DPT – Depth

Standard: IEC 61162-1 Ed.4, 2010-11

Water depth relative to the transducer and offset of the measuring transducer. Positive offset numbers provide the distance from the transducer to the waterline. Negative offset numbers provide the distance from the transducer to the part of the keel of interest. For the ECDIS, the offset is always negative to provide depth relative to the keel.

$--DPT, x.x[1], x.x[2], x.x[3]*hh<CR><LF>

No.	Field	Description
1	x.x	Water depth relative to the transducer, in meters

No.	Field	Description
2	x.x	Offset from transducer, in meters (distance from transducer to keel)
3	x.x	Maximum range scale in use

DTM – Datum Reference

Standard: IEC 61162-1 Ed.4, 2010-11

Local geodetic datum and datum offsets from a reference datum. This sentence is used to define the datum to which a position location and geographic locations in subsequent sentences are referenced. Latitude, longitude and altitude offsets from the reference datum, and the selection of the reference datum, are also provided.

$--DTM,ccc[1],a[2],x.x[3],a[4],x.x[5],a[6], x.x[7],ccc[8]*hh<CR><LF>

No.	Field	Description
1	ccc	Local datum
2	a	Local datum subdivision code
3	x.x	Lat offset, min
4	a	N/S
5	x.x	Lon offset, min,
6	a	E/W
7	x.x	Altitude offset, m
8	ccc	Reference datum

EVE – General event message

Standard: IEC 61162-1 Ed.4, 2010-11

This sentence is used to transmit events (e.g. actions by the crew on the bridge) with a time stamp.

$--EVE, hhmmss.ss[1], c--c[2], c--c[3] *hh<CR><LF>

No.	Field	Description
1	hhmmss.ss	Event time; may be a null field
2	c--c	Tag code used for identification of source of event; may be a null field
3	c--c	Event description

GGA – Global positioning system (GPS) fix data

Standard: IEC 61162-1 Ed.4, 2010-11

Time, position and fix-related data for a GPS receiver.

$--GGA, hhmmss.ss[1], llll.ll[2], a[3], yyyyy.yy[4], a[5], x[6], xx[7], x.x[8], x.x[9], M[10], x.x[11], M[12], x.x[13], xxxx[14]*hh<CR><LF>

No.	Field	Description
1	hhmmss.ss	UTC of position
2	llll.ll	Latitude: degrees and minutes
3	a	N/S
4	yyyy.yy	Longitude
5	a	E/W
6	x	GPS quality indicator
7	xx	Number of satellites in use, 00-12, may be different from the number in view
8	x.x	Horizontal dilution of precision
9	x.x	Antenna altitude above/below mean sea level (geoid)
10	M	Units of antenna altitude, meters
11	x.x	Geoidal separation: the difference between the WGS-84 earth ellipsoid surface and mean sea level (geoid) surface, " – " = mean sea level surface below the WGS-84 ellipsoid surface.
12	M	Units of geoidal separation, meters
13	x.x	Age of differential GPS data: time in seconds since last SC104 type 1 or 9 update, null field when DGPS is not used.
14	xxxx	Differential reference station ID, 0000-1023

GLL – Geographic Position – Latitude/Longitude

Standard: IEC 61162-1 Ed.4, 2010-11

Latitude and longitude of vessel position, time of position fix and status.

$--GLL, llll.ll[1], a[2], yyyyy.yy[3], a[4], hhmmss.ss[5], A[6], a[7] *hh<CR><LF>

No.	Field	Description
1	llll.l	Latitude
2	a	N/S
3	yyyy.yy	Longitude
4	A	E/W
5	hhmmss.ss	UTC of position
6	A	Status: A=data valid; V=data invalid
7	a	Mode indicator

GNS – GNSS Fix Data

Standard: IEC 61162-1 Ed.4, 2010-11

Fix data for single or combined satellite navigation systems (GNSS). This sentence provides fix data for GPS, GLONASS, possible future satellite systems and systems combining these. This sentence could be used with the talker identification of GP for GPS, GL for GLONASS, GN for GNSS combined systems, as well as future identifiers. Some fields may be null fields for certain applications, as described below.

$--GNS, hhmmss.ss[1], llll.ll[2], a[3], yyyyy.yy[4], a[5], c–c[6], xx[7], x.x[8], x.x[9], x.x[10], x.x[11], x.x[12], a[13]*hh<CR><LF>

No.	Field	Description
1	hhmmss.ss	UTC of position
2	llll.ll	Latitude: degrees and minutes
3	a	N/S
4	yyyy.yy	Longitude
5	a	E/W
6	c--c	Mode indicator
7	xx	Total number of satellites in use, 00-99
8	x.x	Horizontal dilution of precision
9	x.x	Antenna altitude above/below mean sea level (geoid), meters
10	x.x	Geoidal separation, meters
11	x.x	Age of differential data
12	x.x	Differential reference station ID
13	a	Navigational status indicator

HBT – Heartbeat supervision sentence

Standard: IEC 61162-1 Ed.4, 2010-11

This sentence is intended to be used to indicate that equipment is operating normally, or for supervision of a connection between two units.

The sentence is transmitted at regular intervals specified in the corresponding equipment standard. The repeat interval may be used by the receiving unit to set the time-out value for the connection supervision.

$--HBT, x.x[1], A[2], x[3]*hh<CR><LF>

No.	Field	Description
1	x.x	Configured repeat interval (see Note 1)
2	A	Equipment status (see Note 2)
3	x	Sequential sentence identifier (see Note 3)

NOTE 1: Configured autonomous repeat interval in seconds. This field should be set to NULL in response to a query if this feature is supported.

NOTE 2: Equipment in normal operation A = yes, V = no. This field can be used to indicate the current equipment status. This could be the result of a built-in integrity testing function.

NOTE 3: The sequential sentence identifier provides a message identification number from 0 to 9 that is sequentially assigned and is incremented for each new sentence. The count resets to 0 after 9 is used.

HDT – Heading true

Standard: IEC 61162-1 Ed.4, 2010-11

Actual vessel heading in degrees true produced by any device or system producing true heading.

$--HDT, x.x[1], T[2]*hh<CR><LF>

No.	Field	Description
1	x.x	True heading, degrees
2	M	Heading type: T for true

MWD –Wind direction and speed

Standard: IEC 61162-1 Ed.4, 2010-11

The direction from which the wind blows across the earth's surface with respect to north, and the speed of the wind.

$--MWD, x.x[1], T[2], x.x[3], M[4], x.x[5], N[6], x.x[7], M[8]*hh<CR><LF>

No.	Field	Description
1 2	x.x T	Wind direction, 0° to 359° true
3 4	x.x M	Wind direction, 0° to 359° magnetic
5 6	x.x N	Winds speed, knots
7 8	x.x M	Wind speed, m/s

MWV – Wind speed and angle

Standard: IEC 61162-1 Ed.4, 2010-11

When the reference field is set to R (Relative), data is provided giving the wind angle in relation to the vessel's bow/centerline and the wind speed, both relative to the (moving) vessel. Also called apparent wind, this is the wind speed as felt when standing on the (moving) ship.

When the reference field is set to T (Theoretical, calculated actual wind), data is provided giving the wind angle in relation to the vessel's bow/centerline and the wind speed as if the vessel was stationary. On a moving ship this data can be calculated by combining the measured relative wind with the vessel's own speed.

$--MWV, x.x[1], a[2], x.x[3], a[4], A[5] *hh<CR><LF>

No.	Field	Description
1	x.x	Wind angle, 0° to 359°
2	a	Reference, R = relative, T = true
3	x.x	Wind speed
4	a	Wind speed units: K = km/h; M = m/s; N = knots
5	A	Status: A = data valid; V= data invalid

NRM – NAVTEX receiver mask

Standard: IEC 61162-1 Ed.4, 2010-11

This command is used to manipulate the configuration masks that control which messages are stored, printed and sent to the INS port of the NAVTEX receiver. This is a command sentence.

$--NRM, x[1], x[2], hhhhhhhh[3], hhhhhhhh[4], a[5], *hh<CR><LF>

No.	Field	Description
1	x	Function code, 0 to 9 (see Note 1)
2	x	Frequency table index, 1 to 9 (see Note 2)
3	hhhhhhhh	Transmitter coverage area mask (see Note 3)
4	hhhhhhhh	Message type mask (see Note 4)
5	a	Sentence status flag (see Note 5)

NOTE 1: The function code is used to further identify the purpose of the sentence. The meaning of the function code is as follows: 0 – request messages for the given mask; 1 – set/report the storage mask; 2 – set/report the printer mask; 3 – set/report the INS mask; 4 to 9 – reserved for future use.

NOTE 2: The frequency indicator identifies the frequency that the NAVTEX message was received on: 1 = 490 kHz; 2 = 518 kHz; 3 = 4 209.5 kHz; 4 through 9 are reserved for future use.

NOTE 3: The transmitter coverage area mask is defined as a 32 bit hex field where the least significant bit represents transmitter coverage area ‘A’, the next bit is ‘B’ and so on up to bit 25 which is ‘Z’. Bits 31 through 26 are reserved for future use and should be set to zero. To select a transmitter coverage area, its corresponding bit should be set to one. To deselect a transmitter coverage area, its corresponding bit should be set to zero.

NOTE 4: The message type mask is defined as a 32-bit hex field where the least significant bit represents message type ‘A’, the next bit is ‘B’ and so on up to bit 25 which is ‘Z’. Bits 31 through 26 are reserved for future use and should be set to zero. To select a message type, its corresponding bit should be set to one. To deselect a message type, its corresponding bit should be set to zero.

NOTE 5: This field is used to indicate a sentence that is a status report of current settings or a configuration command changing settings. This field should not be null. R = Sentence is a status report of current settings (use for a reply to a query). C = Sentence is a configuration command to change settings. A sentence without “C” is not a command.

NSR – Navigation status report

Standard: IEC 61924-2, 2012

This sentence is used to handle integrity and plausibility of data for a consistent common reference system (CCRS) associated with an Integrated Navigation System (INS).

Null fields are not allowed for this sentence.

The NSR sentence shall be sent periodically at intervals of not greater than 30 s. For all state changes the NSR sentence is transmitted prior to relevant sentence (e.g. GLL, THS etc.).

For the INS, the talker id is “IN”.

$--NSR, a^1, A^2, a^3, A^4, a^5, A^6, a^7, A^8, a^9, A^{10}, a^{11}, a^{12}, A^{13}*hh<CR><LF>

No.	Field	Description
1	a	Integrity of heading (see Note 1)
2	A	Plausibility of heading (see Note 2)
3	a	Integrity of position (see Note 1)
4	A	Plausibility of position (see Note 2)
5	a	Integrity of STW (see Note 1)
6	A	Plausibility of STW (see Note 2)
7	a	Integrity of SOG and COG (see Note 1)
8	A	Plausibility of SOG and COG (see Note 2)
9	a	Integrity of depth (see Note 1)

No.	Field	Description
10	A	Plausibility of depth (see Note 2)
11	a	Mode of STW (see Note 3)
12	a	Integrity of time (see Note 1)
13	A	Plausibility of time (see Note 2)

NOTE 1 Integrity status: P = Passed, integrity verification passed; F = Failed, integrity verification not passed; D = Doubtful, integrity verification not possible; N = Not available, reporting device does not support integrity check.

NOTE 2 Plausibility status: A = Yes (Plausible); V = No (Not plausible); N = Not available, reporting device does not support plausibility check.

NOTE 3 Mode of STW W = measured water reference; E = Estimated/calculated from non-water referenced sources; M = Manual input; N = Not available.

RMC – Recommended minimum specific GNSS data

Standard: IEC 61162-1 Ed.4, 2010-11

Time, date, position, course and speed data provided by a GNSS navigation receiver.

$--RMC, hhmmss.ss[1], A[2], llll.ll[3], a[4], yyyyy.yy[5], a[6], x.x[7], x.x[8], xxxxxx[9], x.x[10], a[11], a[12], a[13]*hh<CR><LF>

No.	Field	Description
1	hhmmss.ss	UTC of position fix
2	A	Status: A = data valid; V = navigation receiver warning
3	llll.ll	Latitude
4	a	N/S
5	yyyy.yy	Longitude
6	a	E/W
7	x.x	Speed over ground, knots
8	x.x	Course over ground, degrees true
9	xxxxxx	Date: dd/mm/yy
10	x.x	Magnetic variation, degrees
11	a	E/W
12	a	Mode indicator
13	a	Navigational status

ROT – Rate of turn

Standard: IEC 61162-1 Ed.4, 2010-11

Rate of turn and direction of turn.

$--ROT, x.x[1], A[2]*hh<CR><LF>

No.	Field	Description
1	x.x	Rate of turn, °/min, "-" = bow turns to port
2	A	Status: A = data valid; V = data invalid

THS – True heading and status

Standard: IEC 61162-1 Ed.4, 2010-11

Actual vessel heading in degrees produced by any device or system producing true heading. This sentence includes a “mode indicator” field providing critical safety related information about the heading data and replaces the deprecated HDT sentence.

$--THS, x.x[1], a[2]*hh<CR><LF>

No.	Field	Description
1	x.x	Heading, degrees true
2	a	Mode indicator; this field should not be null: A = Autonomous E = Estimated (dead reckoning) M = Manual input S = Simulator mode V = Data not valid (including standby)

TLB – Target label

Standard: IEC 61162-1 Ed.4, 2010-11

Common target labels for tracked targets. This sentence is used to specify labels for tracked targets to a device that provides tracked target data (e.g. via the TTM – Tracked target message). This will allow all devices displaying tracked target data to use a common set of labels (e.g. targets reported by two radars and displayed on an ECDIS).

$--TLB,x.x[1],c--c[2],x.x[3],c--c[4],...[5]x.x[6],c--c[7]*hh<CR><LF>

No.	Field	Description
1	x.x	Target number ‘n’ reported by the device.
2	c--c	Label assigned to target ‘n’
3	x.x	Additional label pairs
4	c--c	
5	…	Additional label pairs

No.	Field	Description
6	x.x	Additional label pairs
7	c--c	

TLL – Target latitude and longitude

Standard: IEC 61162-1 Ed.4, 2010-11

Target number, name, position and time tag for use in systems tracking targets.

$--TLL, xx[1], llll.ll[2], a[3], yyyyy.yy[4], a[5], c--c[6], hhmmss.ss[7], a[8], a[9]*hh<CR><LF>

No.	Field	Description
1	x.x	Target number 00 – 99
2	llll.ll	Target latitude
3	a	N/S
4	yyyy.yy	Target longitude
5	a	E/W
6	c--c	Target name
7	hhmmss.ss	UTC of data
8	a	Target status: L = Lost, tracked target has been lost; Q = Query, target in the process of acquisition; T = tracking
9	a	Reference target = R, null otherwise

TTD – Tracked target data

Standard: IEC 61162-1 Ed.4, 2010-11

This sentence is used to transmit tracked radar targets in a compressed format. This enables the transfer of many targets with minimum overhead. New target labels are defined by the TLB sentence to reduce bandwidth use. Transmission of up to four targets in the same sentence is possible.

!--TTD, hh[1], hh[2], x[3], s–s[4], x[5]*hh<CR><LF>

No.	Field	Description
1	hh	Total hex number of sentences needed to transfer the message, 01 to FF
2	hh	Hex sentence number, 01 to FF
3	x	Sequential message identifier, 0 to 9
4	s—s	Encapsulated tracked target data
5	a	Number of fill-bits, 0 to 5

TTM – Tracked target message

Standard: IEC 61162-1 Ed.4, 2010-11

Data associated with a tracked target relative to own ship's position.

$--TTM, xx[1], x.x[2], x.x[3], a[4], x.x[5], x.x[6], a[7], x.x[8], x.x[9], a[10], c--c[11], a[12], a[13], hhmmss.ss[14], a[15] *hh<CR><LF>

No.	Field	Description
1	xx	Target number, 00 to 99
2	x.x	Target distance from own ship
3	x.x	Bearing from own ship, degrees
4	a	true/relative (T/R)
5	x.x	Target speed
6	x.x	Target course, degrees
7	a	true/relative (T/R)
8	x.x	Distance of closest-point-of-approach
9	x.x	Time to CPA, min., "-" increasing
10	a	Speed/distance units, K/N/S
11	c--c	Target name
12	a	Target status: L = Lost, tracked target has been lost; Q = Query, target in the process of acquisition; T = Tracking
13	a	Reference target = R, null otherwise
14	hhmmss.ss	Time of data (UTC)
15	a	Type of acquisition: A = Automatic M = Manual K = Reported

VBW – Dual ground/water speed

Standard: IEC 61162-1 Ed.4, 2010-11

Water-referenced and ground-referenced speed data.

$--VBW, x.x[1], x.x[2], A[3], x.x[4], x.x[5], A[6], x.x[7], A[8], x.x[9], A[10]*hh<CR><LF>

No.	Field	Description
1	x.x	Longitudinal water speed ("-" = astern), knots
2	x.x	Transverse water speed ("-" = port), knots
3	A	Status, water speed: A = data valid, V = data invalid
4	x.x	Longitudinal ground speed ("-" = astern), knots
5	x.x	Transverse ground speed ("-" = port), knots
6	A	Status, ground speed: A = data valid, V = data invalid
7	x.x	Stern transverse water speed ("-" = port), knots
8	A	Status, stern water speed: A = data valid, V = data invalid
9	x.x	Stern transverse ground speed ("-" = port), knots

No.	Field	Description
10	A	Status, transverse ground speed: A = data valid, V = data invalid

VDM – AIS VHF data link message

Standard: IEC 61162-1 Ed.4, 2010-11

This sentence is used to transfer the entire contents of a received AIS message packet, as defined in ITU-R M.1371 and as received on the VHF Data Link (VDL), using the “six-bit” field type. The structure provides for the transfer of long binary messages by using multiple sentences.

Data messages should be transmitted in as few sentences as possible. When a data message can be accommodated in a single sentence, then it must not be split.

!--VDM, x^1, x^2, x^3, a^4, s–s^5, x^6*hh<CR><LF>

No.	Field	Description
1	x	Total number of sentences needed to transfer the message, 1 to 9
2	x	Sentence number, 1 to 9
3	x	Sequential message identifier, 0 to 9
4	a	AIS channel
5	s—s	Encapsulated ITU-R M.1371 radio message
6	x	Number of fill-bits, 0 to 5

VDO – AIS VHF data-link own-vessel report

Standard: IEC 61162-1 Ed.4, 2010-11

This sentence is used to transfer the entire contents of an AIS unIt is broadcast message packet, as defined in ITU-R M.1371 and as sent out by the AIS unit over the VHF data link (VDL) using the “six-bit” field type. The sentence uses the same structure as the VDM sentence formatter.

!--VDO, x^1, x^2, x^3, a^4, s–s^5, x^6*hh<CR><LF>

No.	Field	Description
1	x	Total number of sentences needed to transfer the message, 1 to 9
2	x	Sentence number, 1 to 9
3	x	Sequential message identifier, 0 to 9
4	a	AIS channel
5	s—s	Encapsulated ITU-R M.1371 radio message
6	x	Number of fill-bits, 0 to 5

VHW – Water speed and heading

Standard: IEC 61162-1 Ed.4, 2010-11

The compass heading to which the vessel points and the speed of the vessel relative to the water.

$--VHW, x.x[1], T[2], x.x[3], M[4], x.x[5], N[6], x.x[7], K[8]*hh<CR><LF>

No.	Field	Description
1	x.x	Heading, degrees true
2	T	'T' for true
3	x.x	Heading, degrees magnetic
4	M	'M' for magnetic
5	x.x	Current speed in knots
6	N	'N' for knots
7	x.x	Current speed in km/h
8	K	'K' for km/h

VTG – Course over ground and ground speed

Standard: IEC 61162-1 Ed.4, 2010-11

The actual course and speed relative to the ground.

$--VTG, x.x[1], T[2], x.x[3], M[4], x.x[5], N[6], x.x[7], K[8], a[9]*hh<CR><LF>

No.	Field	Description
1	x.x	Course over ground, degrees true
2	T	'T' for true
3	x.x	Course over ground, degrees magnetic
4	M	'M' for magnetic
5	x.x	Speed over ground, knots
6	N	'N' for knots
7	x.x	Speed over ground, km/h
8	K	'K' for km/h
9	a	Mode indicator

ZDA – Time and date

Standard: IEC 61162-1 Ed.4, 2010-11

UTC, day, month, year and local time zone.

$--ZDA, hhmmss.ss[1], xx[2], xx[3], xxxx[4], xx[5], xx[6]*hh<CR><LF>

No.	Field	Description
1	hhmmss.ss	UTC time
2	xx	Day, 01 to 31 (UTC)
3	xx	Month, 01 to 12 (UTC)

No.	Field	Description
4	xxxx	Year (UTC)
5	xx	Local zone hours, 00 h to ±13 h; not processed
6	xx	Local zone minutes, 00 to +59; not processed

Output NMEA Messages

The following output messages are available:

ABK	AIS addressed and binary broadcast acknowledgement
ABM	AIS addressed binary and safety related message
ALC	Cyclic alert list
ALF	Alert sentence
APB	Heading/track controller (autopilot) sentence B
ARC	Alert command refused
BBM	AIS broadcast binary message
HBT	Heartbeat supervision sentence
MWD	Wind direction and speed
MWV	Wind speed and angle
NRX	NAVTEX received message
PDANBWOL	Distance and bearing to the next WOL
PDANRMDST	Route monitoring destination information
PDANRMLEG	Route monitoring information about upcoming WOL
RTE	Routes
SSD	AIS ship static data
VSD	AIS voyage static data
WPL	Waypoint location

ABK – AIS addressed and binary broadcast acknowledgement

Standard: IEC 61162-1 Ed.4, 2010-11

The ABK-sentence is generated when a transaction, initiated by reception of an ABM, AIR, or BBM sentence, is completed or terminated. This sentence provides information about the success or failure of a requested ABM broadcast of either ITU-R M.1371 Messages 6 or 12. The ABK process utilizes the information received in ITU-R M.1371 Messages 7 and 13. Upon reception of either a VHF Data-link Message 7 or 13, or the failure of Messages 6 or 12, the AIS unit delivers the ABK sentence to the external application. This sentence is also used to report to the external application the AIS unit is handling of the AIR (ITU-R M.1371 Message 15) and BBM (ITU-R M.1371 Messages 8, 14, 19, and 21) sentences. The external application initiates an interrogation using the AIR-sentence, or a broadcast using the BBM sentence. The AIS unit generates an ABK sentence to report the outcome of the ABM, AIR, or BBM broadcast process.

The ABK is also used as an input and output to indicate that a received Message 12 has been read and acknowledged on a display unit.

$--ABK, xxxxxxxxx[1], x[2], x.x[3], x[4], x[5]*hh<CR><LF>

No.	Field	Description
1	xxxxxxxxx	MMSI of the addressed AIS unit (see Note 1)
2	x	AIS channel of reception (see Note 2)
3	x.x	ITU-R M.1371 Message ID (see Note 3)

No.	Field	Description
4	x	Message sequence number (see Note 4)
5	x	Type of acknowledgement (see Note 5)

NOTE 1 Identifies the distant addressed AIS unit involved with the acknowledgement. If more than one MMSI is being addressed (ITU-R M.1371 Messages 15 and 16), the MMSI of the first distant AIS unit, identified in the message, is the MMSI reported here. This is a null field when the ITU-R M.1371 Message type is 8 or 14.

NOTE 2 Indication of the VHF data link channel upon which a Message type 7 or 13 acknowledgement was received. An “A” indicates reception on channel A. A “B” indicates reception on channel B.

NOTE 3 This indicates to the external application the type of ITU-R M.1371 message that this ABK sentence is addressing. Also see the message IDs listed in Note 4.

NOTE 4 The message sequence number, together with the message ID and MMSI of the addressed AIS unit, uniquely identifies a previously received ABM, AIR, or BBM sentence. Generation of an ABK sentence makes a sequence message identifier available for re-use. The message ID determines the source of the message sequence number.

The following lists the source by message ID:

ITU-R M.1371 Message ID	Message sequence number source
6	sequential message identifier from ABM sentence
7	addressed AIS unit is Message 7, sequence number
8	sequential message identifier from BBM-sentence
12	sequential message identifier from ABM-sentence
13	addressed AIS unit is Message 13, sequence number
14	sequential message identifier from BBM-sentence
15	no source, the message sequence number should be null

NOTE 5 Acknowledgements provided are:

0 = Message (6 or 12) successfully received by the addressed AIS unit,
1 = Message (6 or 12) was broadcast, but no acknowledgement by the addressed AIS unit,
2 = message could not be broadcast (i.e. quantity of encapsulated data exceeds five slots),
3 = requested broadcast of Message (8, 14 or 15) has been successfully completed,
4 = late reception of a Message 7 or 13 acknowledgement that was addressed to this AIS unit (own ship) and referenced as a valid transaction,
5 = message has been read and acknowledged on a display unit.

ABM – AIS addressed binary and safety related message

Standard: IEC 61162-1 Ed.4, 2010-11

This sentence supports ITU-R M.1371 Messages 6 and 12 and provides an external application with a means to exchange data via an AIS transponder. Data is defined by the application only, not the AIS unit. This message offers great flexibility for implementing system functions that use the transponder as a communications device. After receiving this sentence via the IEC 61162-2 interface, the transponder initiates a VDL broadcast of either Message 6 or 12. The AIS unit will make up to four broadcasts of the message. The actual number will depend on the reception of an acknowledgement from the addressed “destination” AIS unit. The success or failure of reception of this transmission by the addressed AIS unit is confirmed using the “Addressed binary and safety related message acknowledgement” ABK sentence formatter, and the processes that support the generation of an ABK sentence.

!--ABM, x[1], x[2], x[3], xxxxxxxxx[4], x[5], xx[6], s—s[7], x[8] *hh<CR><LF>

No.	Field	Description
1	x	Total number of sentences needed to transfer the message, 1 to 9 (see Note 1)
2	x	Sentence number, 1 to 9 (see Note 1)
3	x	Sequential message identifier, 0 to 3 (see Note 2)
4	xxxxxxxxx	The MMSI of the destination AIS unit for the ITU-R M.1371 Message 6 or 12 (see Note 3)
5	x	AIS channel for broadcast of the radio message (see Note 4)
6	xx	ITU-R M.1371 Message ID (6 or 12)
7	s—s	Encapsulated data (see Note 5)
8	x	Number of fill-bits, 0 to 5 (see Note 6)

NOTE 1 The total number of sentences required to transfer the binary message data to the AIS unit. The first field specifies the total number of sentences used for a message, minimum value 1. The second field identifies the order of this sentence in the message, minimum value 1. All sentences contain the same number of fields. Successive sentences may use null fields for fields that have not changed, such as fields 4, 5, and 6.

NOTE 2 This sequential message identifier serves two purposes. It meets the requirements as stated in IEC 61162-1 Ed.4, chapter 7.2.5 and it is the sequence number utilized by ITU-R M.1371 in Message types 6 and 12. The range of this field is restricted by ITU-R M.1371 to 0 – 3. The sequential message identifier value may be re-used after the AIS unit provides the “ABK” acknowledgement for this number.

NOTE 3 The MMSI of the AIS unit that is the destination of the message.

NOTE 4 The AIS channel that is to be used for the broadcast: 0 = no broadcast channel preference, 1 = broadcast on AIS channel A, 2 = broadcast on AIS channel B, 3 = broadcast message on both AIS channels, A and B.

NOTE 5 This is the content of the “binary data” parameter for ITU-R M.1371 Messages 6, or the “Safety related Text” parameter for Message 12: Up to 936 bits of binary data (156 six-bit coded characters) using multi-line sentences. The first sentence may contain up to 48 valid six-bit codes (288 bits). Following sentences may contain up to 60 valid six-bit codes (360 bits), if fields 4, 5, and 6 are unchanged from the first sentence and set to null. The actual number of valid characters should be such that the total number of characters in a sentence does not exceed the “82-character” limit.

NOTE 6 This cannot be a null field. See “x4” in IEC 61162-1 Ed.4, chapter 7.3.4.

ALC – Cyclic alert list

Standard: IEC 61924-2 Ed.1, 2012

The purpose of this sentence is to satisfy the needs for a safe and consistent data distribution with a minimum of data traffic. Each change on an alert’s data leads to an incremented Revision counter. So, an alert processing device only needs to check the alert entries in the ALC messages to ensure that no ALF message has been lost. In the case where an ALF message has been lost, the missing message can be requested by sending a request alert command.

The ALC sentence provides condensed ALF sentence information. It contains the identifying data for each present alert of one certain source/device so that the receiver can understand which ALF has been missed (and retransmission of ALF can be requested by using the ACM sentence). It shall be published cyclically at least every 30 s by each alert generating device.

The cyclic alert list transmission shall never stop. When all alerts are in normal state the cyclic alert list is empty, i.e. the number of alert entries is 0.

The length of this sentence varies with the number of alerts (number of list entries) that are being generated. In cases where the needed number of entries exceeds the permitted sentence length the number of sentences is increased.

$--ALC, xx[1], xx[2], xx[3], x.x[4], aaa[5], x.x[6], x.x[7], x.x[8], … … …[9], aaa[10], x.x[11], x.x[12], x.x[13]*hh<CR><LF>

No.	Field	Description
1	xx	Total number of sentences for this message, 01 to 99 (see Note 1)
2	xx	Sentence number, 01 to 99 (see Note 1)
3	xx	Sequential message identifier, 00 to 99 (see Note 2)
4	x.x	Number of alert entries (see Note 3)
5	aaa	Manufacturer mnemonic code – Alert entry 1 (see Note 4)
6	x.x	Alert identifier – Alert entry 1 (see Note 4)
7	x.x	Alert instance – Alert entry 1 (see Note 4)
8	x.x	Revision counter – Alert entry 1 (see Note 4)
9	…	Additional Alert entries (see Note 4)
10	aaa	Manufacturer mnemonic code – Alert entry n (see Note 4)
11	x.x	Alert identifier – Alert entry n (see Note 4)
12	x.x	Alert instance – Alert entry n (see Note 4)
13	x.x	Revision counter – Alert entry n (see Note 4)

NOTE 1: The first field specifies the total number of sentences used for a message, minimum value 1. The second field identifies the order of this sentence in the message, minimum value 1. These cannot be null fields.

NOTE 2: The sequential message identifier relates all sentences that belong to a group of multiple sentences (i.e. message). Multiple sentences (see Note 1) with the same sequential message identifier make up one message.

NOTE 3: Contains the number of alert entries transported within this sentence.

NOTE 4: Alert entry 0 – n: Each alert entry consists of four fields:

- Manufacturer Identifier (see ALF Manufacturer Identifier);
- Alert Identifier (see ALF Alert Identifier);
- Alert instance (see ALF Alert instance);
- Revision Counter (see ALF Revision Counter).

Each entry identifies a certain alert with a certain state. It is not allowed to split an alert entry between two ALC sentences.

ALF – Alert sentence

Standard: IEC 61924-2 Ed.1, 2012

This sentence is used to report an alert condition and the alert state of a device. An ALF message shall be published for an alert each time the alert information in this sentence changes and on alert request.

To transmit additional alert description text (see Note 12), a second ALF sentence may optionally be transmitted.

$$--ALF, x^{1}, x^{2}, x^{3}, hhmmss.ss^{4}, a^{5}, a^{6}, a^{7}, aaa^{8}, x.x^{9}, x.x^{10}, x.x^{11}, x^{12}, c--c^{13}*hh<CR><LF>

No.	Field	Description
1	x	Total number of ALF sentences for this message, 1 to 2 (see Note 1)
2	x	Sentence number, 1 to 2 (see Note 1)
3	x	Sequential message identifier, 0 to 9 (see Note 2)
4	hhmmss.ss	Time of last change (see Note 3)
5	a	Alert category, A, B or C (see Note 4)
6	a	Alert priority, E, A, W or C (see Note 5)
7	a	Alert state, A, S, N, O, U or V (see Note 6)
8	aaa	Manufacturer mnemonic code (see Note 7)
9	x.x	Alert identifier (see Note 8)
10	x.x	Alert instance, 1 to 999999 (see Note 9)
11	x.x	Revision counter, 1 to 99 (see Note 10)
12	x	Escalation counter, 0 to 9 (see Note 11)
13	c--c	Alert text (see Note 12)

NOTE 1: The first field specifies the total number of sentences used for a message, minimum value 1. The second field identifies the order of this sentence in the message, minimum value 1. These cannot be null fields. When the sentence number is 2, the following Alert category, Alert priority and Alert state can be null fields.

NOTE 2: The sequential message identifier relates all sentences that belong to a group of multiple sentences (i.e. message). Multiple sentences (see Note 1) with the same sequential message identifier make up one message.

NOTE 3: Time should represent the last time the data within the alert message has changed. For example, changing the alert text by in-/decrementing a contained counter or count down should cause a revision of alert message and a new time. Time is an optional field. The time-field is additional information about when this happened and not used for decision making. There is no mandatory requirement for time synchronization between the equipment. It should be either a null field (if not used) or UTC (if used). The sender can use all alternatives defined in IEC 61162-1:2010, Table 5, Field type summary. The receiver can ignore the content of this field. If the receiver does not ignore this field, it should support all alternatives defined in IEC 61162-1:2010, Table 5, Field type summary.

NOTE 4: The alert category follows the category definition as described in INS Performance Standard (MSC.252(83)) and Bridge Alert Management Performance Standard (MSC.302(87)):

A, Category A: Alerts where information at the operator unit is directly assigned to the function generating the alert is necessary, such as decision support for the evaluation of the alert-related condition, e.g. graphical information of danger of collision or graphical information of danger of grounding.

B, Category B: Alerts where no additional information for decision support is necessary besides the information which can be presented using the alert source and the text description of the alert.

C, Category C: Alerts that cannot be acknowledged on the bridge but for which information is required about the status and treatment of the alerts, e.g. certain alerts from the engine.

NOTE 5: Alert priority:

- Emergency Alarm: E, for use with Bridge Alert Management, (see IMO MSC.302(87))
- Alarm: A
- Warning: W
- Caution: C

NOTE 6: The alert state transition is defined in IEC 61924-2:2012, Annex J.

- active – unacknowledged: V
- active – silenced: S
- active – acknowledged or active: A
- active – responsibility transferred: O
- rectified – unacknowledged: U
- normal: N

NOTE 7: Used for proprietary alerts defined by the manufacturer. For standardized alerts this should be a null field. For list of standardized alerts, see IEC 61924-2:2012, Annex J.

NOTE 8: The alert identifier is unique within a single alert source. The alert identifier is a variable length integer field of maximum a 7-digit integer. It identifies the type of the alert, e.g. a “lost target” alert. For standardized alerts, see the list of Alert identifiers in Annex J. Number range 10000-9999999 is reserved for proprietary alerts. Alert Identifier examples: “001”, “2456789”, “245”.

NOTE 9: The alert instance identifies the current instance of an alert to distinguish alerts of the same type (Alert identifier) and from the same source (e.g. dangerous target). Alert instance is maximum a 6-digit integer from 1 to 999999. The number of alert instance can be freely defined by the manufacturer as long as it is unique for one type of alert (alert identifier). It is not permitted to modify the alert instance within a life cycle of a distributed alert (from ‘active-unacknowledged’ state until ‘normal’ state is reached). It can be also a null field, when there is only one alert of that type.

NOTE 10: The revision counter is the main method to follow an up-to-date status. The revision counter is also unique for each instance of alert. The revision counter starts with 1 and the step for an increment is 1. The count resets to 1 after 99 is used. The revision counter increments on each change of content of any field of the alert.

NOTE 11: The escalation counter presents the number of alert escalations after time expiration during the state active-unacknowledged. The escalation counter starts with 0 and the step for increment is 1. The count resets to 1 after 9 is used. The alert escalation can be the escalation from warning into warning (activation of audible signal only), the escalation from warning to alarm, or the escalation from alarm to alarm with the activation of backup navigator alarm.

NOTE 12: This field is used for the Alert title which is mandatory and for an additional alert description which is optional.

- The first ALF sentence transmits the Alert title. An Alert title is maximum 16 characters short form of the alert text.
- The optional second ALF sentence transmits the additional alert description. Additional alert description is the long description of the alert. The additional alert description contains more information for decision making (i.e. alert description text).
- The second ALF sentence uses null fields for Time of last change, Alert category, Alert priority, and Alert state to allow longer text. The actual number of valid characters should be such that the total number of characters in a sentence does not exceed the “82”-character limit.

- Some equipment standards specify alert text longer than 16 characters (for example the AIS standard has defined some alerts to be coded with ALR sentence and with text longer than 16 characters). In such cases, the first ALF sentence is used for the first 16 characters of the alert text as alert title and the second ALF sentence to carry the full alert text.

EXAMPLES:

```
$IIALF,1,1,0,124304.50,A,W,A,,192,1,1,0,LOST TARGET*14
$IIALF,2,1,1,081950.10,B,A,S,XYZ,0512,1,2,0,HEADING LOST*2D
$IIALF,2,2,1,,,,,XYZ,0512,1,2,0,NO SYSTEM HEADING AVAILABLE*0D
```

APB – Heading/track controller (autopilot) sentence B

Standard: IEC 61162-1 Ed.4, 2010-11

Commonly used by autopilots, this sentence contains navigation receiver warning flag status, cross-track-error, waypoint arrival status, initial bearing from origin waypoint to the destination, continuous bearing from present position to destination and recommended heading to steer to destination waypoint for the active navigation leg of the journey.

$--APB, A^1, A^2, x.x^3, a^4, N^5, A^6, A^7, x.x^8, a^9, c--c^{10}, x.x^{11}, a^{12}, x.x^{13}, a^{14}, a^{15}*hh<CR><LF>

No.	Field	Description
1	A	Status: A = Data valid; V = LORAN-C blink or SNR warning; V = general warning flag for other navigation systems when a reliable fix is not available
2	A	Status: A = OK or not used; V = LORAN-C cycle lock warning flag
3	x.x	Magnitude of XTE (cross-track-error)
4	a	Direction to steer, L/R
5	N	XTE units, 'N' for nautical miles
6	A	Status: A = arrival circle entered; V = arrival circle not passed
7	A	Status: A = perpendicular passed at waypoint; V = perpendicular not entered
8	x.x	Bearing origin to destination
9	a	M/T = magnetic or true
10	c--c	Destination waypoint ID
11	x.x	Bearing, present position to destination
12	a	M/T = magnetic or true
13	x.x	Heading to steer to destination waypoint
14	a	M/T = magnetic or true
15	a	Mode indicator

ARC – Alert command refused

Standard: IEC 61924-2 Ed.1, 2012

This sentence is used for alert handling.

- Category A or C alerts (see IMO MSC.302(87)), for which it is illegal to accept acknowledge or responsibility transfer, e.g. not enough information for decision support available or the source of acknowledgement is not acceptable. Note that in a properly working system such attempts should not happen.
- Category B (see IMO MSC.302(87)), if the source of acknowledge is not acceptable.

`$--ARC, hhmmss.ss[1], aaa[2], x.x[3], x.x[4], c[5]*hh<CR><LF>`

No.	Field	Description
1	hhmmss.ss	Time (see Note 1)
2	aaa	Manufacturer mnemonic code (see Note 2)
3	x.x	Alert identifier (see Note 3)
4	x.x	Alert instance, 1 to 999999 (see Note 4)
5	c	Refused alert command, A, Q, O or S (see Note 5)

NOTE 1: Release time of the Alert Command Refused, e.g. for VDR purposes, optional, can be a null field. The sender can use all alternatives defined in IEC 61162-1:2010, Table 5, Field type summary. The receiver can ignore the content of this field. If the receiver does not ignore this field, it should support all alternatives defined in IEC 61162-1:2010, Table 5, Field type summary.

NOTE 2: Used for proprietary alerts, defined by the manufacturer. For standardized alerts this should be a null field. For the list of standardized alerts, see IEC 61924-2:2012, Annex J.

NOTE 3: The alert identifier is unique within a single alert source. The alert identifier is a variable length integer field of maximum a 7-digit integer. It identifies the type of the alert, e.g. a “lost target” alert. For standardized alerts, see the list of Alert identifiers in Annex J. Number range 10000-9999999 is reserved for proprietary alerts. Alert Identifier examples: “001”, “2456789”, “245”.

NOTE 4: The alert instance identifies the current instance of an alert to distinguish alerts of the same type (Alert identifier) and from the same source (e.g. dangerous target). Alert instance is maximum a 6-digit integer from 1 to 999999. The number of alert instance can be freely defined by the manufacturer, as long as it is unique for one type of alert (alert identifier). It is not permitted to modify the alert instance within a life cycle of a distributed alert (from 'active-unacknowledged' state until 'normal' state is reached). It can also be a null field, when there is only one alert of that type.

NOTE 5: Refused Alert Command: Indicates refused "Alert command" of a corresponding ACM sentence. This should not be a null field.

- acknowledge: A
- request / repeat information: Q
- responsibility transfer: O
- silence: S

BBM – AIS broadcast binary message

Standard: IEC 61162-1 Ed.4, 2010-11

This sentence supports generation of ITU-R M.1371 binary Messages 8 and 14. This provides the application with a means to broadcast data, as defined by the application only. Data is defined by the application only – not the AIS. This message offers great flexibility for implementing system functions that use the AIS unit as a digital broadcast device. After receiving this sentence, via the IEC 61162-2 interface, the AIS unit initiates a VHF broadcast of either Message 8 or 14 within 4 s. (See the ABK sentence for acknowledgement of the BBM.)

!--BBM, x^1, x^2, x^3, x^4, xx^5, s–s^6, x^7 *hh<CR><LF>

No.	Field	Description
1	x	Total number of sentences needed to transfer the message, 1 to 9 (see Note 1)
2	x	Sentence number, 1 to 9 (see Note 1)
3	x	Sequential message identifier, 0 to 3 (see Note 2)
4	x	AIS channel for broadcast of the radio message (see Note 3)
5	xx	ITU-R M.1371 Message ID (08 or 14)
6	s—s	Encapsulated data (see Note 4)
7	x	Number of fill-bits, 0 to 5 (see Note 5)

NOTE 1 The total number of IEC 61162-1 sentences required to transfer the contents of the binary message to the AIS unit. The first field specifies the total number of sentences used for a message, minimum value 1. The second field identifies the order of this sentence in the message, minimum value 1. All sentences contain the same number of fields. Successive sentences may use null fields for fields that have not changed, such as fields 4 and 5.

NOTE 2 The sequential message identifier provides a message identification number from 0 to 9 that is sequentially assigned and is incremented for each new multi-sentence message. The count resets to 0 after 9 is used. For a message requiring multiple sentences, each sentence of the message contains the same sequential message identification number. It is used to identify the sentences containing portions of the same message. This allows for the possibility that other sentences might be interleaved with the message sentences that, taken collectively, contain a single message. This value is used by the ABK sentence to acknowledge a specific BBM sentence.

NOTE 3 The AIS channel that should be used for the broadcast: 0 = no broadcast channel preference, 1 = broadcast on AIS channel A, 2 = broadcast on AIS channel B, 3 = broadcast the message on both AIS channels A and B.

NOTE 4 This is the content of the “binary data” parameter for ITU-R M.1371 Message 8, or the “Safety related text” parameter for Message 14. The first sentence may contain up to 58 valid “six-bit” symbols (348 bits). The following sentences may contain up to 60 valid “six-bit” symbols (360 bits), if fields 4 and 5 are unchanged from the first sentence and set to null. The actual number of characters should be such that the total number of characters in a sentence does not exceed the “82-character” limit.

NOTE 5 This cannot be a null field. See “x4” in IEC 61162-1 Ed.4, chapter 7.3.4.

HBT – Heartbeat supervision sentence

Standard: IEC 61162-1 Ed.4, 2010-11

This sentence is intended to be used to indicate that equipment is operating normally, or for supervision of a connection between two units.

The sentence is transmitted at regular intervals specified in the corresponding equipment standard. The repeat interval may be used by the receiving unit to set the time-out value for the connection supervision.

$--HBT, x.x[1], A[2], x[3]*hh<CR><LF>

No.	Field	Description
1	x.x	Configured repeat interval (see Note 1)
2	A	Equipment status (see Note 2)
3	x	Sequential sentence identifier (see Note 3)

NOTE 1: Configured autonomous repeat interval in seconds. This field should be set to NULL in response to a query if this feature is supported.

NOTE 2: Equipment in normal operation A = yes, V = no. This field can be used to indicate the current equipment status. This could be the result of a built-in integrity testing function.

NOTE 3: The sequential sentence identifier provides a message identification number from 0 to 9 that is sequentially assigned and is incremented for each new sentence. The count resets to 0 after 9 is used.

MWD –Wind direction and speed

Standard: IEC 61162-1 Ed.4, 2010-11

The direction from which the wind blows across the earth's surface with respect to north, and the speed of the wind.

$--MWD, x.x[1], T[2], x.x[3], M[4], x.x[5], N[6], x.x[7], M[8]*hh<CR><LF>

No.	Field	Description
1	x.x	Wind direction, 0° to 359° true
2	T	
3	x.x	Wind direction, 0° to 359° magnetic
4	M	
5	x.x	Wind speed, knots
6	N	
7	x.x	Wind speed, m/s
8	M	

MWV – Wind speed and angle

Standard: IEC 61162-1 Ed.4, 2010-11

When the reference field is set to R (Relative), data is provided giving the wind angle in relation to the vessel's bow/centerline and the wind speed, both relative to the (moving) vessel. Also called apparent wind, this is the wind speed as felt when standing on the (moving) ship.

When the reference field is set to T (Theoretical, calculated actual wind), data is provided giving the wind angle in relation to the vessel's bow/centerline and the wind speed as if the vessel was stationary. On a moving ship this data can be calculated by combining the measured relative wind with the vessel's own speed.

$--MWV, x.x[1], a[2], x.x[3], a[4], A[5]*hh<CR><LF>

No.	Field	Description
1	x.x	Wind angle, 0° to 359°
2	a	Reference, R = relative, T = true
3	x.x	Wind speed
4	a	Wind speed units: K = km/h; M = m/s; N = knots
5	A	Status: A = data valid; V= data invalid

NRX – NAVTEX received message

Standard: IEC 61162-1 Ed.4, 2010-11

The NRX sentence is used to transfer the contents of a received NAVTEX message from the NAVTEX receiver to another device. As the length of a single NAVTEX message may exceed the number of characters permitted in a single sentence, many NRX sentences may be required to transfer a single NAVTEX message.

$--NRX, xxx[1], xxx[2], xx[3], aaxx[4], x[5], hhmmss.ss[6], xx[7], xx[8], xxxx[9], x.x[10], x.x[11], A[12], c--c[13]*hh<CR><LF>

No.	Field	Description
1	xxx	Number of sentences 001-999 (see Note 1)
2	xxx	Sentence number 001-999
3	xx	Sequential message id 00-99 (see Note 2)
4	aaxx	NAVTEX message code (see Note 3)
5	x	Frequency table index 0-9 (see Note 4)
6	hhmmss.ss	UTC of receipt of message
7	xx	Day 1-31
8	xx	Month 1-12
9	xxxx	Year
10	x.x	Total number of characters in this series of NRX sentences (see Note 5)
11	x.x	Total number of bad characters
12	A	Status indication (see Note 6)
13	c--c	Message body (see Note 7)

NOTE 1 The total number of sentences required to transfer the NAVTEX message from the NAVTEX radio receiver. The first field specifies the total number of sentences used for a message, minimum value 1. The sentence number field identifies the order of this sentence in the message, minimum value 1. All sentences contain the same number of fields. For efficiency, it is recommended that null fields be used in the additional sentences where the data is unchanged from the first sentence (this applies to fields 4 through 12).

NOTE 2 The sequential message identifier provides a unique identifier for each NAVTEX message represented by a group of sentences. Though the message code (field 4) contains a NAVTEX message serial number, there are special cases when the message serial number is set to 00 and has a different meaning or when the same message code can occur more than once. When these conditions occur, the sequential message identifier can be relied upon to uniquely identify this NAVTEX message from other NAVTEX messages with the same message code.

NOTE 3 The NAVTEX message code contains three related entities. The first character identifies the transmitter coverage area and the second character identifies the type of message. Both these characters are as defined in Table I of Recommendation ITU-R M.625-3, combination numbers 1 to 26. Transmitter identification characters are allocated by the IMO NAVTEX Co-ordinating Panel; these characters and the meanings of the message type characters are described in the NAVTEX manual (IMO publication 951E). The remaining two characters are restricted to numerals with a range of 00 to 99 and represent a serial number for each type of message. The value of 00 is a special case and not considered a serial number. See IEC 61097-6 for interpretation of special case value of 00.

NOTE 4 The frequency indicator identifies the frequency that the NAVTEX message was received on:

0 = not received over air (for example test messages);
1 = 490 kHz;
2 = 518 kHz
3 = 4 209.5 kHz;
4 through 9 are reserved for future use.

NOTE 5 The total number of characters indicates the expected size of the message body sent in this sequence of NRX sentences. It does not include the additional overhead for reserved characters found in IEC 61162-1 Ed.4, Table 1.

NOTE 6 Status ‘A’ is used for syntactically correct message reception. Status ‘V’ is used for syntactically incorrect message reception, for example end characters NNNN missing.

NOTE 7 The message body may contain both valid characters, see IEC 61162-1 Ed.4, Table 2, and reserved characters, see IEC 61162-1 Ed.4, Table 1. Reserved characters should be represented using the "^" method (see IEC 61162-1 Ed.4, chapter 7.1.4).

The example below shows a typical message received by the NAVTEX receiver distributed with the NRX sentence:

```
<start of example>
ZCZC IE69================================
ISSUED ON SATURDAY 06 JANUARY 2001.
INSHORE WATERS FORECAST TO 12 MILES
OFFSHORE FROM 1700 UT* TO 0500 UTC.
NORTH FORELAND TO SE**EY BILL.
12 HOURS FORECAST:

SHOWERY WINDS, STRONGEST IN NORTH.

NNNN
<end of example>
```

Inspecting the corresponding NRX sentences would typically show:

```
$CRNRX,007,001,00,IE69,1,135600,27,06,2001,241,3,A,==========
==============*09
$CRNRX,007,002,00,,,,,,,,,,========^0D^0AISSUED ON SATURDAY 06
JANUARY 2001.*29 $CRNRX,007,003,00,,,,,,,,,,^0D^0AINSHORE
WATERS FORECAST TO 12 MILES^0D^0AOFF*0D
$CRNRX,007,004,00,,,,,,,,,,SHORE FROM 1700 UT^2A TO 0500
UTC.^0D^0A^0D^0ANORT*70 $CRNRX,007,005,00,,,,,,,,,,H FORELAND
TO SE^2A^2AEY BILL.^0D^0A12 HOURS FOREC*16
$CRNRX,007,006,00,,,,,,,,,,AST:^0D^0A^0ASHOWERY WINDS^2C
STRONGEST IN NORTH. *3C $CRNRX,007,007,00,,,,,,,,,, ^0D ^0A^0D
^0A*79
```

Decoding the message body should give the following result:

```
<start of decoding>

================================
ISSUED ON SATURDAY 06 JANUARY 2001.
INSHORE WATERS FORECAST TO 12 MILES
OFFSHORE FROM 1700 UT* TO 0500 UTC.

NORTH FORELAND TO SE**EY BILL.
12 HOURS FORECAST:

SHOWERY WINDS, STRONGEST IN NORTH.

<end of decoding>
```

PDANBWOL –Distance and bearing to the next WOL

Standard: proprietary format based on IEC 61162-1 Ed.5, 2016-08

Distance and bearing information about the next wheel-over-line point on the route.

$--PDANBWOL, hhmmss.ss[1], llll.lll[2] , a[3], yyyyy.yyy[4], a[5], x.x[6], x.x[7], c--c[8], a[9], x[10]*hh<CR><LF>

No.	Field	Description
1	hhmmss.ss	UTC time of observation
2	llll.lll	WOL latitude
3	a	N = North, S = South
4	yyyy.yyy	WOL longitude
5	a	E = East, W = West
6	x.x	Bearing, degrees True
7	x.x	Distance, Nautical Miles
8	c--c	Waypoint ID
9	a	Geometry (R = rhumb line, C = great circle)
10	x	GPS quality indicator (only 1 or 6)

PDANRMDST –Route monitoring destination information

Standard: proprietary format based on IEC 61162-1 Ed.5, 2016-08

Information about the destination waypoint.

$--PDANRMDST, hhmmss[1], xxx[2], x.x[3], hhmmss[4], xx[5], xx[6], xxxx[7], x[8]*hh<CR><LF>

No.	Field	Description
1	hhmmss	Time to destination, 00 h to 24 h
2	xxx	Days to destination
3	x.x	Distance to destination in nautical miles
4	hhmmss	UTC of estimated time of arrival at destination
5	xx	Day, 01-31
6	xx	Month, 01-12
7	xxxx	Year
8	x	GPS quality indicator (only 1 or 6)

PDANRMLEG –Route monitoring information about upcoming WOL

Standard: proprietary format based on IEC 61162-1 Ed.5, 2016-08

Information about route's leg.

$--PDANRMLEG, x.x[1], x.x[2], x.x[3], x.x[4], hhmmss[5], x.x[6], x.x[7], hhmmss[8], xx[9], xx[10], xxxx[11], x[12]*hh<CR><LF>

No.	Field	Description
1	x.x	Total number of sentences for this message
2	x.x	Sentence number
3	x.x	Sequential message identifier (0-9)
4	x.x	Leg index (0 – current leg, 1 – next leg etc.)
5	hhmmss	Time to end of leg, 00 h to 24 h
6	x.x	Days to end of leg
7	x.x	Distance to end of leg, Nautical miles
8	hhmmss	UTC of estimated time of arrival at end of leg
9	xx	Day, 01-31
10	xx	Month, 01-12
11	xxxx	Year
12	x	GPS quality indicator (only 1 or 6)

RTE – Routes

Standard: IEC 61162-1 Ed.4, 2010-11

Waypoint identifiers, listed in order with starting waypoint first, for the identified route. Two modes of transmission are provided: "c" indicates that the complete list of waypoints in the route is being transmitted; "w" indicates a working route where the first listed waypoint is always the last waypoint that had been reached (FROM), while the second listed waypoint is always the waypoint that the vessel is currently heading for (TO) and the remaining list of waypoints represents the remainder of the route.

$--RTE, x.x[1], x.x[2], a[3], c--c[4], c--c[5], …… c–c[n]*hh<CR><LF>

No.	Field	Description
1	x.x	Total number of sentences being transmitted (see Note 2)
2	x.x	Sentence number (see Note 2)
3	a	Message mode: c = complete route, all waypoints w = working route, first listed waypoint is "FROM", second is "TO" and remaining are rest of route
4	c--c	Route identifier
5	c--c	Waypoint identifier
6	…….	Additional waypoint identifiers (see Note 1)
n	c--c	Waypoint n identifier (see Note 1)

NOTE 1 A variable number of waypoint identifiers, up to "n", may be included within the limits of allowed sentence length. As there is no specified number of waypoints, null fields are not required for waypoint identifier fields.

NOTE 2 A single route may require the transmission of multiple sentences, all containing identical field formats when sending a complex

message. The first field specifies the number of sentences, minimum value = 1. The second field identifies the order of this sentence (sentence number), minimum value = 1. For efficiency, it is permitted that null fields be used in the additional sentences when the data is unchanged from the first sentence. (Note that this practice can lead to the incorrect assembly of sentences if there is a high risk of loss of sentence.)

SSD – AIS ship static data

Standard: IEC 61162-1 Ed.4, 2010-11

This sentence is used to enter static parameters into a shipboard AIS unit. The parameters in this sentence support several of the ITU-R M.1371 Messages.

$--SSD, c–c[1], c–c[2], xxx[3], xxx[4], xx[5], xx[6], c[7], ac[8] *hh<CR><LF>

No.	Field	Description
1	c—c	Ship's call sign, 1 to 7 characters (see Note 1)
2	c—c	Ship's name, 1 to 20 characters (see Note 2)
3	xxx	Pos. ref., point dist. "A," from bow, 0 to 511 m (see Note 3)
4	xxx	Pos. ref., point dist. "B," from stern, 0 to 511 m (see Note 3)
5	xx	Pos. ref., point dist. "C," from port beam, 0 to 63 m (see Note 3)
6	xx	Pos. ref. ,point dist. "D," from starboard beam, 0 TO 63 m (see Note 3)
7	c	DTE indicator flag (see Note 4)
8	ac	Source identifier (see Note 5)

NOTE 1 Ship's call sign. A null field indicates that the previously entered call sign is unchanged. The string of characters "@@@@@@@" is used to indicate that the call sign is not available.

NOTE 2 The characters that can be used in the name are listed in the ITU-R M.1371, 6-bit ASCI. Some of the acceptable characters in this 6-bit ASCI table are the reserved characters within this standard IEC 61162-1, Table 1. These characters should be represented using the "^" method (see IEC 61162-1 Ed.4, chapter 7.1.4). A null field indicates that the previously entered name is unchanged. The string of characters "@@@@@@@@@@@@@@@@@@@@" is used to indicate that the ship's name is not available.

NOTE 3 These are the four dimensions from the bow, stern, port beam, and starboard beam to the horizontal reference point on the ship for which the current “position reports” are valid. The sum of A + B is the length of the ship in meters, and the sum of C + D is the width of the ship in meters. Refer to the ITU-R M.1371, Message 5, “reference point for reported position and dimensions of ship”. If the reference point of “reported position” is not available, but the dimensions of the ship are available: A = C = 0 and B > 0 and D > 0. If neither the reference point for the reported position nor the dimensions of the ship are available: A = B = C = D = 0 (default). Use of a null field for A, B, C, and/or D indicates that the previously entered dimension for that parameter is unchanged. In many cases, the ship’s reference point for “reported position” will be the location of the positioning antenna.

NOTE 4 The DTE indicator is an abbreviation for data terminal equipment indicator. The purpose of the DTE indicator is to inform distant receiving applications that, if set to “available,” the transmitting station conforms, at least, to the minimum keyboard and display requirements. The DTE indicator is only used as information provided to the application layer – indicating that the transmitting station is available for communications. On the transmitting side, the DTE indicator may be set by an external application using this sentence. DTE indicator flag values are: 0 = Keyboard and display are a standard configuration, and communication is supported; 1 = Keyboard and display are either unknown or unable to support communication.

NOTE 5 The source identifier contains the talker ID of the position source at the location on the ship defined by data fields 3, 4, 5 and 6. The source identifier of “AI” should be used for the AIS unit’s internal position source. This data field helps the AIS to distinguish the position information source for the purpose of changing the information broadcast in VDL message 5 for the location of position sensor antenna on the vessel.

VSD – AIS voyage static data

Standard: IEC 61162-1 Ed.4, 2010-11

This sentence is used to enter information about a ship’s transit that remains relatively static during the voyage. However, the information often changes from voyage to voyage. The parameters in this sentence support several of the ITU-R M.1371 messages.

$--VSD, x.x[1], x.x[2], x.x[3], c–c[4], hhmmss.ss[5], xx[6], xx[7], x.x[8], x.x[9]*hh<CR><LF>

No.	Field	Description
1	x.x	Type of ship and cargo category, 0 to 255 (see Note 1)

No.	Field	Description
2	x.x	Maximum present static draught, 0 to 25,5 m (see Note 2)
3	x.x	Persons on-board, 0 to 8 191 (see Note 3)
4	c—c	Destination, 1-20 characters (see Note 4)
5	hhmmss.ss	Estimated UTC of arrival at destination (see Note 5)
6	xx	Estimated day of arrival at destination, 00 to 31 (UTC) (see Note 6)
7	xx	Estimated month of arrival at destination, 00 to 12 (UTC) (see Note 6)
8	x.x	Navigational status, 0 to 15 (see Note 7)
9	x.x	Regional application flags, 0 to 15 (see Note 8)

NOTE 1 Type of ship and cargo category are defined under Message 5 of ITU-R M.1371. The descriptions of ship and cargo are indicated by a number. The values are defined in ITU-T M. 1371, Message 5. A null field indicates that this is unchanged.

NOTE 2 The draught is reported in units of meters. Valid range is 0 to 25.5. The value 0 = not available and the value 25.5 indicates that the draught is 25.5 m or more. A null field indicates that this is unchanged.

NOTE 3 Current number of people on-board including crew. Valid range is 0 to 8 191. The value 0 = not available and the value 8 191 = 8 191 or more people. A null field indicates that this is unchanged.

NOTE 4 The characters that can be used in the destination are listed in the ITU-R M.1371, 6-bit ASCI IEC 61162-1 Ed.4, Table 14. Some of these characters are reserved characters in IEC 61162-1 Ed.4, Table 1. These characters should be represented using the “A” method (see IEC 61162-1 Ed.4, chapter 7.1.4). A null field indicates that the previously entered destination is unchanged. The string of characters “@@@@@@@@@@@@@@@@@@@@” are used to indicate that the ship’s destination is not available.

NOTE 5 If the hour of arrival is not available, “hh” should be set to 24. If the minute of arrival is not available, “mm” should be set to 60. The seconds option “ss.ss” of the field may be set to “00” as the AIS unit only broadcasts hours and minutes. A null field indicates that this is unchanged.

NOTE 6 The day and month of arrival are in UTC. The field is a fixed two-digit number requiring leading zeros. If the day of arrival is not available, “00” should be the number for the day. If the month of arrival is not available, “00” should be the number for the month. A null field indicates that this is unchanged.

NOTE 7 The navigational status is indicated using the following values, a null field indicates the status is unchanged (ref. ITU-R M.1371, Message 1, navigational status parameter):
0 = under way using engine
1 = at anchor
2 = not under command
3 = restricted maneuverability
4 = constrained by draught
5 = moored
6 = aground 11 to 14 = reserved for future use
7 = engaged in fishing 15 = default
8 = under way sailing
9 = reserved for High Speed Craft (HSC)
10 = reserved for Wing In Ground (WIG)

NOTE 8 Definition of values 1 to 15 provided by a competent regional authority. Value should be set to zero (0), if not used for any regional application. Regional applications should not use zero. A null field indicates that this is unchanged (ref. ITU-R M.1371, Message 1, reserved for regional applications parameter).

WPL – Waypoint location

Standard: IEC 61162-1 Ed.4, 2010-11

Latitude and longitude of specified waypoint.

$--WPL, llll.ll[1], a[2], yyyyy.yy[3], a[4], c--c[5]*hh<CR><LF>

No.	Field	Description
1	llll.ll	Waypoint latitude
2	a	N/S
3	yyyyy.yy	Waypoint longitude
4	a	E/W
5	c--c	Waypoint identifier

Control settings configured in response to ‘Default’ selection

The table below lists control settings that are restored to their default values when you press the Default 

indicator.

Setting	Default value
Display category	ECDIS Standard display
Chart related selector: Accuracy	Off
Chart related selector: Date dependent objects	current date
Chart related selector: Highlight date dependent	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
Manual updates	If applied i.e. displayed if available
Mariner’s notes	If applied i.e. displayed if available
Selected route	Last selected route, including route parameters
Past track	On
Past track length, if selectable	12 h
Past track time-labels	On, 30 min

Setting	Default value
Look-ahead time	6 min
Any edit window (for example route plan)	Exit
Position data source	Remain unchanged
Safety contour	Remain unchanged
Safety depth	Remain unchanged
Cross track limit	Remain unchanged
Graphical indication of crossing safety contour during route planning, if selection provided	On
Graphical indication of prohibited areas, areas with special conditions and navigational hazards during route planning, if selection provided	On
Distance to prohibited areas, areas with special conditions and navigational hazards	Remain unchanged
Graphical indication of crossing safety contour during route monitoring, if selection provided	On
Graphical indication of prohibited areas and areas with special conditions during route monitoring, if selection provided	On
Graphical indication of navigational hazards during route monitoring, if selection provided	On
Object highlight, selected object, track display from log	Cleared from display
Cursor pick	Closed
Any additional window (dual view, 3d, tides, etc.)	Closed
Any additional information layer, proprietary layer (weather, tides, AML, etc.)	Cleared from display
Chart update, Chart information exchange	Aborted
Color differentiation test diagrams	Closed
Update review	Off
Chart 1	Closed
Units	m, NM, kn
Crossing a navigational hazard in route monitoring mode	Caution
Vector time (length)	6 min
Vector mode	True
Vector stabilization	Ground
Symbol for target association, if provided	AIS
Collision warnings, if provided	ON (limits, CPA = 2 NM; TCPA = 12 min)
Radar and AIS target association, if provided	ON
AIS target filtering, if provided	target range = 6 NM target CPA = 4 NM target TCPA = 24 min target display = Off

Setting	Default value
	sleeping target display = Off AtoN display = On SART display = On repeated target display= Off
AIS true target outline	Off
Display of Radar image overlay, if provided	Off
Display of Radar tracked targets, if provided	Off
Display of AIS reported targets, if provided	Off
Target past positions, if provided	Off
Target trails, if provided	Off
Lost target warning, if provided	Off
Lost target warning range, if provided	12 NM
AIS interrogation, if provided	Off
Own ship true outline	Off
LOP source indication	Off
User selected time for warning escalation	60 s
Suppression of indication of user selected MSI messages based on first character of NAVTEX code field, if provided	Remain unchanged
Suppression of indication of user selected messages based on time and distance from own ship, monitored route or planned route	No
Brightness and contrast controls, if software controlled	Calibrated setting

Glossary

Activated AIS target

A target activated for the display of additional graphically presented information (for example, heading line, velocity vector, etc.)

Aids to Navigation

An Aid to Navigation is any device external to a vessel specifically intended to assist navigators in determining their position or safe course, or to warn them of dangers or obstructions to navigation.

AIS

See Automatic Identification System.

ARPA

See Automatic Radar Plotting Aid.

Automatic Identification System (AIS)

AIS provides a means of broadcasting digitally navigation information including ship position/speed/heading/dimension/name/destination/ROT, aids to navigation, base station reports and more. Created by the IMO and sanctioned by the U.S. Coast Guard for ship monitoring and collision avoidance. It is used by ship traffic monitoring and control locations throughout the world to improve situational awareness and help prevent collisions at sea.

Automatic Radar Plotting Aid (ARPA)

The function entailing the detection of moving targets and calculating their speed and course. Used to automatically detect radar targets and output to other devices, ARPA is a collision avoidance system.

Autopilot

A self-steering device that attaches to a ship's steering mechanism to control the ship's bearing.

Azimuth

Azimuth of a body is the arc of the horizon intercepted between the North or South point and the foot of the vertical circle passing through the body. It is reckoned in degrees from either the North or South point clockwise entirely around the Horizon. (source: Our Restless Tides).

Bathymetric

Measurement of the depth, contours and slopes of the floor of a body of water (sea, lake, ocean or river), obtained through topographic charting.

Beam

Ship width.

Bearing (BRG)

The angle between the direction of the boat and the reference direction expressed in degrees, with a notation of True or Magnetic Variation (T or M). Due north corresponds to 0 degrees, east to 90, south to 180 and west to 270. For compass bearings, the reference direction is magnetic North. For true bearings, the reference direction is true North.

Bearing from Ship to Cursor

This data is an aid in route making and planning. Bearing from ship to cursor is expressed in degrees, with a notation of True or Magnetic Variation.

Bearing Waypoint to Waypoint (BWW)

Bearing from the current waypoint to the next waypoint.

Bow

The front of a ship

Broadcast Notice to Mariner (BNM)

See Local Notice to Mariners (LNM)

BWW

See Bearing Waypoint to Waypoint

Cartesian Coordinates

Also known as "Rectangular Coordinates". A two-dimensional plane contains an x-axis and a y-axis. Negative x coordinates lay to the left of the y-axis and positive x-coordinates to the right. Negative y coordinates lay below the x-axis and positive above the x-axis.

Chart

Nautical term for maps used in nautical navigation that show the depth of waters as well as land boundaries and other obstructions. Charts may be paper or electronic and electronic charts may be of raster or vector type.

Chart License

Chart Licenses unlock a Chart region. Each license is made up of 16 digits laid out in the following convention: 1234-1234-1234-1234

Closest Point of Approach (CPA)

Predicted closest point a maneuvering boat will get relative to any target, moving or otherwise, located at a point on the relative movement line perpendicular to the reference ship. The minimum horizontal distance between two vessels during a proximity encounter.

COG

See Course Over Ground.

COM Port

The interface through which the ECDIS can communicate with peripherals. Visual series support 32 COM Ports.

Course

The direction a vessel is being steered.

Course Over Ground (COG)

Is the track of the ship over the ground and is based on position changes.

Course to Steer (CTS)

Course to steer to get to the active wheel over line point from the current position.

CPA

See Closest Point of Approach

Cross Track Distance (XTD)

The distance of a perpendicular line drawn from the ship to an active route leg. Determines how much the ship is straying from the course of a *Route*.

CTS

See Course to Steer

Current

The flow of water characterized by direction and speed. Current speed and direction may change with the tide.

See also Ebb Current and Flood Current.

Data Sentence

The unit of information sent between peripherals and the ECDIS, conforming to the NMEA 0183 specification.

Dead-reckoned Position

DR position extrapolated from the last accepted position update, based on present course and speed.

Dead Reckoning

A method of navigation where known values (position, course, speed, time and distance to travel) are used to calculate unknown values. Values such as set and drift can also be incorporated.

Depth

In the ECDIS, depth is water depth relative to the keel.

Deviation

Changes in the magnetic field due to the ferrous composition of surrounding objects affecting the measured direction of magnetic North. Deviation is measured as the angular difference in direction between the actual magnetic heading and the compass heading.

DGPS (Differential GPS)

A network of 60 radio beacons in conjunction with a GPS that sends correction information used to reduce positional error to the 1-3-meter range.

Digital Selective Calling (DSC)

A type of VHF radio that allows boats to contact other, similarly equipped boats using that boat's *MMSI Number*. DSC allows two radios to communicate selectively with each other while excluding other receivers from using the signal. DSC can report position information.

Display Base

Level of information that cannot be removed from the ECDIS display, consisting of information that is always required in all geographic areas and all circumstances. It is not intended to be enough for safe navigation.

Display Scale

Ratio between a distance on the display and a distance on the ground, normalized and expressed as, for example 1:10 000.

Distance to Arrival (DTA)

The distance from the current position of the own vessel to the end of the route.

Distance to Wheel-over Line (DWOL)

Distance from the current position of the own vessel to the wheel-over line of the active route leg.

DPTH (Depth)

See Depth

DR

See Dead Reckoning

Draft

The extent to which a boat protrudes into water. The draft of a boat may vary due to changes in weight and changes in water salinity.

Drift

The cumulative effect of wind and current on the ship.

DSC

See Digital Selective Calling

DTA

See Distance to Arrival

DWOL

See Distance to Wheel-over Line

Ebb Current (Ebb)

Movement of tidal current away from shore or down a tidal river or estuary.

Echo Sounder

See Sounder.

Electronic Chart Display and Information System (ECDIS)

A hardware/software/data marine navigation system that meets the specifications of the International Hydrographic Organization (IHO). An ECDIS is the only electronic system allowed to replace paper charts under the International Convention for the Safety of Life at Sea (SOLAS).

Electronic Chart System (ECS)

A system comprised of navigation software, navigation data, system hardware.

An ECS is any combination of hardware and software that displays marine charts electronically. The term ECS is used specifically when ECDIS specifications are not met by the software/hardware system.

Electronic Navigation Chart (ENC)

An electronic data file containing information that could be used to display a chart. The ENC contains all the chart information necessary for safe navigation and may contain supplementary information in addition to that contained in the paper chart (for example sailing directions) which may be considered necessary for safe navigation.

EP

See Estimated Position.

Estimated Position

Position of own ship determined by the common intersection of two LOPs.

Estimated Time of Arrival (ETA)

The calculated arrival time to the end of the route, assuming no change in present course and speed or weather conditions. This time is based on computer clock time. For greatest accuracy, make sure computer clock is synchronized with real time.

Fish Finder

See Sounder.

Fix

Position of own ship determined, without reference to any former position, by the common intersection of three or more LOPs.

Flood Current (Flood)

The movement of tidal current up the shore or up a tidal river or estuary.

Geo-reference

To establish the relationship between page coordinates on a planar map and real-world coordinates.

Global Positioning System (GPS)

A worldwide radio-navigation system developed by the US Department of Defense. In addition to military purposes, it is widely used in marine, terrestrial navigation and location-based services. Uses stationary satellites or a surface signal to locate the ship with a very high degree of accuracy. The term GPS is frequently used to refer to GPS receivers.

GPS

See Global Positioning System.

Great Circle

A Great Circle is the shortest distance between two points on a spheroid. A great circle is formed at the edge of a plane crossing through the center of a sphere. Unlike Rhumb Lines, great circles generally do not have constant bearing (the equator and the meridians are prominent exceptions).

Greenwich Meridian

See Prime Meridian.

GRIB (Gridded Binary)

A general purpose, bit-oriented data exchange format, GRIB is an efficient vehicle for transmitting large volumes of gridded data over high-speed telecommunication lines using modern protocols. GRIB weather communicates large weather data files efficiently.

Heading (HDG)

The direction the ship is oriented.

High Water (HW)

The maximum height reached by a rising tide.

Higher High Water (HHW)

The highest of the high water (or single high water) of any specified tidal day due to the declinational effects of the Mood and the Sun.

Higher Low Water (HLW)

The highest of the low water of any specified tidal day do to the declinational effects of the Moon and the Sun.

International Hydrographic Organization (IHO)

An organization that provides the specifications for what qualifies as an ECDIS.

Knot (Kn)

A speed unit of one international nautical mile (1852.0 meters or 6,076.11549 international feet) per hour.

Latitude

The designation for angles measuring how far North or how far South a position is. Value range is from 90ºS to 0º at the equator to 90ºN. Latitude values are represented by the Greek letter lambda (λ).

Lat/Lon

Any object's position expressed in Latitude and Longitude.

Leg

The segment of a route between two waypoints.

Line of Position

Plotted line on which own ship is located determined by observation or measurement of the range or bearing to an aid to navigation or another charted element.

LOC

Local time.

Log

A record of the ship's movements and a place for manual text entries.

Longitude

The designation for angles measuring how far West or how far East a position is. Value range is from 180ºE to 180ºW. Values of longitude are represented with the Greek letter phi (φ).

LOP

See Line of Position.

LORAN (LOng Range Aid to Navigation)

LORAN is a terrestrial-based navigation system using the time interval between radio signals to determine the position of the receiver. LORAN was popular with marine navigation prior to the existence of GPS. The current version of LORAN in use is LORAN-C. LORAN fails under different conditions than GPS, arguably making it a complementary radio-navigation system.

Low Water

The minimum height reached by a falling tide.

Lower High Water (LHW)

The lowest of the high waters of any specified tidal day due to the declinational effects of the Moon and the Sun.

Lower Low Water (LLW)

The lowest of the low waters (or single low water) of any specified tidal day due to the declinational effects of the Moon and Sun.

Magnetic Variation

The degree to which the magnetic north differs from the true north. This data is available from the Current Chart indicator.

Man Overboard (MOB)

Mark that can be placed on a digital chart to indicate emergency location. The ECDIS will track that location to aid in returning the boat to MOB coordinates.

Maritime Mobile Service Identity (MMSI)

MMSI Numbers are a series of nine digits transmitted over a DSC radio path to uniquely identify ship stations, ship earth stations, coast stations, coast earth stations and group calls. These identities can be used by telephone and telex subscribers connected to the general telecommunications network principally to call ships automatically.

Mean High Water (MHW)

A tidal datum. The average of the higher high water heights observed over the National Tidal Datum Epoch.

Mean Higher High Water (MHHW)

A tidal datum. The average of all the high water heights of each tidal day observed over the National Tidal Datum Epoch.

Mean Low Water (MLW)

A tidal datum. The average of all the low water heights observed over the National Tidal Datum Epoch.

Mean Lower Low Water (MLLW)

A tidal datum. The average of the lower low water height of each tidal day observed over the National Tidal Datum Epoch.

Mercator Projection

The Mercator projection is a conformal projection devised by Gerhardus Mercator in 1569. Similar to a cylindrical projection in that the horizontal and vertical distances are stretched towards the poles. Unlike the cylindrical projection the vertical and horizontal stretching of the chart preserves shape and direction. Due to increasing distortion towards the poles Mercator charts are not very useful for representing cartographic information towards the poles.

Lines of latitude and longitude are straight lines on the Mercator projection.

On Mercator charts, rhumb lines can be drawn as straight lines because the Mercator projection preserves bearing.

MMSI

See Maritime Mobile Service Identity.

MOB

See Man Overboard.

National Marine Electronics Association (NMEA)

This organization has determined a standard, 0183, to which all data transmission to and from marine peripherals must conform. The NMEA issues standards for interfacing marine electronics devices. Pronounced "nee-ma". Not to be confused with NEMA (National Electrical Manufacturers Association).

Computers directly connected to NMEA producing devices (GPS, heading sensor, etc.) receive raw NMEA data. This data conforms to the NMEA 0183 (3.01) specification.

See also NMEA 0183 and NMEA 2000.

NMEA

See National Marine Electronics Association.

NMEA 0183

NMEA 0183 defines the electrical interface and data protocol for communications between marine instrumentation. Many times referred to as "NMEA" in the context of marine instrumentation communications.

NMEA 2000

This standard contains the requirements for a serial data communications network to inter-connect marine electronic equipment on ships. It is multi-master and self-configuring and there is no central network controller. Equipment designed to this standard will have the ability to share data, including commands and status with other compatible equipment over a single channel. (source: http://www.nmea.org/pub/2000/)

NOAA (National Oceanic and Atmospheric Administration)

NOAA is a federal agency focused on the conditions of the oceans and the atmosphere. NOAA supplies navigation chart information for the coastal U.S. and the Great Lakes region.

Overscale

Display of the chart information at a display scale larger than the compilation scale. Overscaling may arise from deliberate overscaling by the mariner, or from automatic overscaling by ECDIS in compiling a display when the data included is at various scales.

Pan

To move the view window over the chart. (Also called Scrolling).

Past Track

An onscreen and/or logged record of a ship's previous movements.

Polyconic Projection

The polyconic projection involves projecting the surface of the Earth onto a series of cones situated with their apexes over the poles.

Port

Port designates the left side of a boat as seen standing on the deck facing toward the bow. Port side is indicated with a red light.

Prediction Vector

A vector displayed in front of the vessel showing where the boat will be after a specified period, assuming no intervening heading or speed changes.

Prime Meridian

The meridian of longitude that passes through the original site of the Royal Observatory in Greenwich and used as the origin of Longitude. Also known as the Greenwich Meridian.

RADAR (RAdio Distancing And Ranging)

Microwave pulses used to detect objects (usually metallic) based on wave reflection.

Radio Technical Commission for Maritime Services (RTCM)

In the United States, the Federal Communications Commission (FCC) and U.S. Coast Guard use RTCM standards to specify radar systems, Emergency Position Indicating Radio Beacons and the basic version of Digital Selective Calling (DSC) radios.

Range

The distance between two specified points, usually the ship and a mark.

Range from Ship to Cursor

The distance between the ship icon and the cursor.

Raster Chart

Charts where the chart information is stored as a rasterized image. Examples are raster charts are Raster Plus (RPL), BSB and GeoTIFF. Rasters are the scanned images of the original paper chart.

Rate of Turn (ROT)

The speed at which heading is changing.

Rhumb Line

A Rhumb Line is a line of constant bearing. Unlike great circles, rhumb lines are usually not the shortest path between two points on a sphere. Part of the utility of rhumb lines is that they can be drawn as straight lines on Mercator projections. Rhumb lines have the advantage of being easy to navigate because they follow a constant bearing. The parallels of the earth are examples of rhumb lines. Rhumb lines are undefined values at the poles.

A rhumb line of sufficient length will usually tend to spiral around the earth towards a pole forming a loxodrome. Such spiraling rhumb lines will form a logarithmic spiral on a polar stereographic projection.

ROT

See Rate of Turn.

Route

Desired path of travel, created on a chart or grid and consisting of starting, ending and any number of interim waypoints. The ECDIS can instruct a properly connected autopilot to steer along the path of a *Route*.

Scale

See Zoom.

Scroll

To move different parts of a long list into view, using the arrow buttons or scroll bar. In addition, scroll is often used as a synonym for pan.

Selected Target

Target selected manually or automatically for the display of detailed alphanumeric data, information and text in a separate user dialogue area. The target is represented by a “selected target” symbol.

SENC

See System Electronic Navigational Chart.

Set

The cumulative effect of wind and current on the direction of a ship.

Slack Water (Slack)

The state of a tidal current when its speed is hear zero, especially the moment when a current changes direction and its speed is zero.

Sleeping AIS Target

AIS target indicating the presence of a vessel equipped with AIS in a certain location. The target is represented by a “sleeping target” symbol indicating the vessel’s orientation. No additional information is presented until the AIS target is activated.

SOG

See Speed Over Ground.

Sonar (SOund Navigation And Ranging)

The usage of ultrasonic pulses to detect submersed objects by their reflection.

Sounder (also known as Fish Finder or Echo Sounder)

A Sounder uses ultrasonic pulses to detect the distance to the sea floor, calculating the time interval between signal transmission and the detected reflected signal.

Source Scale

The original scale of a paper chart from which an electronic chart is derived.

Standard Display

Level of information that should be shown when a chart is first displayed on ECDIS. The level of the information it provides for route planning or route monitoring may be modified by the user according to the user's needs.

STW

See Speed Through Water.

Speed Over Ground (SOG)

SOG is the actual, fixed, geographic speed of a ship over the earth's surface. It is essentially the *Speed Through Water (STW)*, plus the cumulative effect of wind and current.

Speed Through Water (STW)

STW is the relative speed of the vessel over water surface. *See also Speed Over Ground (SOG).*

Starboard

Starboard designates the right side of the boat as seen standing on the deck facing toward the bow. Starboard side is indicated with a green light.

Stern

The rear of a ship.

System Electronic Navigational Chart (SENC)

A database in the manufacturer's internal ECDIS format, resulting from the lossless transformation of the entire ENC contents and updates. It is this database that is actually accessed by ECDIS for the display generation and other navigational functions and is the equivalent of an up-to-date paper chart. The SENC may also contain information added by the mariner and information from other sources.

Target

In nautical terminology, a target is generally an obstacle or object in or near the water to avoid for the purpose of safe navigation.

TCPA

See Time to Closest Point of Approach.

Tidal Currents

Tidal currents (a horizontal motion) are a result of the rise and fall of the water level due to tides (a vertical motion). The effects of tidal currents on the movement of water in and out of bays and harbors can be substantial.

See Neap Tides.

Tide

The change in ocean levels due to gravitational influences external to the Earth. Formulas for calculating tides can be found in tide and current tables provided by NOAA and the British Admiralty.

Time to Closest Point of Approach (TCPA)

This is the time remaining until the closest point of approach of a target.

Time to Arrival (TTA)

The amount of time estimated until the ship reaches the end of route, assuming no intervening change in course or speed. Displayed in hours and minutes.

Time to Go (TTG)

The amount of time estimated until the ship reaches an active waypoint, assuming no intervening change in course or speed. Displayed in hours and minutes.

TTA

See Time to Arrival

TTG

See Time to Go.

UTC

Coordinated universal time.

Underscale

Display of the chart information at a display scale smaller than the compilation scale. Underscaling may arise from deliberate underscaling by the mariner, or from automatic underscaling by ECDIS in compiling a display when the data included is at various scales.

Universal Transverse Mercator Projection (UTM)

UTM is similar to the Mercator projection except the projecting cylinder is mapped transverse to the meridians and the Mercator projection used is a secant variation where the map scale to nominal scale is 0.9996.

The UTM segments the earth into 60 six degrees of longitude wide zones where the cylinder is oriented along the central meridian of a zone. The zones extend from 84ºN to 80ºS. The sixty zones start 180 degrees east and proceed eastward. The usage of zones allows the UTM projection to be used over the entirety of the Earth while minimizing distortion towards the poles.

User-added Electronic Chart Information

Electronic chart information manually entered by the user for presentation (for example, navigational notes, safety zones of interest, local notices to mariners, etc.)

Variable Range Marker (VRM)

Term describing a circle around the boat. When enabled, the VRM can be manually manipulated to change the radius.

Variation

Also known as Magnetic Variation and Declination. The angular difference in direction between true North and magnetic North.

Vector Chart

A chart where chart information is stored in terms of points, lines and polygons. NCX and TX-97 charts are vector chart formats.

Vertical Datum

For marine applications, a base elevation used as a reference from which to reckon heights or depths. It is called a tidal datum when defined in terms of a certain phase of the tide. Tidal datums are local datums and should not be extended into areas, which have differing hydrographic characteristics without substantiating measurements. In order that they may be recovered when needed, such datums are referenced to fixed points known as bench marks. (source: Our Restless Tides).

VRM

See Variable Range Marker.

Waypoint

A set of coordinates that identify a point in physical space. The ship, when following a route, steers by successive waypoints.

WDir (Wind Direction)

The direction from which the wind blows across the earth’s surface with respect to north.

WP, WPT

See Waypoint

WSpd (Wind Speed)

The speed of the wind.

XTE

See Cross Track Error.

Zoom

To change the apparent scale of a chart in the chart view.

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