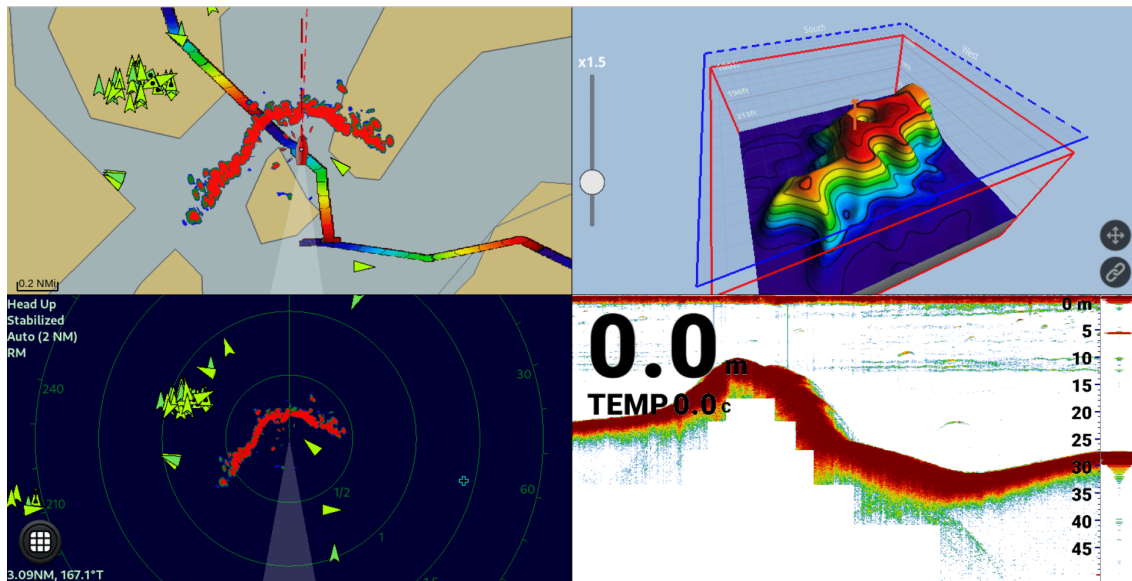


DEEPPREY®

Chartplotter User Manual

Version 1.0 April 2026

Deepry Research Ltd



Deepry MFD interface overview

Acknowledgements

The Deeprey navigation software that runs on the Deeprey MFD is built on **OpenCPN**, the open-source marine navigation platform created and maintained by a global community of developers and mariners. We run the current live upstream release of OpenCPN without forking or modification, and add the Deeprey plugins on top to provide the navigation interface, instruments, sonar, bathymetry, dashboard, and video features described in this manual.

Our special thanks go to the founders and members of OpenCPN's community for their guidance, review and continued support throughout the design and development of the Deeprey MFD.

OpenCPN is, and remains, an independent open-source project. It is released under the GNU General Public License and continues to be freely available to download, install, and use on desktop and other platforms, entirely separately from Deeprey. The Deeprey software is one of many products that integrate OpenCPN; this does not change OpenCPN's availability, licensing, or governance for any other user. Source code, downloads, documentation, and community forums are at <https://opencpn.org> and <https://github.com/OpenCPN/OpenCPN>. We encourage every Deeprey user to learn about and, where possible, contribute to the OpenCPN project.

Legal Notices

Copyright © 2026 Deeprey Research Ltd. All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form without the prior written permission of Deeprey Research Ltd, 124 City Road, London EC1V 2NX, United Kingdom (Registered in England and Wales No. 15929253).

Trademarks Deeprey™ and the Deeprey logo are trademarks of Deeprey Research Ltd. OpenCPN is a trademark of the OpenCPN project. o-charts is a trademark of o-charts.org. All other trademarks are the property of their respective owners.

Disclaimer The information in this manual is provided ``as is" and is subject to change without notice. Deeprey Research Ltd makes no warranty of any kind with regard to this manual, including but not limited to the implied warranties of merchantability and fitness for a particular purpose. Deeprey Research Ltd shall not be liable for errors contained herein or for incidental or consequential damages in connection with the furnishing, performance, or use of this material.

Governing language In the event of any discrepancy between translations, the English-language version of this manual shall prevail.

Further information Full license texts, open-source attributions, and regulatory declarations are provided in Chapter 19 --- Regulatory & Legal Notices.

Contents

1	Introduction	11
1.1	About this manual	11
1.1.1	Document conventions	11
1.1.2	Safety symbols used in this manual	11
1.2	System requirements	11
1.2.1	Minimum hardware	11
1.2.2	Network requirements	12
1.3	Supported hardware	12
1.3.1	Multi-vendor radar support	12
1.3.2	Sonar transducers	12
1.3.3	IP cameras	12
1.4	Built on OpenCPN	12
1.5	Regulatory notices	13
1.6	Revision history	13
2	Safety Information	14
2.1	Safety warnings	14
2.2	Electrical safety guidelines	15
3	Getting Started	16
3.1	Powering on and off	16
3.1.1	Turning on	16
3.1.2	Shutting down	16
3.2	First-time setup	16
3.3	Using touch gestures	16
3.3.1	Basic gestures	16
3.3.2	Edge swipes	17
3.3.3	Context menus	17
3.4	The main chart canvas	18
3.5	Navigating the home screen	18
3.5.1	Opening and closing the home menu	18
3.6	System control panel	20
3.6.1	Opening the system control panel	20
3.6.2	Taking a screenshot and exporting to USB	20
3.6.3	Managing WiFi connections	20
4	Display and Layout	22
4.1	Understanding workspace layouts	22
4.1.1	Available canvas types	23
4.2	Using Views	23
4.3	Using Combo Views	24
4.3.1	Preset combo layouts	24
4.4	Creating custom layouts	25
4.4.1	Deleting a custom combo	25
4.5	Overlay behavior	26
5	Instruments Bar	27
5.1	Overview	27
5.1.1	Showing and hiding the bar	27
5.2	Instrument styles and data types	27
5.2.1	Available data reference	28
5.3	Customizing the bar	31
5.3.1	Adding instruments	31
5.3.2	Modifying existing instruments	32
6	Charts	33

6.1	The chart canvas	33
6.2	Navigating the chart	35
6.2.1	Pan and zoom	35
6.2.2	Orientation modes	35
6.2.3	True motion and look ahead	35
6.3	Built-in basemaps	35
6.4	Chart types	36
6.5	Loading and managing charts	36
6.5.1	Importing from USB	36
6.5.2	Downloading via Chart Manager	36
6.5.3	Authorizing and downloading O-Charts	37
6.5.4	Updating charts	38
6.5.5	Removing or deactivating charts	38
6.6	Configuring vector chart display	39
6.6.1	Vector chart layers (sidebar)	39
6.6.2	Display category	39
6.6.3	Boundaries	39
6.6.4	Chart quilting	39
6.6.5	Text and symbol options	39
6.6.6	Depth contours	40
6.7	Chart object information	40
6.8	Chart context menu	41
6.9	Chart overlays	41
7	Waypoints, Routes, and Tracks	42
7.1	Understanding waypoints, routes, tracks, and layers	42
7.2	Managing waypoints	44
7.2.1	Creating a waypoint	44
7.2.2	Waypoint context menu	44
7.2.3	Moving a waypoint	44
7.2.4	Waypoint list	45
7.2.5	Waypoint actions	47
7.2.6	Waypoint properties	47
7.3	Managing routes	49
7.3.1	Creating a route	49
7.3.2	Route context menu	50
7.3.3	Route list	51
7.3.4	Route actions	51
7.3.5	Route properties	52
7.3.6	Activating a route	53
7.4	Managing tracks	54
7.4.1	Recording a track	54
7.4.2	Track context menu	54
7.4.3	Track list	55
7.4.4	Track actions	56
7.4.5	Track properties	56
7.4.6	Creating a route from a track	57
7.5	Managing layers	58
7.5.1	Layer list	58
7.5.2	Layer actions	59
7.5.3	Layer properties	59
7.5.4	Importing and exporting GPX files	59
7.6	Waypoint and track settings	60
7.6.1	Waypoint display settings	60
7.6.2	Track recording settings	60
8	Navigation	61
8.1	Understanding navigation	61
8.1.1	Navigation terminology	61

8.2	Reading the navigation display	62
8.2.1	The steering guidance widget	63
8.2.2	Enabling or disabling steering guidance	63
8.3	Starting navigation	64
8.3.1	Navigate to an existing waypoint	64
8.3.2	Navigate to a chart position	64
8.3.3	Activate a saved route	64
8.4	Following an active route	64
8.4.1	Waypoint advance	64
8.4.2	Persisting the active route across restarts	65
8.5	Chart orientation while navigating	65
8.6	Stopping navigation	65
8.7	Navigation settings	66
9	Dashboard	67
9.1	What the Dashboard Pane Is	67
9.2	Opening the Dashboard	67
9.3	The Four Presets	68
9.4	Reading the Gauges	69
10	Radar	71
10.1	Understanding marine radar	71
10.1.1	Radar terminology	71
10.2	Supported radar scanners	72
10.3	The radar canvas and sidebar	72
10.3.1	The Radar Options sidebar	74
10.4	Operating the radar	76
10.4.1	Transmit and standby	76
10.4.2	Adjusting range	76
10.4.3	Orientation	76
10.4.4	Bearing reference	76
10.4.5	Timed transmit	77
10.4.6	Blocking a bearing sector	77
10.5	Tuning the radar image	78
10.5.1	Gain	78
10.5.2	Sea clutter	78
10.5.3	Rain clutter	78
10.5.4	Tuning workflow	79
10.5.5	Advanced controls	79
10.6	Targets on the PPI	80
10.6.1	Showing AIS and ARPA on the PPI	80
10.6.2	Target trails	80
10.6.3	Tracking targets (ARPA)	82
10.7	Measuring with EBL and VRM	84
10.7.1	Placing an EBL/VRM	85
10.7.2	Moving an EBL/VRM	85
10.7.3	Clearing an EBL/VRM	85
10.8	Guard zones	85
10.8.1	Configuring a guard zone	86
10.8.2	Enabling and disabling	88
10.8.3	Alarm behaviour	88
10.9	Radar overlay on chart	89
10.9.1	Enabling the overlay	89
10.9.2	Overlay appearance	90
10.10	Radar context menu	90
10.11	Radar settings	91
10.11.1	Installation	91
10.11.2	Parameters	93
10.11.3	Display Colors	94

11 AIS	95
11.1 Understanding AIS	95
11.1.1 How AIS works and target classes	95
11.2 Reading AIS targets on the chart	96
11.2.1 Target symbols and visual states	96
11.2.2 Tapping a target for details	99
11.3 AIS target list	100
11.3.1 Sorting and filtering	101
11.3.2 Create Waypoint from target	102
11.3.3 Center View on target	102
11.4 CPA and TCPA	102
11.4.1 Warning distance and time settings	102
11.4.2 CPA lines on chart	102
11.4.3 Responding to CPA / TCPA alerts	103
11.5 Target tracks	104
11.5.1 Showing a track for a vessel	104
11.6 AIS target context menu	105
11.7 AIS alerts	107
11.8 AIS settings	108
11.8.1 Display and rendering	108
11.8.2 CPA and TCPA thresholds	108
11.8.3 Anchored and moored suppression	108
11.8.4 Target attenuation	109
11.8.5 Target lifecycle	109
11.8.6 Alert behaviour	109
11.8.7 Tooltip content	109
11.8.8 WPL / APRS interoperability	110
11.9 AIS SART distress signals	111
11.9.1 What Deeprey does when a SART is received	111
11.10 AIS transponder --- transmit	112
12 Sonar (Fishfinder)	113
12.1 Understanding Sonar Basics	113
12.2 Connecting a Transducer	113
12.2.1 Supported Transducers	114
12.2.2 About the Transducer	114
12.2.3 When the Sonar Doesn't Connect	115
12.3 Reading the Sonar Display	115
12.3.1 Elements of the Sonar Display	115
12.3.2 What You See on the Waterfall	116
12.4 Sidebar Controls	117
12.4.1 Depth Range (Auto and Manual)	117
12.4.2 Gain (Auto and Manual)	118
12.4.3 Scroll Speed	118
12.4.4 Color Palette	119
12.4.5 A-Scope Visibility	120
12.4.6 Noise Rejection	120
12.4.7 Split Screen	120
12.5 Fish Detection	122
12.5.1 Opening the Controls	122
12.5.2 Reading the Display	122
12.5.3 Controls	123
12.5.4 Behaviour Notes	124
12.6 Canvas Gestures	125
12.6.1 Zoom	125
12.6.2 Reviewing Sonar History	125
12.6.3 Context Menu	126
12.7 Recording	127
12.8 Sonar Settings	127

12.8.1 Display Options	127
12.8.2 Parameters	128
13 Bathymetric Survey	129
13.1 Understanding Bathymetric Survey	129
13.2 Recording Live Data	130
13.2.1 The On-Chart Info Bar	131
13.3 Configuring Data Quality Filters	132
13.3.1 The Four Filters	132
13.3.2 Filter Statistics	133
13.4 Adjusting the Display	133
13.4.1 Depth Range (Manual and Auto)	133
13.4.2 Brush Size (Fixed and Dynamic Mode)	134
13.4.3 Visualization	136
13.5 Configuring Shadows	138
13.6 Configuring Isobath Contour Lines	139
13.6.1 Enable, Mode, and Labels	139
13.6.2 Appearance	140
13.6.3 Custom Depths	140
13.7 Using Presets	141
13.7.1 Applying, Saving, Renaming, and Deleting Presets	141
13.8 Managing the Bathymetry Database	142
13.8.1 STATUS	143
13.8.2 DATA TRANSFER	143
13.8.3 MAINTENANCE	144
13.9 Using the 3D Terrain Cube	145
13.9.1 Opening the 3D View	145
13.9.2 Rotating, Zooming, and Vertical Exaggeration	146
13.9.3 2D Sync Mode	146
13.10 Reading a Seabed Depth Profile	148
13.10.1 Opening a Profile	148
13.10.2 Anatomy of the Profile Panel	148
13.10.3 Dropping a Mark on a Feature	149
13.10.4 Closing the Profile	149
14 Weather and Meteogram	150
14.1 Weather Forecasts in Deeprey	150
14.2 Downloading a Forecast	151
14.2.1 Model, Duration, and Coverage Area	151
14.3 Navigating the Weather Timeline	152
14.3.1 Timestamp, Slider, Step, and Play Controls	152
14.4 Configuring Weather Layers	153
14.4.1 Layers and Display Toggles	153
14.4.2 Recommended Starting Combinations	154
14.4.3 Reading Wind Barbs	154
14.4.4 Heatmap Color Legends	155
14.4.5 Advanced Controls	155
14.5 Reading Weather Data at Cursor	155
14.6 Using the Meteogram Panel	156
14.6.1 Opening and Selecting a Forecast Location	156
14.6.2 Available Lanes	157
14.6.3 Wind Gradient Visualisation and Direction Arrows	158
14.6.4 Day / Night Timeline Overlay	159
14.6.5 Weather Icon Reference	159
14.6.6 Reading Exact Values (Tap-and-drag)	160
14.6.7 Weather Along a Route	161
14.7 Glossary of Weather Terms	163
15 Tide and Current	164

15.1 Tide and Current in Deeprey	164
15.2 Showing Tide and Current Stations on the Chart	164
15.3 The Tide and Current Dialog	165
15.3.1 Anatomy	166
15.3.2 HUD Panel	166
15.3.3 Graph Panel	167
15.3.4 Station Data Card	168
15.3.5 Today's Events	169
15.3.6 Date Navigation	169
15.4 Units and Tide-Datum Correction for Sonar	169
16 Video Camera	170
16.1 What the Video Camera Pane Is	170
16.2 Opening the Pane	170
16.3 Anatomy of the Sidebar	172
16.4 Connecting to a Camera	173
16.4.1 ONVIF Auto-Discovery	173
16.4.2 Manual RTSP	173
16.5 Playback	173
16.5.1 Steering a Camera (Pan-Tilt-Zoom)	174
16.6 AI Object Detection	175
17 Global Settings	177
17.1 Opening Settings	177
17.2 Anatomy of the Settings Screen	177
17.2.1 The Seven Top-Level Categories	178
17.2.2 How the Controls Work	178
17.3 General	178
17.3.1 User Interface	178
17.3.2 Units	179
17.3.3 Sounds	180
17.3.4 Advanced	180
17.3.5 Software Update	181
17.4 Network	181
17.4.1 Network Setup	181
17.4.2 Data Source Priorities	185
17.4.3 Real-time Data Feed	186
17.4.4 Advanced Settings	186
17.5 Vessel	187
17.5.1 My Vessel	187
17.5.2 Routes and Waypoints	188
17.5.3 AIS	188
17.6 Charts	188
17.7 Radar	188
17.8 Sonar	189
17.9 About	189
18 Maintenance and Troubleshooting	190
18.1 Keeping the Software Up to Date	190
18.2 Device Information and Diagnostics	190
18.2.1 About --- the Identity Card	191
18.2.2 Diagnostics & Support	191
18.2.3 Legal	191
18.3 Remote Support	191
18.4 Troubleshooting	192
18.5 Caring for the Display	193
19 Regulatory & Legal Notices	195
19.1 Disclaimer and limitation of liability	195

19.2 End-User License Agreement (EULA)	195
19.3 Open-source software licenses	195
19.4 Electronic chart data and cartography licenses	196
19.5 Regulatory approvals	196
19.5.1 European Union --- CE marking	197
19.5.2 United Kingdom --- UKCA marking	197
19.6 Environmental compliance	197
19.6.1 RoHS	197
19.6.2 WEEE	197
19.6.3 REACH	197
19.6.4 Packaging	197
19.7 Warranty	198
19.8 Technical accuracy	198
19.9 Publication copyright	198

A Glossary	199
-------------------	------------

1

Introduction

About this manual

This manual describes the operation and configuration of the Deeprey MFD multifunction display system. It is intended for vessel owners, captains, and marine technicians who operate or maintain the system.

The manual covers software version 1.0.

Document conventions

The following conventions are used throughout this manual:

- **Bold text** indicates a button name, menu item, or on-screen label
- *Italic text* indicates a setting value or file name
- Menu paths are written as: **Settings** > **General** > **Units**
- Section cross-references appear as: see *Charts* on page XX

Safety symbols used in this manual

Three types of safety notices appear throughout this manual. Each has a distinct color and label so it can be identified at a glance:

**Danger**

Immediate hazard that will result in death or serious injury if not avoided.

**Warning**

Hazardous situation that could result in injury or equipment damage.

**Note**

Important operating information, helpful tip, or cross-reference to related content.

System requirements

Minimum hardware

Refer to the hardware documentation supplied with your Deeprey MFD unit for detailed specifications.

Network requirements

Connection	Purpose
Ethernet	Radar scanner, sonar transducer, IP camera
WiFi	Software updates, chart downloads, weather data
NMEA 2000 (CAN bus)	Primary vessel network: GNSS position, heading, AIS, instrument data (wind/depth/speed), and engine/tank telemetry
NMEA 0183 (Serial)	Legacy sensor integration: VHF DSC data, external GPS receivers, and older navigational instruments
USB	Charts, GPX and XYZ files, screenshots, system upgrade

Supported hardware

Multi-vendor radar support

Deeprey supports radar scanners from a number of manufacturers through Ethernet. The system auto-detects the scanner type.



Note Only one radar scanner can be active at a time. Connect the scanner to the Ethernet port and the system will detect it automatically.

Sonar transducers

The sonar module supports a range of Airmar transducers connected via Ethernet. Transducer type and frequency are detected automatically. Supported features include single-channel fishfinder with waterfall display, A-Scope, and split-screen bottom zoom/lock modes.

IP cameras

Any IP camera that supports RTSP streaming can be used. For automatic network discovery and PTZ control, the camera must support the ONVIF protocol. No proprietary camera hardware is required.

Built on OpenCPN

The Deeprey navigation software combines the proven **OpenCPN** chartplotter engine with the Deeprey navigation interface and instrument suite. OpenCPN (<https://opencpn.org>) is a mature, widely-used open-source marine navigation platform and provides the core charting, routing, NMEA, and AIS capabilities. The Deeprey plugins, developed by Deeprey Research Ltd, supply the on-screen interface and the radar, sonar, bathymetry, dashboard, and video features. Together they form the software that ships on, and runs on, every Deeprey MFD.

Deeprey uses the current live upstream release of OpenCPN without forking or modifying it, so that the Deeprey software stays in step with the ongoing work of the OpenCPN community. This architecture, and the close collaboration with the OpenCPN project that made it possible, is described in the Acknowledgements at the front of this manual. Full licensing information is provided in Chapter 19.

OpenCPN remains an independent open-source project and continues to be freely available to download and use on desktop and other platforms, entirely separately from Deeprey. The Deeprey software is one of several products built on OpenCPN; this does not change OpenCPN's availability or licensing for any other user.

Regulatory notices

Regulatory, licensing, warranty, and environmental-compliance information for the Deeprey MFD is provided in Chapter [19](#) --- Regulatory & Legal Notices.

Revision history

Version	Date	Description
1.0	April 2026	Initial release

2

Safety Information

**Danger**

Read this chapter completely before operating the Deepry MFD. Failure to observe these safety warnings may result in injury, death, or damage to equipment.

Safety warnings

**Warning: Safe Navigation**

- **Navigation Aid Only:** This product is intended only as an aid to navigation and must never be used in preference to sound navigational judgment. It is not a substitute for official nautical charts and publications, proper voyage planning procedures, qualified watchkeeping, or compliance with COLREGS and SOLAS requirements. The captain is responsible for the safe navigation of the vessel at all times.
- **Maintain a Permanent Watch:** Always maintain a proper lookout as required by the International Regulations for Preventing Collisions at Sea (COLREGS). Never rely solely on a single source of position information. Use radar, visual bearings, and depth soundings to confirm GPS position.
- **Electronic Chart Accuracy:** Electronic charts may contain inaccuracies or omissions. Chart data from third-party providers is not guaranteed to be error-free. Always cross-reference with official government charts, notices to mariners, and visual observations.
- **Distraction:** Do not allow the multifunction display to distract your attention from safe navigation. Any distraction while navigating increases the risk of collision. Give navigation your full attention at all times.

**Warning: Equipment Hazards**

- **Sonar Transducer Safety:** Never touch the transducer face when the sonar is powered on. Switch off the sonar if divers or swimmers are likely to be within 7.6 m (25 ft) of the transducer.
- **Radar Radiation:** The radar scanner emits microwave radiation. Maintain a safe distance from the antenna when transmitting. Switch the radar to **Standby** or **Off** before performing any work near the antenna. Never look directly at a rotating antenna. Do not allow personnel to remain within the direct beam for extended periods. Refer to the radar manufacturer's documentation for safe distance specifications.
- **Display Brightness:** Switching from Night mode to Day mode instantly increases the display brightness to maximum. This may temporarily impair the operator's night vision. Allow your eyes to adjust before resuming navigation duties.

Deepry Research Ltd accepts no liability for accidents, property damage, or loss of life resulting from the use of this system.

Electrical safety guidelines

- Ensure all electrical connections are properly grounded according to marine electrical standards (ABYC E-11 or equivalent).
- Use appropriately rated fuses or circuit breakers on all power supply lines.
- Do not open the display unit. There are no user-serviceable parts inside. Refer all repairs to qualified marine electronics technicians.
- Protect all connections from water ingress. Use appropriate marine-grade connectors and cable glands.
- Disconnect power before making any wiring changes.

3

Getting Started

Powering on and off

Turning on

Press and hold the power button for 2 seconds. The display shows the Deeprey logo during boot, followed by the home screen with the default chart canvas.

Shutting down

1. Open the **System Control Panel** (see page 20)
2. Tap **Power Off**

Alternatively, long-press the power button (2 seconds) to shut down.



Warning Always use the software shutdown procedure. Do not disconnect power while the system is running, as this may corrupt configuration data.

First-time setup

On first startup, configure the following basic settings:

1. Select your preferred **language** (**Settings** > **General** > **Language**)
2. Set **measurement units** (**Settings** > **General** > **Units**) --- distance, speed, depth, temperature
3. Enter your **vessel dimensions** (**Settings** > **Vessel**)
4. Connect **NMEA sensors** (**Settings** > **Network**)



Note For detailed sensor and network configuration, see [Chapter 17](#) --- Global Settings.

Using touch gestures

Basic gestures

Gesture	Action
Tap	Select an item, press a button, open a dialog
Long-press	Open the context menu at the pressed location
Pan	Drag with one finger to move the chart or radar display
Pinch	Pinch with two fingers to zoom in or out

Edge swipes

Swipe	Action
Right edge, swipe left	Open the Instruments Bar (Chapter 5)
Bottom edge, swipe up	Open the Home Menu

Context menus

Long-press to open a context-specific menu. The items shown depend on the canvas and the object under your finger.

Chart canvas

Chart	Drop Mark, Meteogram (when GRIB data is visible), Measure / Measure Off, New Route, Move Boat Here (when GPS is invalid), Navigate To Here, Center View
Waypoint	Properties, Delete, Navigate To This, Center View
Route	Properties, Activate / Deactivate, Insert Waypoint, Append Waypoint, Delete, Hide / Show Waypoint Names, Center View
Track	Properties, Delete, Route from Track, Center View
AIS target	Target Query, Hide / Show Target CPA, Target List, Hide / Show Target Track, Center View



Note During route creation, the context menu changes to show only **Finish Route** and **Cancel Route**.

Radar canvas

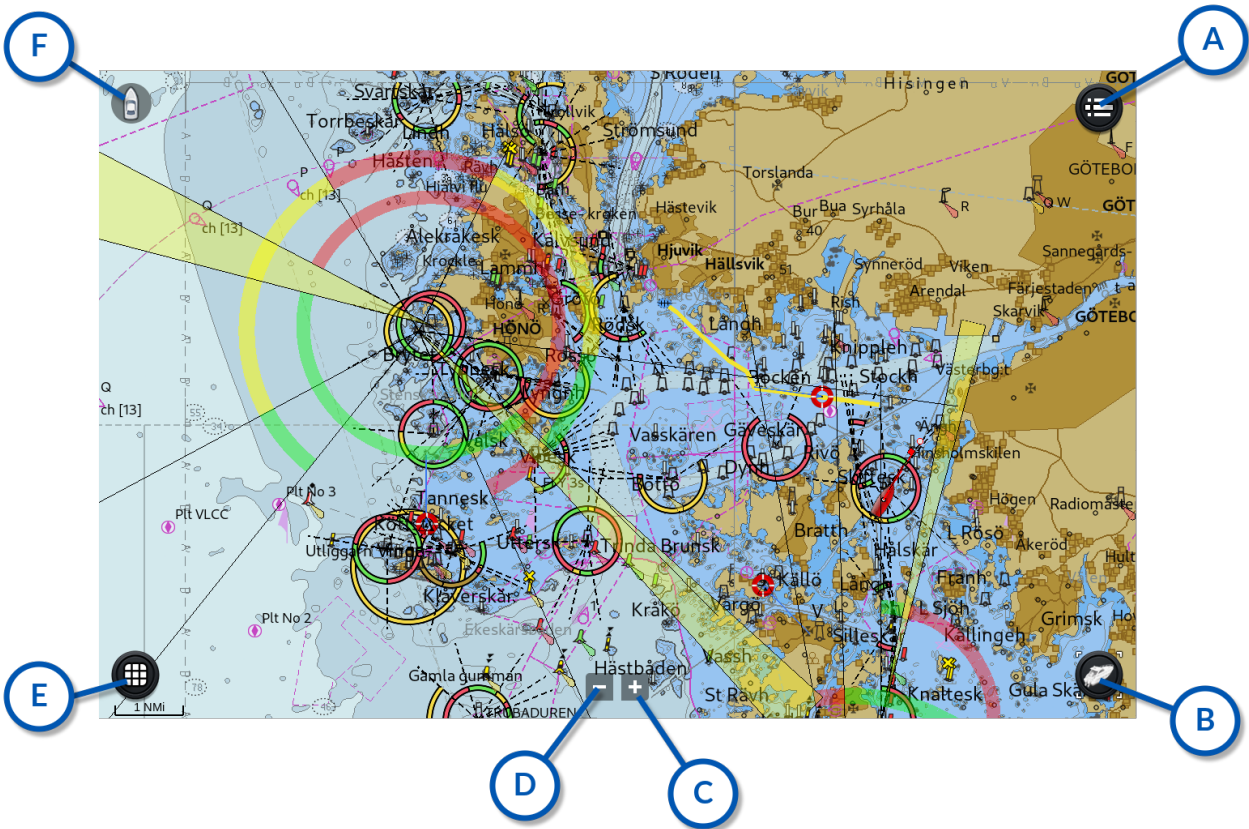
Radar	Clear Cursor, Acquire Target, Delete Target, Delete All Targets, Place EBL/VRM 1, Place EBL/VRM 2, Enable / Disable Guard Zone 1, Enable / Disable Guard Zone 2
--------------	---

Sonar canvas

Sonar	Drop Mark, Screenshot
--------------	-----------------------

The main chart canvas

After startup, the default view is a full-screen chart canvas. The following overlay controls are available:



A	Chart menu button. Opens the chart sidebar with display settings and layer controls.
B	Course button. Centers the chart on the vessel and aligns to current heading.
C	Zoom in button. Tap to increase the chart zoom level.
D	Zoom out button. Tap to decrease the chart zoom level.
E	Home button. Opens the home menu for layout switching, settings, and system controls.
F	Compass indicator. Shows chart orientation (North Up, Course Up, or Head Up). Tap to cycle between modes.

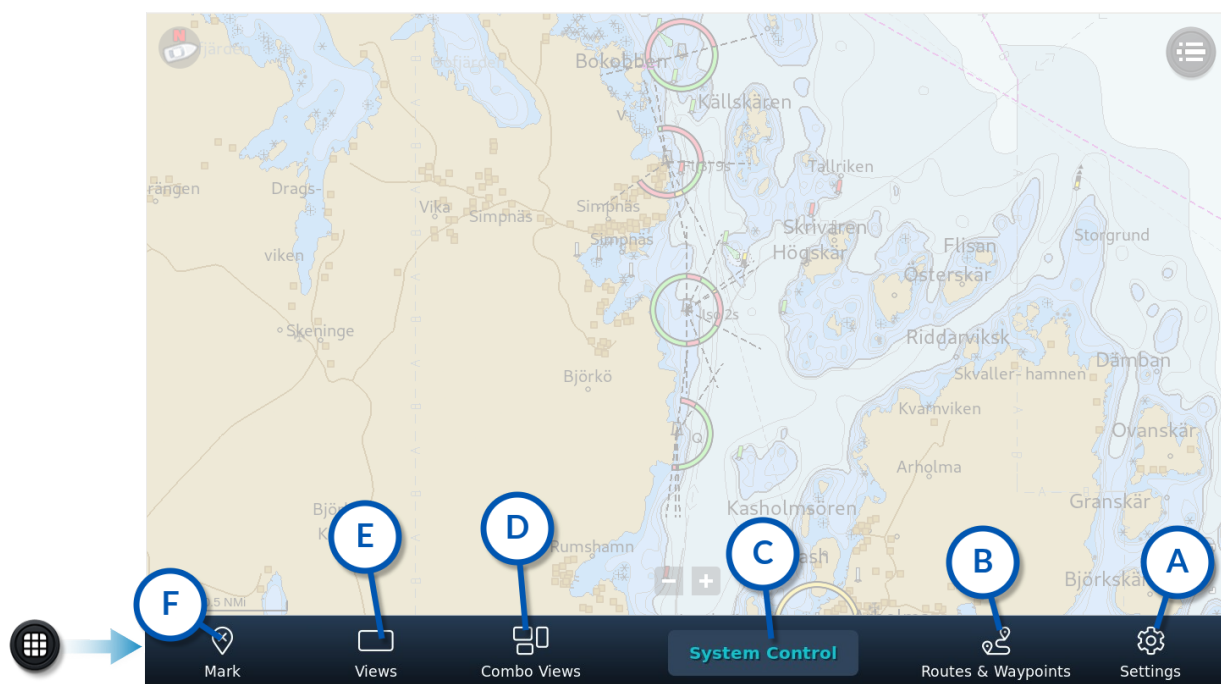
Navigating the home screen

Opening and closing the home menu

The home menu provides quick access to workspace views, combo views, routes & waypoints, system controls, and settings.

- **Open:** Tap the home button in the bottom-left corner of any canvas, or swipe up from the bottom edge of the screen

- **Close:** Tap anywhere outside the menu

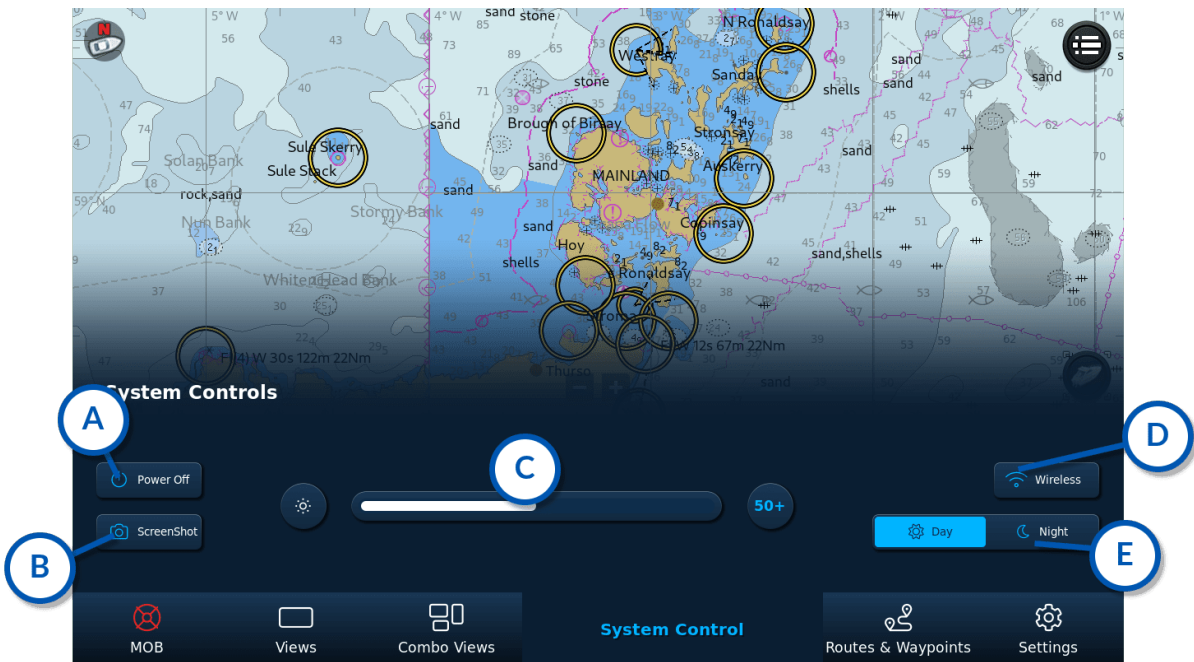


(A)	Settings. Opens the global settings panel (Chapter 17).
(B)	Routes & Waypoints. Opens the route, waypoint, track, and layer manager (Chapter 7).
(C)	System Control. Opens the system control panel for brightness, day/night, WiFi, and power.
(D)	Combo Views. Select a combo view or create custom canvas combinations (Chapter 4).
(E)	Views. Select a single canvas view (Chapter 4).
(F)	MOB. Activate the Man Overboard alarm and mark the current boat position.

System control panel

Opening the system control panel

Tap **System Control** in the Home Menu to open the system control panel. The panel appears above the home menu bar.



A	Power Off. Shut down the system safely.
B	ScreenShot. Capture the current screen and optionally export it to a USB drive.
C	Brightness slider. Slide left to decrease, right to increase the display backlight. The current percentage is shown beside the slider.
D	Wireless. Open the WiFi panel to scan, connect, and manage wireless networks.
E	Day / Night toggle. Switch between day mode (light colours) and night mode (dark red colours).

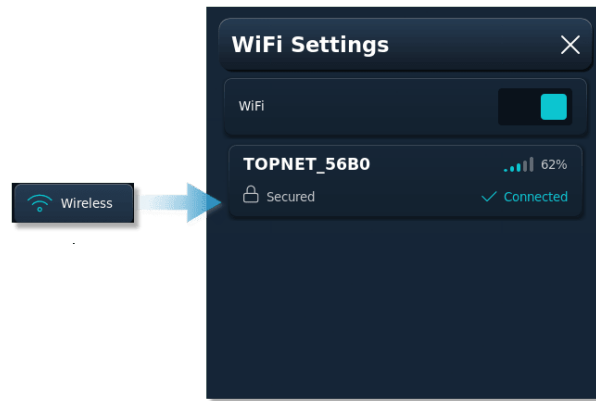
Taking a screenshot and exporting to USB

1. Tap **ScreenShot** in the system control panel
2. The screen is captured and saved to internal storage
3. A dialog asks whether to export to USB
4. Insert a USB drive and confirm to copy the screenshot

Managing WiFi connections

WiFi is required for chart downloads, weather data, and software updates.

1. Tap **Wireless** in the system control panel
2. The system scans for available networks
3. Select your network from the list and enter the password
4. Connection status and signal strength appear in the Wireless panel



4

Display and Layout

Understanding workspace layouts

The display can show one or more canvases at the same time. Layouts are organized into two categories accessible from the home menu:

Category	Description
Views	Single full-screen canvases. One canvas fills the entire display.
Combo Views	Preset or custom multi-canvas layouts combining two to four canvases side by side.

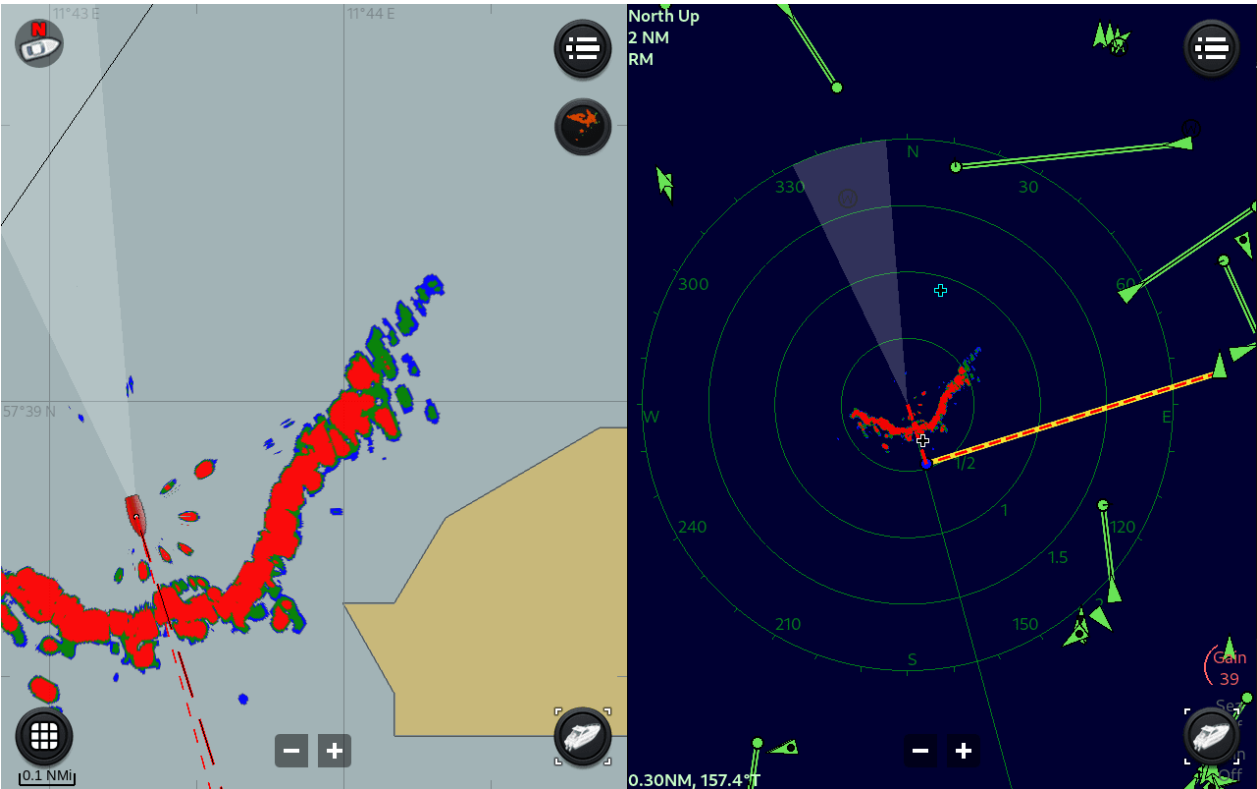


Chart and Radar combo layout --- nautical chart alongside a radar PPI view

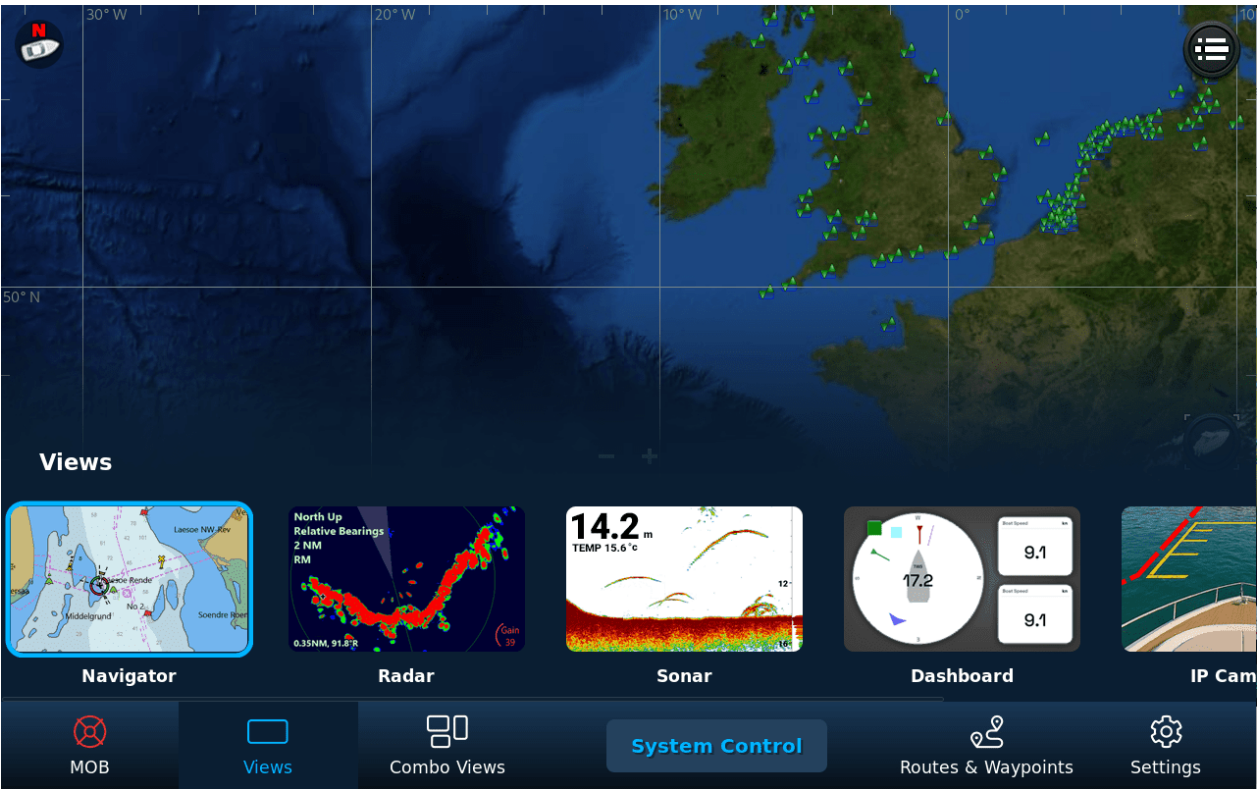
Available canvas types

Each canvas can display one of the following types:

Canvas Type	Description
Navigator	Nautical chart display with vessel position, AIS targets, and route overlay
Radar	Radar PPI display from a connected scanner
Sonar	Fishfinder waterfall display from a connected sonar transducer
Dashboard	Customizable gauge display with real-time sensor readouts
IP Camera	Live video feed from an IP camera (ONVIF/RTSP)
3D Bathy	Real-time 3D bathymetric terrain visualization

Using Views

Tap **Views** in the home menu to see the available single-view options. Each view fills the entire screen with one canvas.



Views menu showing available canvas types. Swipe left to see more views.

Tap a view to switch immediately. The previous view state is remembered --- switching back restores your position and settings.

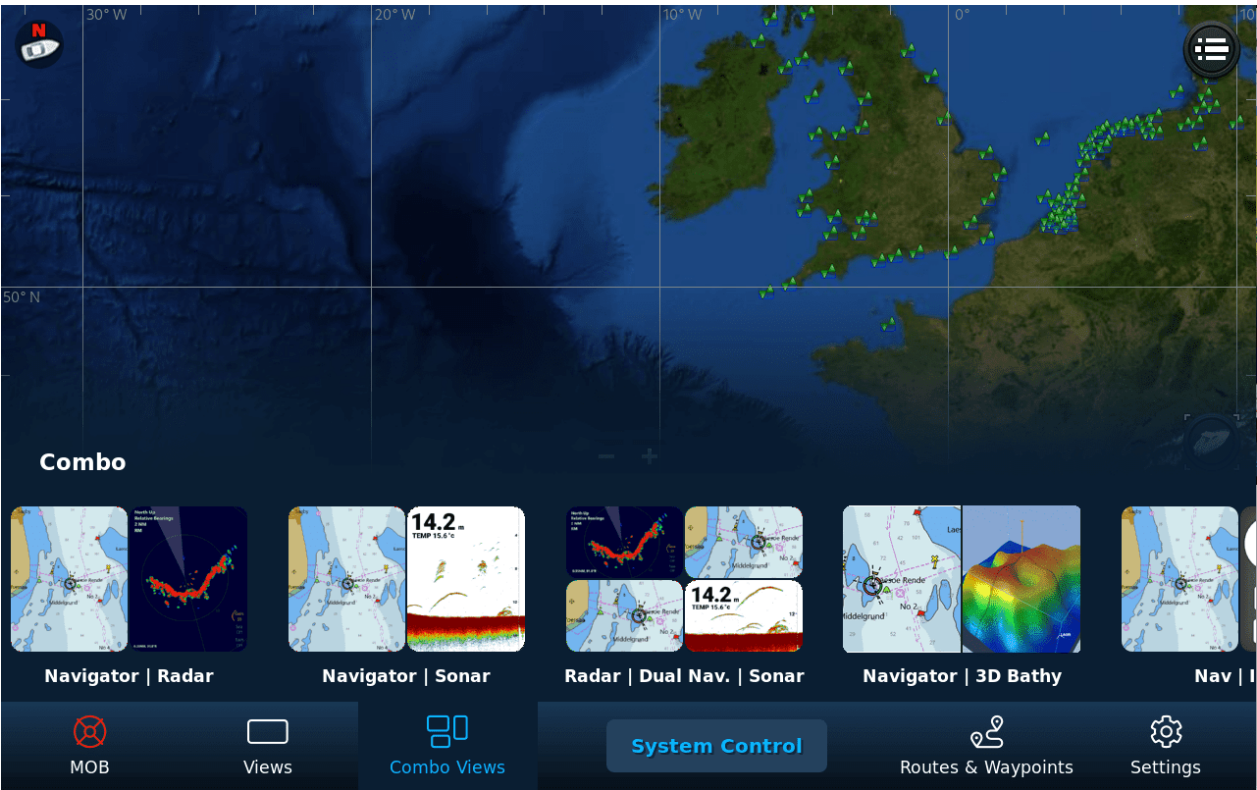
Using Combo Views

Tap **Combo Views** in the home menu to see multi-canvas layout presets.

Preset combo layouts

The following preset combinations are available:

Combo	Canvases
Navigator Radar	Chart and radar side by side
Navigator Sonar	Chart and fishfinder side by side
Navigator 3D Bathy	Chart and 3D bathymetry terrain side by side
Radar Dual Nav. Sonar	Four canvases: radar, two charts, and fishfinder

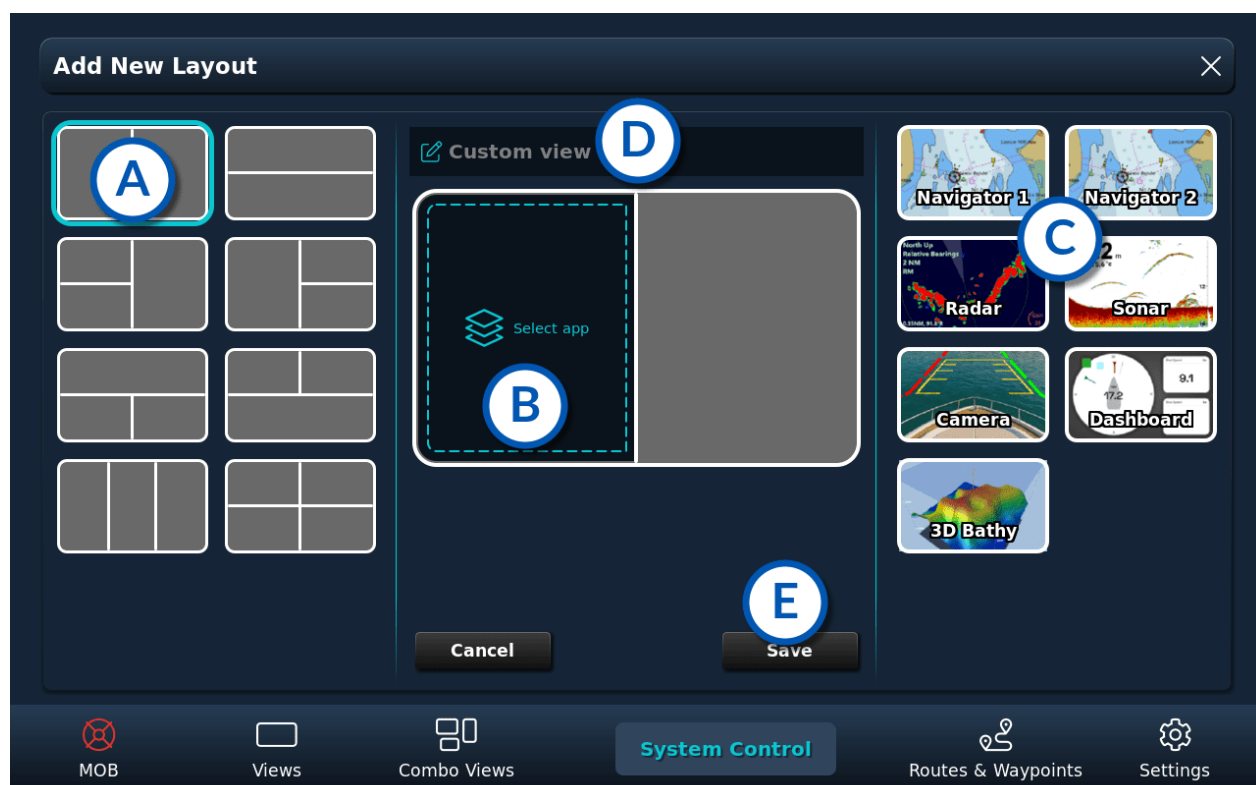


Combo Views menu showing preset multi-canvas layouts. Swipe left to see more combos.

Creating custom layouts

You can build a multi-canvas workspace tailored to your specific navigation needs.

1. Open the home menu, tap **Combo Views**, and select **Add New Layout**.
2. Select a canvas arrangement from the **Grid Templates** (A).
3. Tap an empty **Canvas Slot** (B) in the preview area to highlight it.
4. Tap a canvas type in the **Canvas Picker** (C) to assign it to the slot.
5. Once all canvas slots are assigned, optionally tap the **Layout Name** (D) field to enter a custom name. If left empty, a default name is generated automatically.
6. Tap **Save** (E) to add the new layout to your home menu.

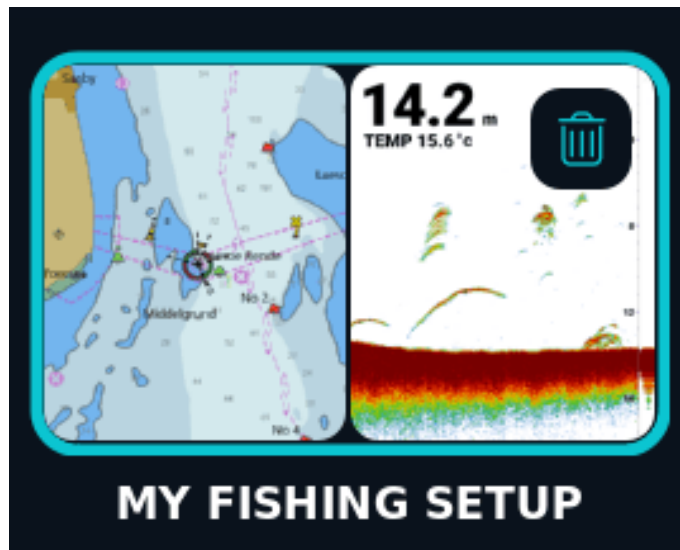


Custom layout editor showing templates (A), preview slot (B), canvas picker (C), naming field (D), and save/cancel (E).

Deleting a custom combo

Custom layouts can be removed from the Combo Views menu at any time.

1. Open the home menu and tap **Combo Views**.
2. Tap the custom combo tile you wish to delete to make it active.
3. Tap the **trash icon** that appears in the top-right corner of the tile.
4. Confirm the deletion by tapping **Yes** in the confirmation dialog.



Warning Deleting a custom combo is permanent and cannot be undone. You will need to rebuild the layout manually if it is deleted by mistake.

Overlay behavior

The system uses three visual cues to help you focus on the active content:

Auto-hide

Overlay controls (home button, zoom buttons) fade after a period of inactivity. Touch the screen to bring them back. This feature can be toggled in **Settings > General**.

Canvas dimming

In multi-canvas layouts, when a menu is open on the active canvas, the other canvases are dimmed with a diagonal hatching overlay to visually distinguish them. Close the menu to restore normal display. This feature can be toggled via **Dim Inactive Canvases** in **Settings > General**.

5

Instruments Bar

Overview

The Instruments Bar is a vertical sidebar that displays real-time sensor data. It appears on the right side of any active canvas (Chart, Radar, Sonar, etc.), allowing you to monitor key vessel data without leaving your primary navigation view.



The Instruments Bar (right) providing persistent sensor data over a chart canvas.

Showing and hiding the bar

- **Swipe** left from the right edge of the screen to open
- **Close:** Tap the **X** icon at the top of the bar to hide it
- **Toggle** in **Settings > General > Navigation Bar**

When hidden, the full screen width is available for canvases.

Instrument styles and data types

Each instrument slot can be configured to show one of four display styles:

Style	Description
Digital	A large, clear numeric readout with unit labels
Gauge	A circular needle display with color-coded safety scales
Cursor Position	Real-time coordinates of the cursor on the chart
GPS Status	Satellite count, signal bars, and position accuracy

Available data reference

The default layout shows 6 instruments. The following data types are available. Each instrument can be displayed in digital format, gauge format, or both depending on the data type.

Wind

Code	Name	Format	Description
AWA	Apparent Wind Angle	Digital, Gauge	Wind angle relative to bow, as measured by the wind sensor
AWS	Apparent Wind Speed	Digital, Gauge	Wind speed as measured at the sensor
TWA	True Wind Angle	Digital, Gauge	Wind angle corrected for boat speed
TWS	True Wind Speed	Digital, Gauge	Wind speed corrected for boat movement
TWD	True Wind Direction	Digital, Gauge	Compass direction the wind is coming from

Compass and heading

Code	Name	Format	Description
HDG	Heading Magnetic	Digital, Gauge	Magnetic heading from compass sensor
HDT	True Heading	Digital, Gauge	True heading (corrected for variation)
COG	Course Over Ground	Digital, Gauge	Actual direction of travel from GPS

Speed

Code	Name	Format	Description
SOG	Speed Over Ground	Digital, Gauge	Actual speed from GPS
STW	Speed Through Water	Digital, Gauge	Speed measured by paddlewheel/log sensor
VMG	Velocity Made Good	Digital, Gauge	Speed component toward the destination

Depth and environment

Code	Name	Format	Description
DPT	Depth	Digital, Gauge	Water depth below transducer
SST	Water Temperature	Digital, Gauge	Sea surface temperature from transducer
AIR	Air Temperature	Digital, Gauge	Ambient air temperature from sensor
ATM	Atmospheric pressure	Digital, Gauge	Barometric pressure from sensor
HUM	Humidity	Digital	Relative humidity from sensor

Position and status

Code	Name	Format	Description
POS	Boat Position	Digital	Current GPS position (latitude/longitude)
CUR	Cursor Position	Digital	Position of the cursor on the chart
WPT	Waypoint Position	Digital	Position of the active waypoint
SAT	Satellite Status	Digital	GPS satellite count, HDOP, fix quality
TIME	Time	Digital	Current UTC or local time

Vessel motion and other

Code	Name	Format	Description
RSA	Rudder Angle	Digital, Gauge	Current rudder position
PITCH	Pitch	Digital	Bow up/down angle
ROLL	Roll	Digital	Port/starboard tilt angle
WIN	Windlass	Digital	Anchor windlass rope depth



Note Instrument readings require the corresponding NMEA sensor to be connected and configured. Instruments without a data source display dashes (---).

Customizing the bar

You can personalize the bar by adding, replacing, or removing instruments to suit your needs.

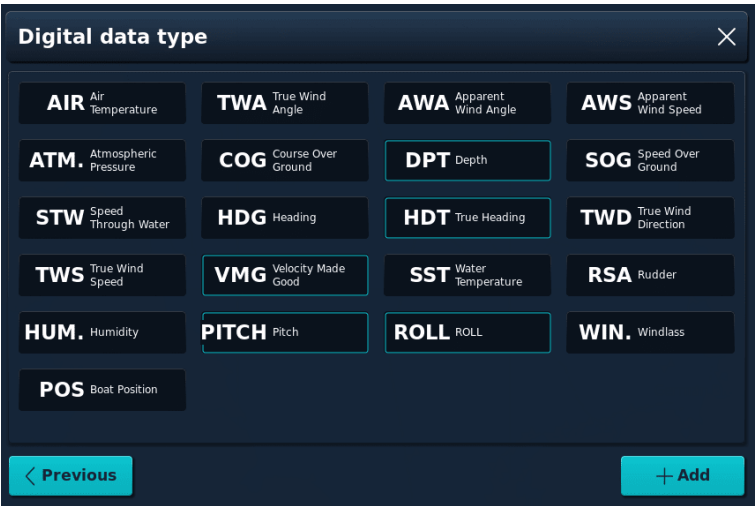
Adding instruments

1. Tap the  icon at the top of the Instruments Bar.
2. Select a display style.
3. Select one or more data types (selected items are highlighted).
4. Tap  to confirm and add the new instrument(s) to the bar.

New instruments are added at the bottom of the bar. The bar holds as many instruments as fit the screen height; when it is full, adding another shows a **Navbar full** message instead. Long-press an existing instrument and choose **Remove** to free up space first.



(A) Style selection: Digital, Gauge, Cursor position, or GPS Status.



(B) Data type selection: tap any code to highlight, then tap + Add.

Use the  button to go back and choose a different display style.

Modifying existing instruments

Long-press any instrument --- its border brightens to confirm the press --- to open the customization menu:

- Replace** Select a new data type or display style from the **Digital / Gauge** submenus, or choose **Cursor pos** or **Gps status**. The instrument is instantly replaced.
- Add** Insert a new instrument into the bar.
- Remove** Tap **Remove** to delete the instrument from the bar.

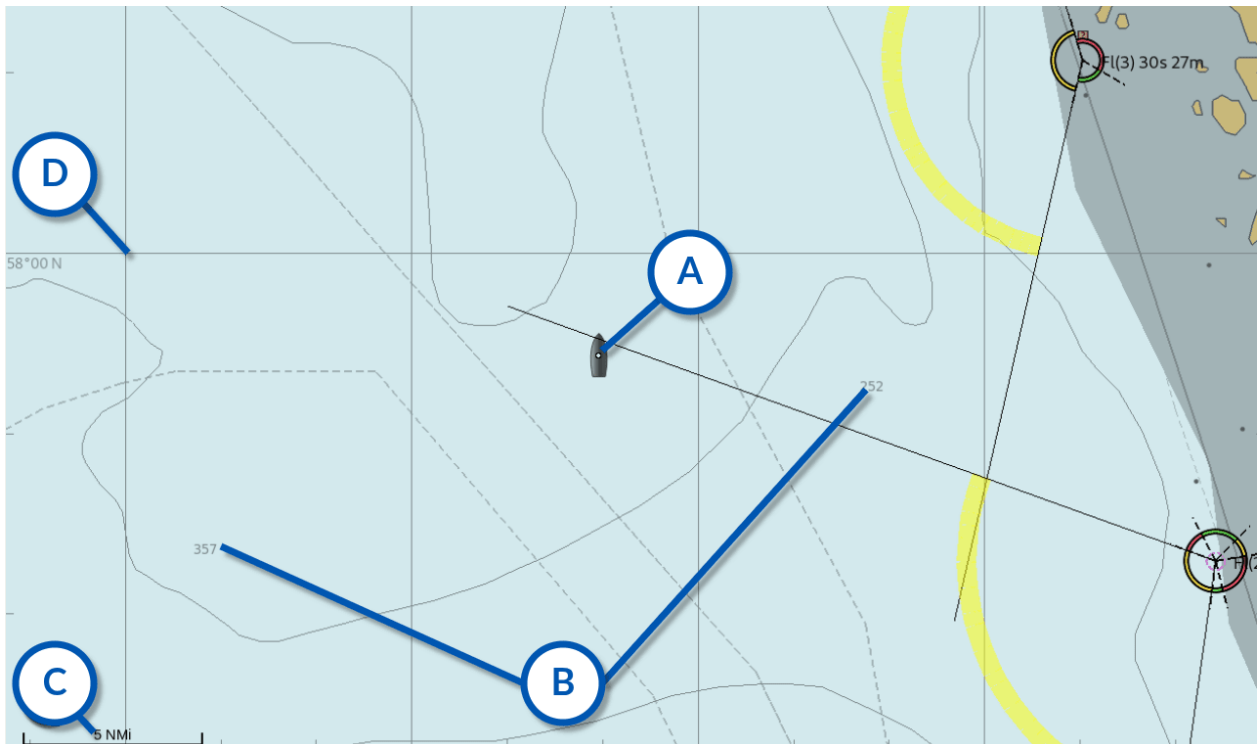


Note Customizations to the Instruments Bar are saved automatically and persist across all Views and Combo Views.

Charts

The chart canvas

The chart canvas is the primary navigation view. It displays nautical charts with your vessel position, heading, and any active routes or waypoints.



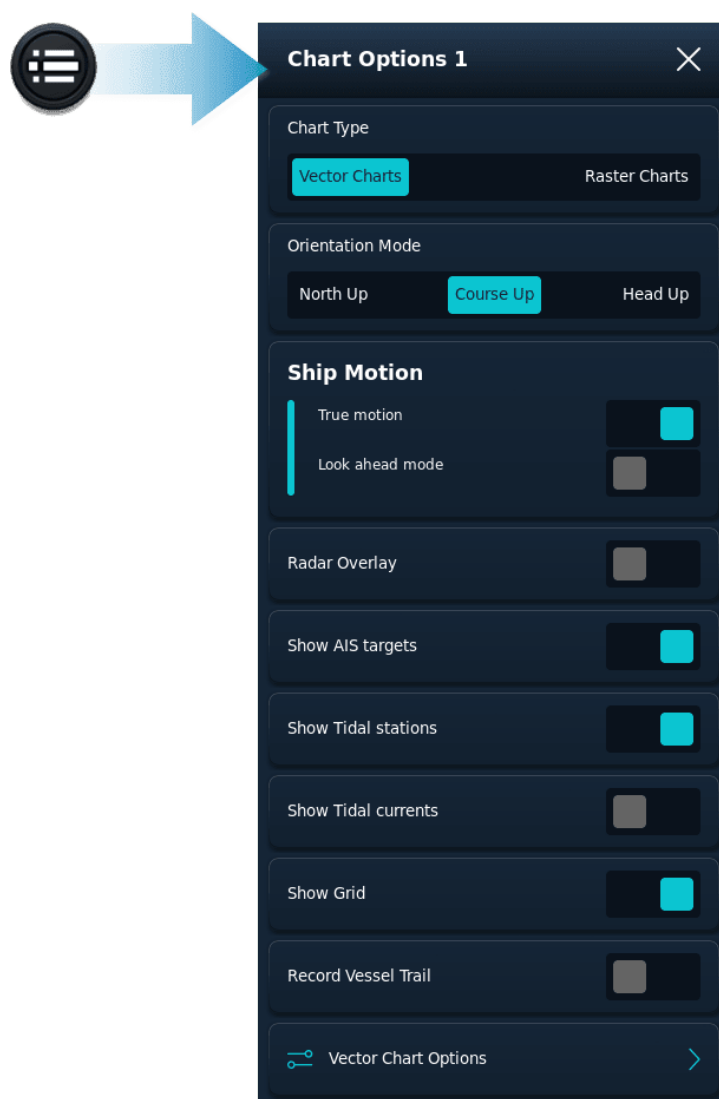
A	Vessel symbol. Shows your current GPS position and heading on the chart.
B	Depth soundings. Individual depth values displayed on the chart.
C	Chart range scale. Displays the current distance scale.
D	Chart grid. Latitude and longitude grid lines overlaid on the chart.

The chart canvas also provides on-screen controls around the edges of the display:

Control	Description
Chart menu button	Top-right. Opens the chart menu sidebar with display settings, orientation, and overlay controls.
Orientation button	Top-left. Tap to cycle between North Up, Course Up, and Head Up modes. The icon changes to reflect the active mode.
Zoom In / Zoom Out	Bottom-center. Tap + to zoom in ($\times 1.25$) or - to zoom out ($\times 0.75$).
Center button	Bottom-right. Re-centers the chart on the vessel and re-enables Follow Mode.
Home button	Bottom-left. Opens the home menu for layout switching, settings, and system controls.

For a visual overview of these controls with annotated callouts, see [Chapter 3](#).

Tap the chart menu button (top-right) to open the **chart menu sidebar**. This sidebar is referenced throughout this chapter --- it provides quick access to chart type, orientation, motion, overlay toggles, and vector chart display options.



The chart menu sidebar. Overlay options for radar, weather, and other modules are documented in their respective chapters.

Navigating the chart

Pan and zoom

Drag with one finger to pan the chart in any direction. Pinch with two fingers to zoom in or out, or use the **Zoom In** (+) and **Zoom Out** (-) buttons at the bottom-center of the canvas.

When you pan or zoom away from the vessel, Follow Mode is disabled and the chart stays at the position you selected. Tap the **Center** button (bottom-right) to re-center on the vessel and re-enable Follow Mode.

Orientation modes

Tap **Orientation Mode** in the chart menu sidebar, or tap the orientation button (top-left of the canvas) to cycle between modes:

Icon	Mode	Description
	North Up	The chart is displayed with north at the top. This is the traditional, fixed map orientation.
	Course Up	The chart rotates so your direction of travel (COG) is always pointing toward the top of the screen.
	Head Up	The chart rotates to match the vessel's heading from the compass sensor. If no compass is available, COG is used instead.

True motion and look ahead

Under **Ship Motion** in the chart menu sidebar:

True Motion

The chart display continuously follows the vessel, keeping it centered on screen as you move. When disabled, the chart stays at whatever position you have panned to and the vessel icon moves freely across the display.

Look Ahead

Shifts the chart view in the direction of travel so more of the water ahead is visible and the vessel appears offset from center. Only active above 2 knots to avoid jitter at low speed or at anchor. This option is available when True Motion is enabled.

Built-in basemaps

Your MFD ships with two basemaps ready to use from first power-on --- no download or setup required.

Basemap	Description
World ENC Vector	Worldwide coverage at three scale levels: overview (1:12M, 32 cells), coastal (1:2M, 96 cells), and detailed (1:200K, 339 cells). 467 S-57 vector charts from the IHO WorldWide ENC dataset.
Satellite (Blue Marble)	NASA Blue Marble global satellite imagery. Provides a photographic earth view underneath the vector chart data.



Note To toggle the satellite basemap on or off, open the chart menu sidebar and tap **Satellite Basemap**. For higher-detail regional charts, download additional charts via the Chart Manager (see below).

Chart types

The system supports three chart formats:

Format	Description
Raster (BSB/KAP)	Scanned paper charts. Familiar appearance but fixed scale --- zooming beyond the native resolution reduces clarity.
Vector (ENC/S-57)	Digital charts with selectable layers. Scale freely without loss of detail. Individual features (lights, soundings, buoys) can be toggled on or off.
O-Charts (oeSENC)	Encrypted commercial vector charts. Require a subscription and online authorization. Offer high-quality cartography for regions where free charts are limited.

To switch between chart types, tap **Chart Type** in the chart menu sidebar to toggle between Vector and Raster.



Note Chart menu options vary depending on whether a raster or vector chart is currently displayed. Vector chart options (soundings, lights, display category) are only available when viewing vector charts.

Loading and managing charts

Importing from USB

1. Copy chart files to a USB drive from a computer.
2. Insert the USB drive into the MFD.
3. Open **Settings > Charts > Chart Manager**.
4. Tap **Import from USB** and select the chart files.
5. The charts are installed and available immediately.

Downloading via Chart Manager

The Chart Manager provides access to free nautical charts published by NOAA (United States) and other national hydrographic agencies worldwide. These are official government-issued charts available at no cost.

1. Ensure the MFD is connected to WiFi (see [Chapter 3](#)).
2. Open **Settings > Charts > Chart Manager**.
3. Browse the catalog and filter by region (USA NOAA or International).
4. Select the desired charts and tap **Download**.
5. Download progress is shown. Charts are available once the download completes.

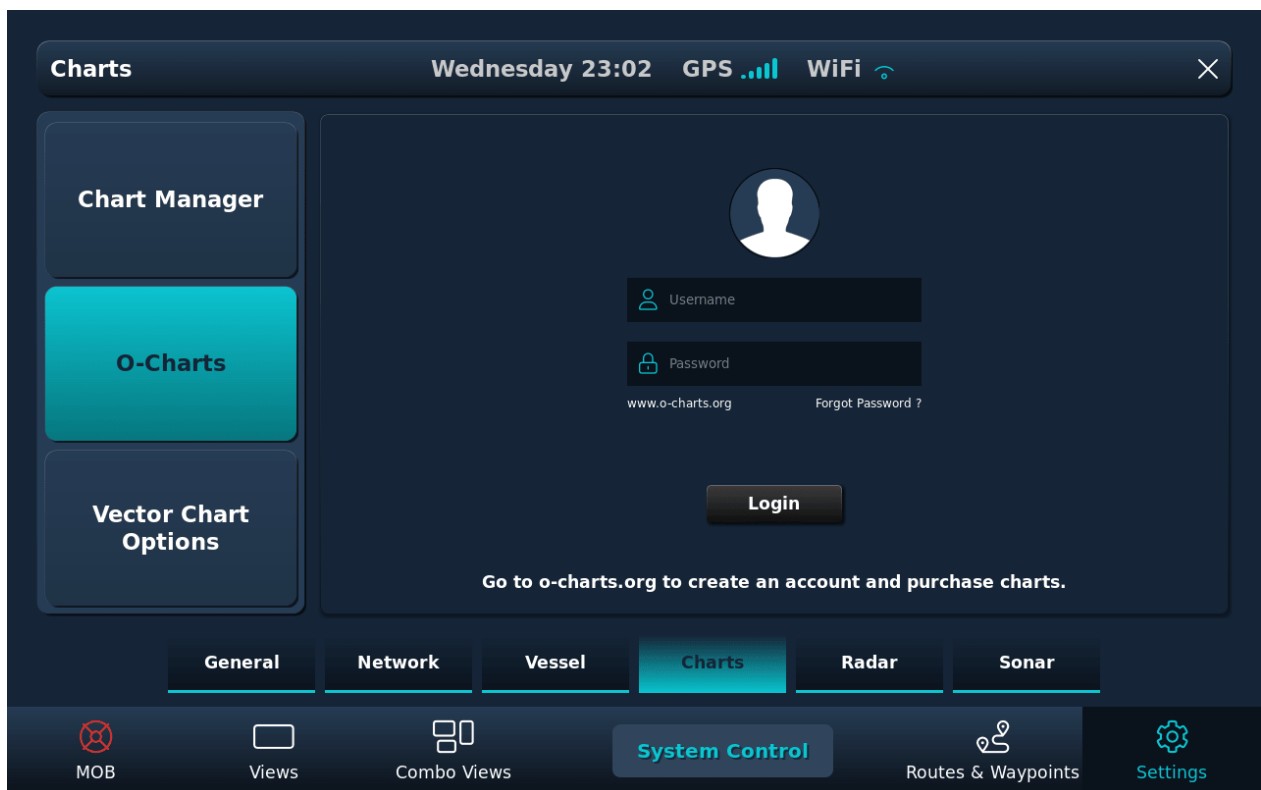


Settings > Charts > Chart Manager showing installed charts, download, and import options.

Authorizing and downloading O-Charts

O-Charts are paid, encrypted commercial charts licensed per-device. They offer high-quality cartography for regions where free government charts are limited. Charts must be purchased on the O-Charts website before they can be downloaded to the MFD.

1. Visit www.o-charts.org to create an account and purchase charts for your region.
2. On the MFD, open **Settings > Charts > O-Charts**.
3. Log in with your O-Charts account credentials.
4. On first login, the system automatically registers your device with the O-Charts server using a unique hardware fingerprint. This happens once and requires no action from you.
5. Your purchased charts appear in the dashboard. Tap a chart card and select **Download**.
6. The first download of each chart permanently assigns it to your device. Confirm the assignment when prompted.
7. The chart files are downloaded and installed. Once complete, the chart is available on the chart canvas.



Settings > Charts > O-Charts login panel.



Warning Assigning a chart to your device is permanent and cannot be undone, moved, or transferred. Each chart license allows up to five assignments. Software updates and OS upgrades preserve your assignment. If you exhaust all assignments, you will need to purchase a new license.

Updating charts

The Chart Manager checks for updates automatically every 24 hours. Charts with a newer version available show an **Update Available** status on their chart card. Tap the chart card and select **Download** to install the update.

O-Charts updates are managed separately through **Settings > Charts > O-Charts**. When a new edition is released, it appears as available for download in the O-Charts dashboard.

Removing or deactivating charts

Deactivate Hides charts from the display without deleting the files. Deactivated charts can be re-activated at any time from the Chart Manager. This is useful for reducing clutter when you have overlapping chart coverage.

Delete Permanently removes chart files from the device. Downloaded charts can be re-downloaded; imported charts must be re-imported from USB.

Both options are available by tapping the chart card in **Settings > Charts > Chart Manager**.

Configuring vector chart display

Vector chart appearance can be customized in two places: quick toggles in the **chart menu sidebar**, and detailed options in **Settings > Charts > Vector Chart Options**.

Vector chart layers (sidebar)

The following layers can be toggled on or off in the chart menu sidebar under **Vector Chart Options**:

Layer	Description
Show Chart Outlines	Displays the boundaries of individual chart sheets
Show Depth Soundings	Displays individual depth values on the chart
Show Lights	Displays light symbols (lighthouses, buoys with lights)
Buoy/Light Labels	Shows text labels for buoys and lights
Light Descriptions	Shows detailed light characteristics (flash pattern, range)
Show Anchoring Info	Displays anchoring areas and restrictions

Display category

Controls the level of detail shown on vector charts.

Base	Minimum features that must always be shown for safe navigation.
Standard	Default level with features needed for safe navigation.
All	All available chart features, including additional detail.
Mariner	Mariner-specified features for customized display.

Boundaries

Choose between **Plain Boundaries** (simple lines) and **Symbolised Boundaries** (pattern-filled boundaries).

Chart quilting

When enabled, the system seamlessly stitches together multiple chart sheets to provide continuous coverage. This is the default behavior.

Text and symbol options

Option	Description
Show Text	Master toggle to show or hide all chart text
National Text on Chart	Shows text in the local language of the chart region
Important Text Only	Filters the display to show only critical navigational labels
De-Cluttered Text	Automatically hides overlapping text to create a cleaner display
Show Visible Sector Lights	Highlights the visible sectors of navigational lights on the chart
Show Depth Units	Displays the depth unit indicator on the chart

Depth contours

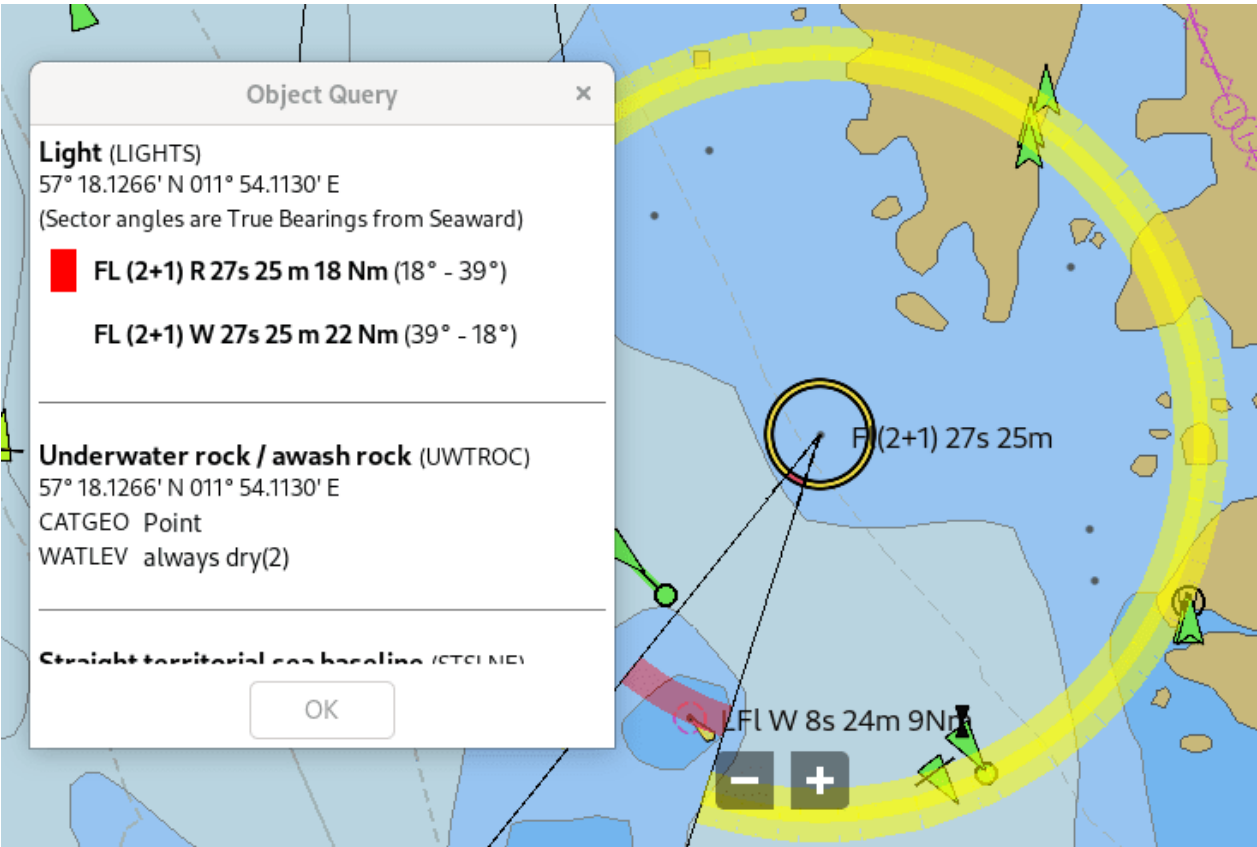
Three configurable depth thresholds control how the chart shades water areas. Values are displayed in the currently selected depth unit (meters, feet, or fathoms).

Threshold	Description
Shallow Depth	Water shallower than this value is shaded as a safety warning
Safety Depth	The primary safety contour for your vessel's draft
Deep Depth	Water deeper than this value is shown as deep water

**Warning** Set the Safety Depth contour to match your vessel's maximum draft plus a suitable under-keel clearance margin. Water shallower than this contour is highlighted on the chart as a visual warning.

Chart object information

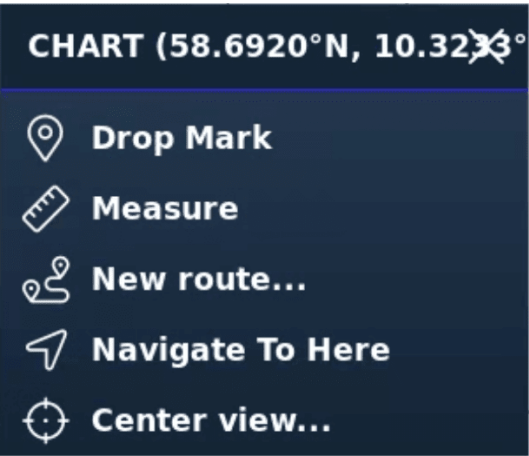
Double-tap any chart object (buoy, light, anchorage, depth sounding, etc.) to view its details. A popup displays the object name, position, and relevant attributes such as light characteristics, depth values, or cable warnings.



Double-tapping a light symbol displays its characteristics, position, and nearby chart objects.

Chart context menu

Long-press anywhere on the chart to open the context menu. The menu header shows the coordinates of the pressed position. The available actions are:



Action	Description
Drop Mark	Places a waypoint at the pressed position and adds it to the active layer
Measure	Draws a line from the vessel to the cursor showing distance and bearing. Long-press again and tap Measure Off to cancel
New Route...	Begins route creation mode. Tap the chart to add waypoints. Changes to Finish Route while a route is being created
Navigate To Here	Creates a direct route from the vessel to the pressed position and activates navigation
Center View...	Recenters the chart on the pressed position

i

Note When GRIB weather data is active and covers the pressed position, a **Meteogram** option appears to show a weather forecast at that location (see [Chapter 14](#)). When no GPS signal is available, a **Move Boat Here** option allows repositioning the vessel manually.

The context menu adapts when you long-press on specific chart objects. For example, long-pressing on a waypoint, route, or track shows additional actions specific to that object --- see [Chapter 7](#) for details. Long-pressing on an AIS target shows vessel information and tracking options --- see [Chapter 11](#).

Chart overlays

Several data layers can be overlaid on the chart. Each overlay is toggled from the chart menu sidebar and documented in its respective chapter:

- **Radar overlay** --- see [Chapter 10](#)
- **AIS targets** --- see [Chapter 11](#)
- **Weather data** --- see [Chapter 14](#)
- **Bathymetry** --- see [Chapter 13](#)
- **Tidal stations and currents** --- see [Chapter 15](#)

7

Waypoints, Routes, and Tracks

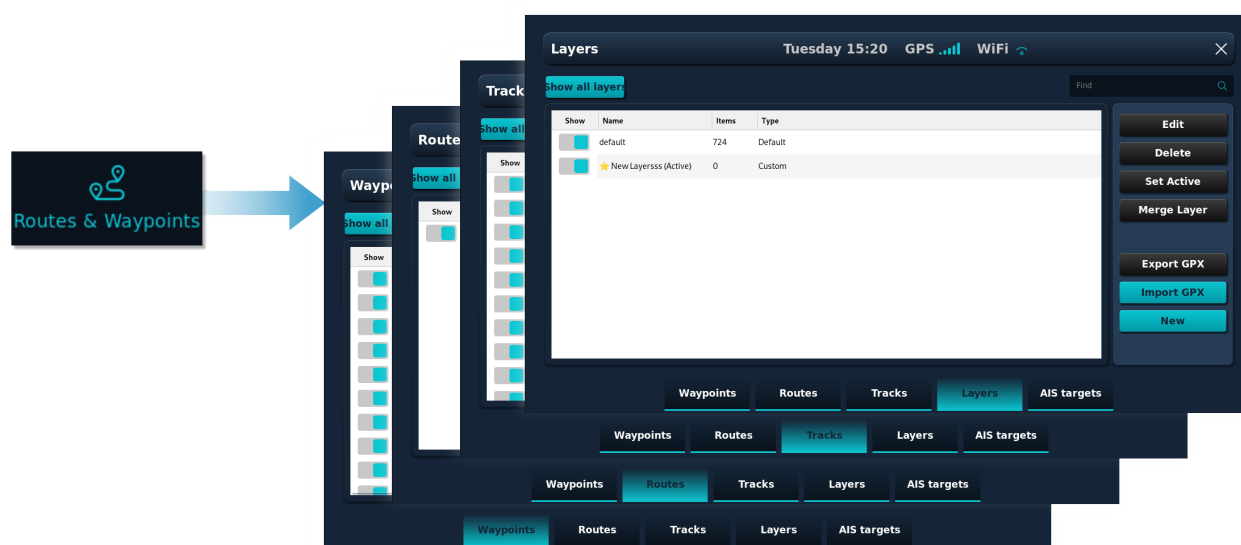
Understanding waypoints, routes, tracks, and layers

Waypoints, routes, and tracks are the core tools for marking places, planning voyages, and recording where you have been. They can be used in the Chart, Radar, and Sonar screens, and are organized into layers for easy management.

The system uses four types of navigation objects:

Object	Description
Waypoint	A saved position on the chart, identified by an icon and a name. Waypoints mark locations of interest and serve as building blocks for routes.
Route	A pre-planned path made up of a sequence of waypoints. Routes are used to plan voyages and guide navigation.
Track	A recorded path of your vessel's actual movement. Tracks are created in real time as you navigate.
Layer	A named group that organizes related waypoints, routes, and tracks together.

All navigation objects are managed from the **Routes & Waypoints** panel. To open, tap **Routes & Waypoints** in the home menu (see [Chapter 3](#)).



The Routes & Waypoints panel with Waypoints, Routes, Tracks, and Layers tabs.

The panel is organized into four tabs: **Waypoints**, **Routes**, **Tracks**, and **Layers**. Each tab includes a **Find** search box and a **Show All** button to reveal any hidden items.



Note The system does not impose a fixed limit on the number of waypoints, routes, or tracks you can create. Storage is only bounded by the available disk space on the device.

Managing waypoints

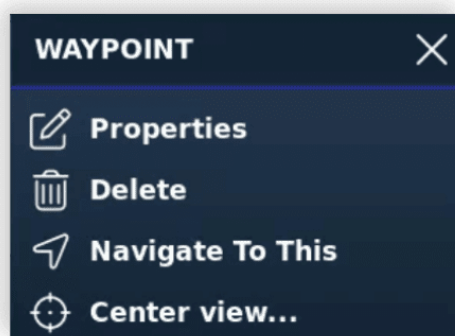
Waypoints are locations you save in the system. They can mark where you are, where you are going, or where you have been. Each waypoint stores a name, an icon, a position, and an optional description.

Creating a waypoint

There are two ways to create a waypoint:

- | | |
|-----------------------|--|
| From the chart | Long-press on the chart and tap Drop Mark . A waypoint is placed at the pressed position and added to the active layer. |
| From the panel | Open the Waypoints tab and tap Add Waypoint . A waypoint is created at the current vessel position. |

Waypoint context menu



Long-press on a waypoint symbol on the chart to open its context menu:

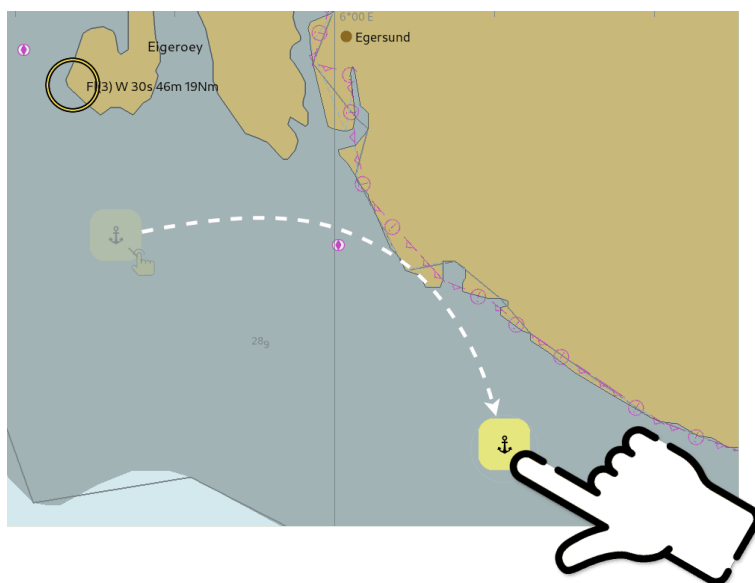
- | | |
|-------------------------|--|
| Properties | Open the waypoint properties panel. |
| Delete | Remove the waypoint from the chart. |
| Navigate To This | Create a route from the vessel to this waypoint and activate navigation. |
| Center View | Recenter the chart on the waypoint. |

Moving a waypoint

A waypoint's position can be changed in two ways:

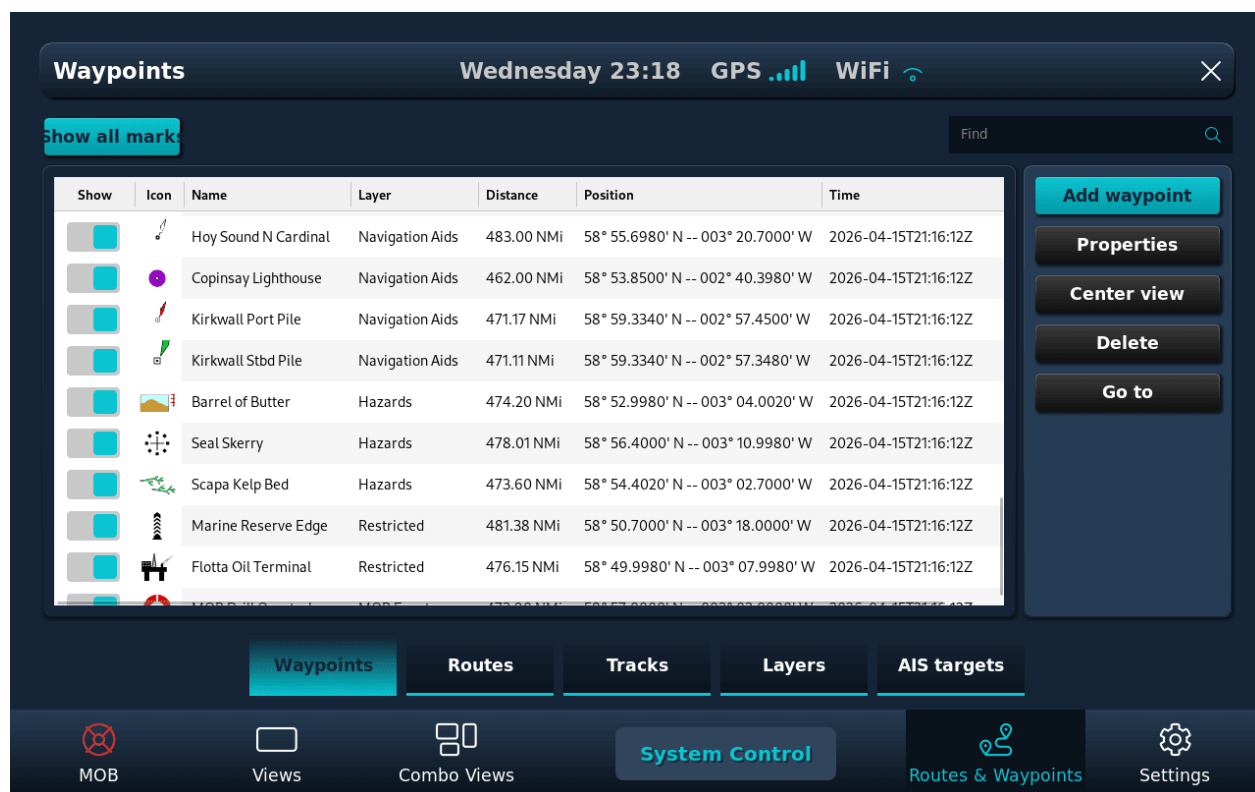
- **By dragging on the chart.** Touch and hold directly on the waypoint symbol, then drag your finger to the new location and release. The waypoint moves to where you lift your finger.

- **By editing coordinates.** Open the waypoint's **Properties** panel (long-press the waypoint on the chart, or select it in the waypoint list and tap **Properties**), then edit the **Latitude** and **Longitude** fields. Useful for precise repositioning or for moving a waypoint that is far from the current chart view.



Dragging a waypoint: touch and hold the symbol, then drag to the new position.

Waypoint list



The Waypoints tab showing the list, action buttons, and search bar.

The Waypoints tab displays a table with the following columns:

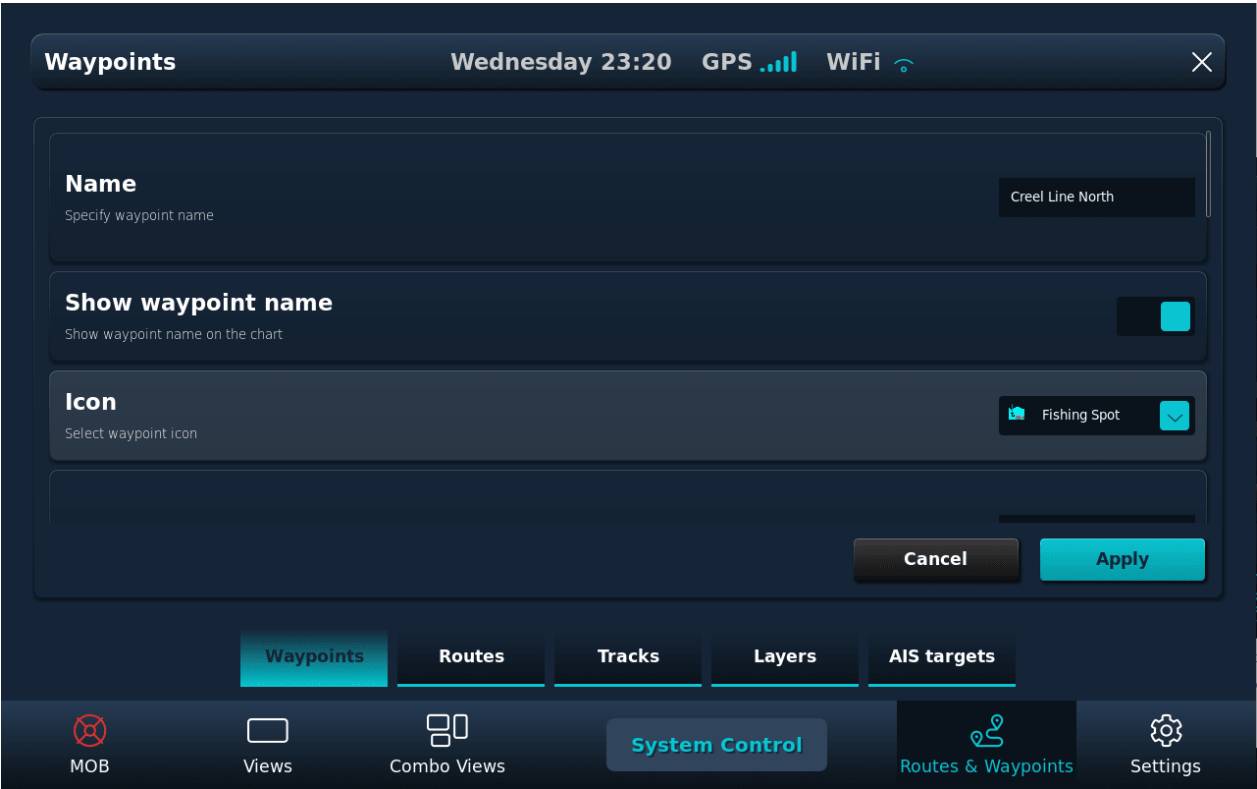
Column	Description
Show	Toggle waypoint visibility on the chart
Icon	The waypoint symbol
Name	The waypoint name
Layer	The layer the waypoint belongs to
Distance	Distance from the vessel to the waypoint
Position	Latitude and longitude coordinates
Time	Timestamp when the waypoint was created

Waypoint actions

Select a waypoint in the list to enable the action buttons on the right side of the panel:

- Add Waypoint** Create a new waypoint at the current vessel position.
- Properties** Open the waypoint properties panel.
- Center View** Pan the chart to center on the selected waypoint.
- Go To** Smoothly animate the chart to pan and zoom to the waypoint.
- Delete** Remove the selected waypoint with confirmation.

Waypoint properties



The waypoint properties panel with name, visibility toggle, and icon selector.

Tap **Properties** from the waypoint context menu on the chart, or from the action buttons in the waypoint list. The properties panel contains the following fields:

- Name** Custom label for the waypoint.
- Show Waypoint Name** Toggle to display the name label on the chart.
- Icon** Choose from over 40 symbol types (anchor, buoy, float, diamond, etc.).
- Latitude / Longitude** Editable position coordinates.
- Description** Optional text description.
- Show on Chart** Toggle waypoint visibility on the chart.
- Show at Scale** Only display the waypoint when zoomed in beyond a threshold.
- Range Rings** Number of concentric distance circles (0--10), with configurable distance, unit, and color.
- Layer** Assign the waypoint to a layer.

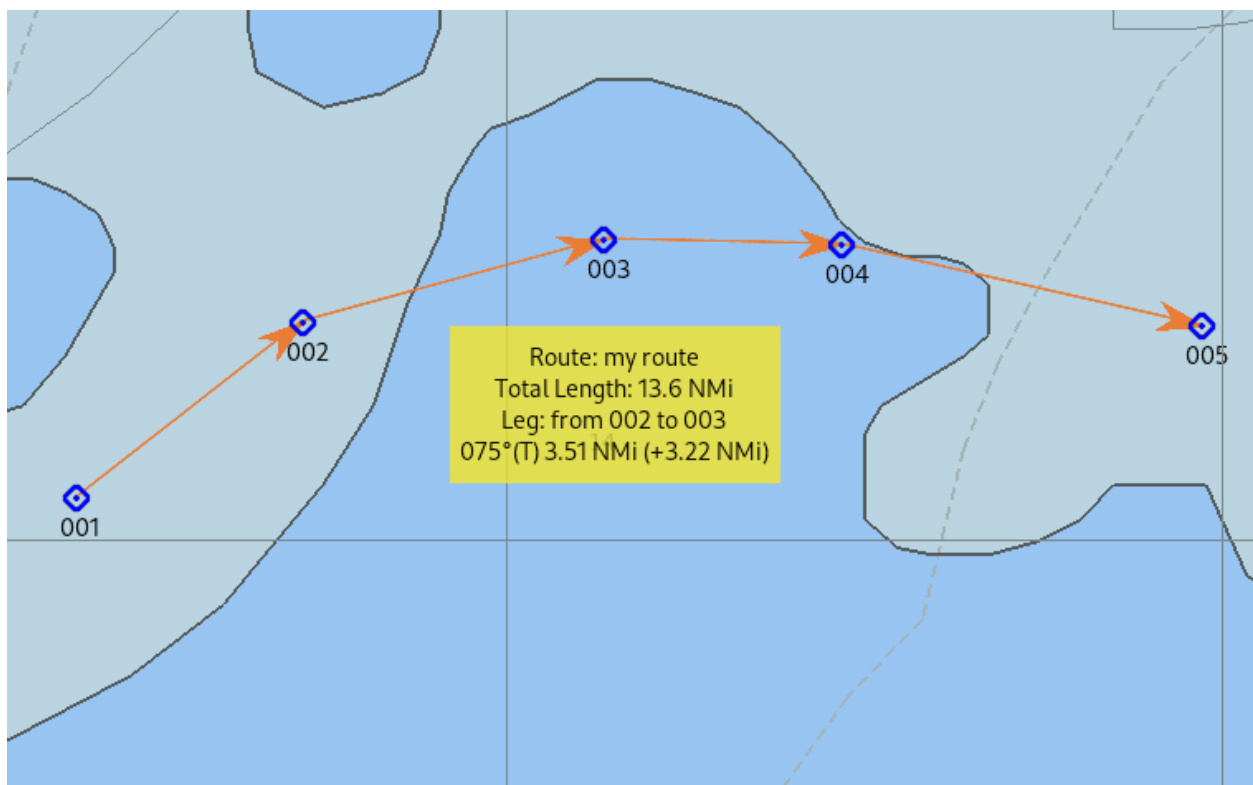
Available waypoint icons

The Icon dropdown provides 44 symbols to choose from, organized by category: basic shapes, hazards, navigation aids, activities, and services.

	Empty		Triangle		Square		Circle
	Diamond		Active WP		MOB		Boundary
	Anchor		Anchorage		Mooring		Float
	Buoy A		Buoy B		Oil Buoy		Light A
	Light B		Lite Vessel		Green Light		Red Light
	R/G Light		Fishing		Fish Haven		Fish
	Scuba		Camping		Campfire		Boarding
	Airplane		Fuel		Food		Platform
	Rock (exp.)		Rock (awash)		Shoal		Sand
	Coral		Kelp		Snag		Wreck A
	Wreck B		Blue X		Green X		Red X

Managing routes

A route is a path from one location to one or more destinations, made up of a sequence of waypoints. Routes are used to plan voyages in advance and to guide navigation from one point to the next.



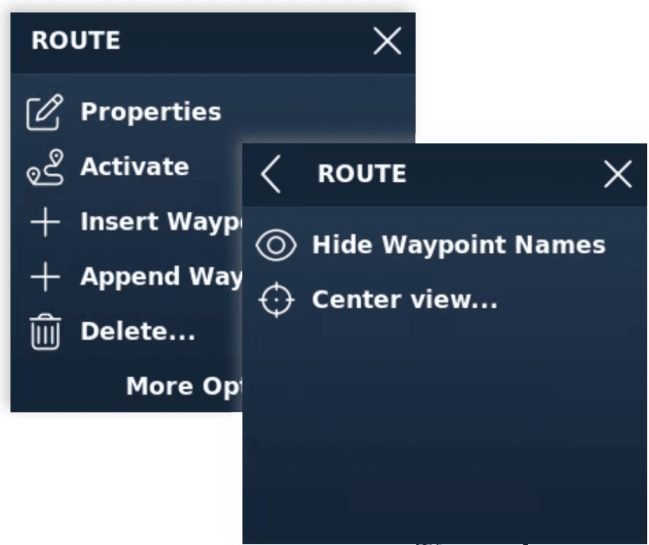
A route displayed on the chart with numbered waypoints, legs, and total distance.

Creating a route

1. Long-press on the chart and tap **New Route...** from the context menu.
2. The chart enters route creation mode. Tap the chart to place waypoints along the desired path.
3. Long-press again and tap **Finish Route** to complete the route.

Note To cancel a route during creation, long-press and tap **Cancel Route**. Waypoints are automatically named in sequence (NM001, NM002, etc.) and can be renamed later in the route properties.

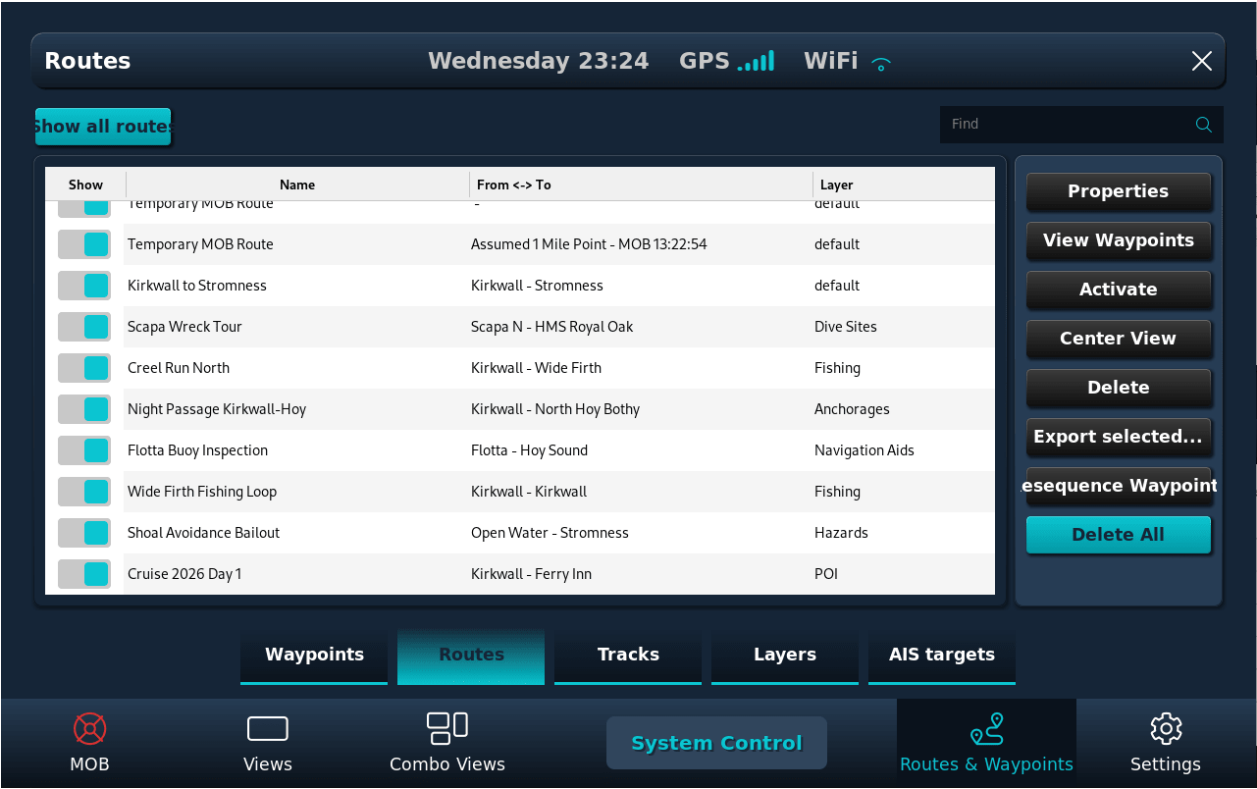
Route context menu



Long-press on a route line on the chart to open its context menu. If the menu contains more items than fit on screen, tap **More Options** to see the additional actions:

Properties	Open the route properties panel.
Activate / Deactivate	Start or stop navigation along the route.
Insert Waypoint	Add a new waypoint at the pressed position along the route.
Append Waypoint	Add a new waypoint at the end of the route.
Delete	Remove the route from the chart, with confirmation.
Hide Waypoint Names	Toggle waypoint name labels on the route.
Center View	Recenter the chart on the route.

Route list



The Routes tab showing the list, action buttons, and search bar.

The Routes tab displays a table with the following columns:

Column	Description
Show	Toggle route visibility on the chart
Name	The route name
From ↔ To	Start and end point names
Layer	The layer the route belongs to

Route actions

Select a route in the list to enable the action buttons on the right side of the panel:

- Properties** Open the route properties panel.
- View Waypoints** Open a panel listing all waypoints in the route with their details.
- Activate** Set the route as the active navigation route and zoom to it on the chart.
- Center View** Pan and zoom the chart to show the entire route.
- Delete** Remove the selected route with confirmation.
- Export Selected** Export the selected route as a GPX file.
- Resequence Waypoints** Rename the waypoints in the route with sequential numbers.
- Delete All** Remove all routes with confirmation.

Route properties

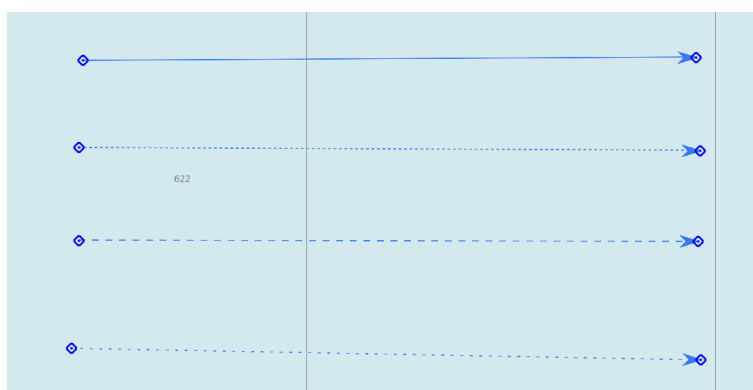
The route properties panel with name, start/end points, distance, and plan speed.

Tap **Properties** from the route context menu on the chart, or from the action buttons in the route list. The properties panel contains the following fields:

Name	Custom name for the route.
From / To	Editable start and end point labels (e.g., harbor names).
Distance	Total route distance in nautical miles (read-only, calculated).
Plan Speed	Planned cruising speed used for time calculations.
Enroute	Estimated total sailing time based on distance and plan speed (read-only).
Departure	Planned departure date and time.
Time Format	UTC, Local Time, LMT@Location, or Honor Global Settings.
Color	Line color on the chart, chosen from 16 available colors.
Style	Line style: Default, Solid, Dot, Long dash, or Short dash.
Layer	Assign the route to a layer.

Available route line styles

The Style dropdown provides 4 line patterns to distinguish routes visually on the chart.



Available route line styles: Solid, Dot, Long dash, Short dash.

Available route colors

The Color dropdown provides 16 colors, from dark muted tones to bright primary colors, allowing routes to be color-coded for easy identification.



Available route colors.

Activating a route

When a route is activated, the system sets it as the active navigation route and begins steering guidance toward the first waypoint. As you approach each waypoint within its arrival circle, the system automatically advances to the next leg of the route.

To activate a route:

- Tap **Activate** from the route context menu on the chart, or
- Select the route in the Routes tab and tap **Activate** from the action buttons.

To stop navigating, long-press on the route and tap **Deactivate**. See [Chapter 8](#) for full details on the navigation display, steering guidance, and cross-track error indicators.

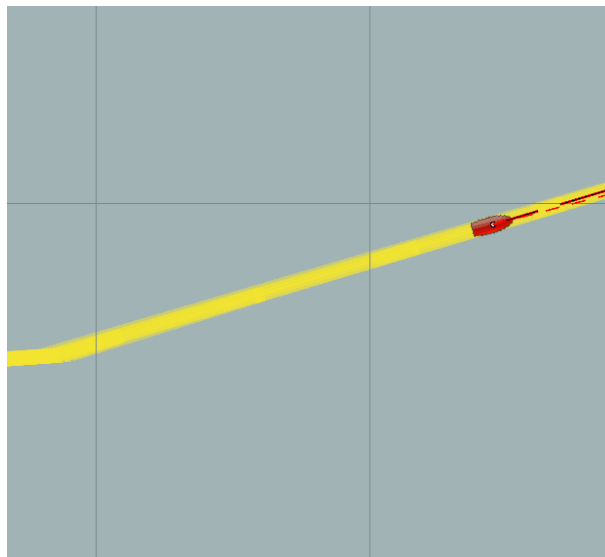


Warning

Always verify your route is safe before activating navigation. Check each leg for obstacles, shallow water, restricted areas, and traffic separation zones. Routes must be manually reviewed --- the system does not automatically check for hazards.

Managing tracks

A track is a record of where your vessel has been. Unlike routes, which are planned in advance, tracks are recorded automatically in real time as you move. A recorded track can later be converted into a route to retrace the same passage.



A vessel recording a track. The yellow trail shows the path travelled so far.

Recording a track

There are two ways to start and stop track recording:

From the chart menu

Open the chart menu sidebar and toggle **Record Vessel Trail** on or off. This is the quickest way to start recording while navigating.

From the panel

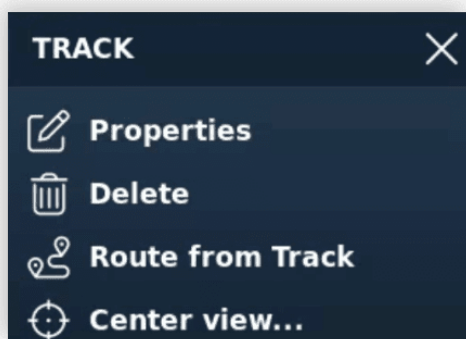
Open the Routes & Waypoints panel, select the **Tracks** tab, and tap **Start Track**. To stop recording, return to the tab and tap the same button.

While recording, the track appears as a line on the chart that grows as the vessel moves.



Note Tracks are recorded at the precision set in **Settings > General > Advanced**. See the Settings section at the end of this chapter for details.

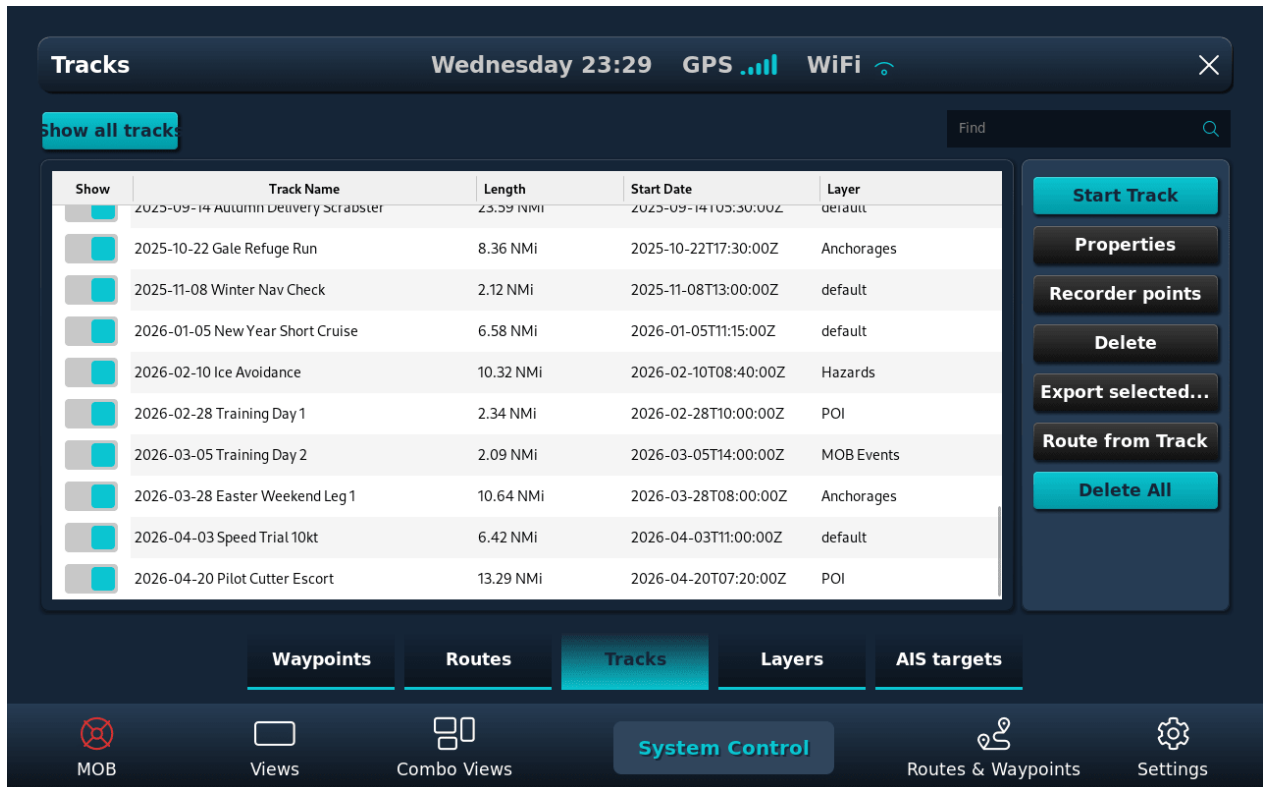
Track context menu



Long-press on a track line on the chart to open its context menu:

- Properties** Open the track properties panel.
- Delete** Remove the track from the chart, with confirmation.
- Route from Track** Convert the track into an optimized route.
- Center View** Recenter the chart on the track.

Track list



The Tracks tab showing the list, action buttons, and search bar.

The Tracks tab displays a table with the following columns:

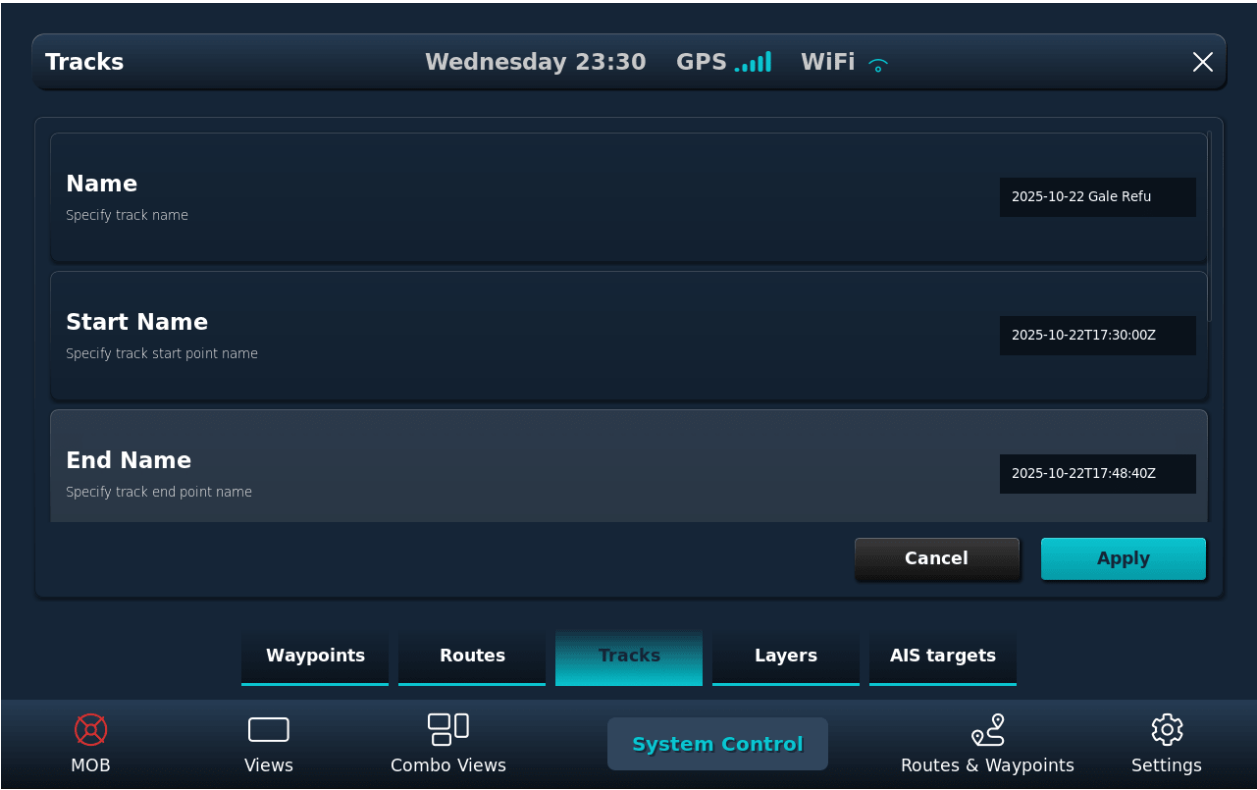
Column	Description
Show	Toggle track visibility on the chart
Track Name	The track name
Length	Total distance traveled
Start Date	Date and time the track recording began
Layer	The layer the track belongs to

Track actions

Select a track in the list to enable the action buttons on the right side of the panel:

- Start Track** Begin recording a new track from the current vessel position.
- Properties** Open the track properties panel.
- Recorder Points** View a detailed list of all recorded positions in the selected track.
- Delete** Remove the selected track with confirmation.
- Export Selected** Export the selected track as a GPX file.
- Route from Track** Convert the selected track into an optimized route for future navigation.
- Delete All** Remove all tracks with confirmation.

Track properties



The track properties panel with name, start/end labels, total distance, and layer.

Tap **Properties** from the track context menu on the chart, or from the action buttons in the track list. The properties panel contains the following fields:

- Name** Custom name for the track.
- Start Name** Label for the starting point of the track.
- End Name** Label for the end point of the track.
- GUID** Internal identifier (read-only).
- Total Distance** Total length of the track in nautical miles (read-only, calculated automatically).
- Layer** Assign the track to a layer.

Creating a route from a track

The **Route from Track** feature converts a recorded track into a navigable route by intelligently reducing the number of waypoints while preserving the path shape. This is useful for retracing a previously traveled path.

You can trigger **Route from Track** in two ways:

From the chart Long-press on a track line and tap **Route from Track** from the context menu.

From the panel Open the Tracks tab, select a track, and tap **Route from Track** from the action buttons.

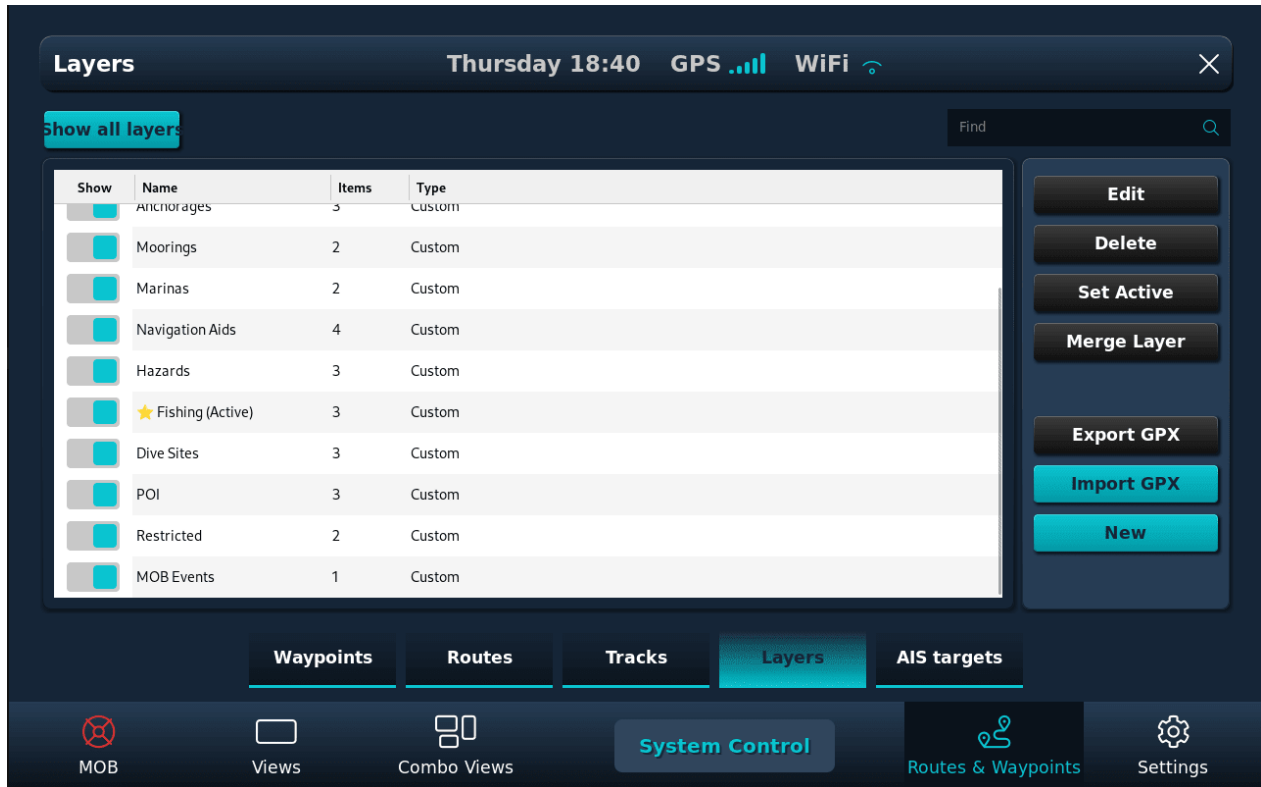
In both cases, the system creates an optimized route and adds it to the same layer as the original track. The new route appears in the Routes tab and can be activated for navigation.

Managing layers

Layers organize related waypoints, routes, and tracks into named groups. For example, you might create separate layers for different harbors, fishing areas, or voyage plans. Hiding a layer hides all its contents at once, making layers a powerful way to manage large collections of navigation data.

A default layer (named *default*) is created automatically and cannot be deleted. All new waypoints, routes, and tracks are added to the **active layer**.

Layer list



The Layers tab showing the list, action buttons, and search bar.

The Layers tab displays a table with the following columns:

Column	Description
Show	Toggle visibility of all items in the layer
Name	The layer name
Items	Number of waypoints, routes, and tracks in the layer
Type	Default or Custom

Layer actions

Select a layer in the list to enable the action buttons on the right side of the panel:

New	Create a new empty layer.
Edit	Open the layer properties panel to rename the layer and toggle waypoint name visibility for all items in the layer.
Delete	Remove the selected layer. A confirmation dialog offers the choice to either move all items to the default layer or delete them permanently. The default layer cannot be deleted.
Set Active	Set the selected layer as the active layer. New waypoints, routes, and tracks will be added to this layer.
Merge Layer	Select a target layer to merge into. All items from the current layer are moved to the target, and the source layer is deleted. The default layer cannot be merged.
Export GPX	Export all waypoints, routes, and tracks in the layer as a GPX file.
Import GPX	Import waypoints, routes, and tracks from a GPX file. A new layer is created automatically, named after the imported file.

Layer properties

Tap **Edit** to open the layer properties panel, which contains:

Layer Name	Custom name for the layer.
Show Waypoint Names	Toggle the name label visibility for all waypoints in the layer at once.

Importing and exporting GPX files

Navigation data can be shared between devices using the standard GPX file format.

Exporting a layer

1. Open the Routes & Waypoints panel and select the **Layers** tab.
2. Select the layer to export.
3. Tap **Export GPX**.
4. Choose a save location. If a USB drive is connected, it is offered as the default destination.
5. The file is saved with the layer name as the default filename.

Importing from a GPX file

1. Open the Routes & Waypoints panel and select the **Layers** tab.
2. Tap **Import GPX**.
3. Browse to the GPX file on local storage or USB drive.
4. A new layer is created automatically, named after the imported file.
5. A progress dialog shows the import status; tap **Cancel** to abort.



Note Individual routes and tracks can also be exported from the Routes and Tracks tabs using the **Export Selected** action.

Waypoint and track settings

Waypoint display settings

The following settings control how waypoints appear on the chart. They are configured in **Settings > Vessel > Routes and Waypoints**.

Setting	Description
Show Marks at Chart Scale	Hide waypoint icons when the chart is zoomed out beyond a threshold, to reduce visual clutter
Override Scale Visibility	Force all waypoints to remain visible regardless of zoom level
Mark Range Rings	Display concentric distance circles around waypoints (0--10 rings)
Ring Distance / Unit	Set the distance between range rings in nautical miles or kilometers

Track recording settings

The following settings control how tracks are recorded. They are configured in **Settings > General > Advanced**.

Setting	Description
Automatic Daily Track	Automatically segment tracks into daily recordings
Highlight Tracks	Highlight vessel tracks with a visible color on the chart
Tracking Precision	How frequently positions are recorded: Low, Medium, or High. Higher precision produces more accurate tracks but larger files



Note Navigation-related settings such as waypoint arrival circle radius, advance on arrival behavior, and active route persistence are documented in [Chapter 8](#).

8

Navigation

Understanding navigation

Navigation is the act of guiding your vessel from its current position to a chosen destination. Once you start navigation, the system continuously computes the distance, bearing, and estimated time to the destination, and displays real-time steering guidance to help you stay on course.

You can navigate to any of the following destinations:

- A waypoint** An existing saved position on the chart.
- A chart position** Any arbitrary point on the chart selected by long-press.
- A route** A sequence of waypoints connected in order. The system automatically advances from one waypoint to the next.

For details on creating waypoints and routes, see [Chapter 7](#).



Note Navigation relies on a valid GPS position. If no GPS signal is available, the navigation data bar and steering guidance cannot be updated.

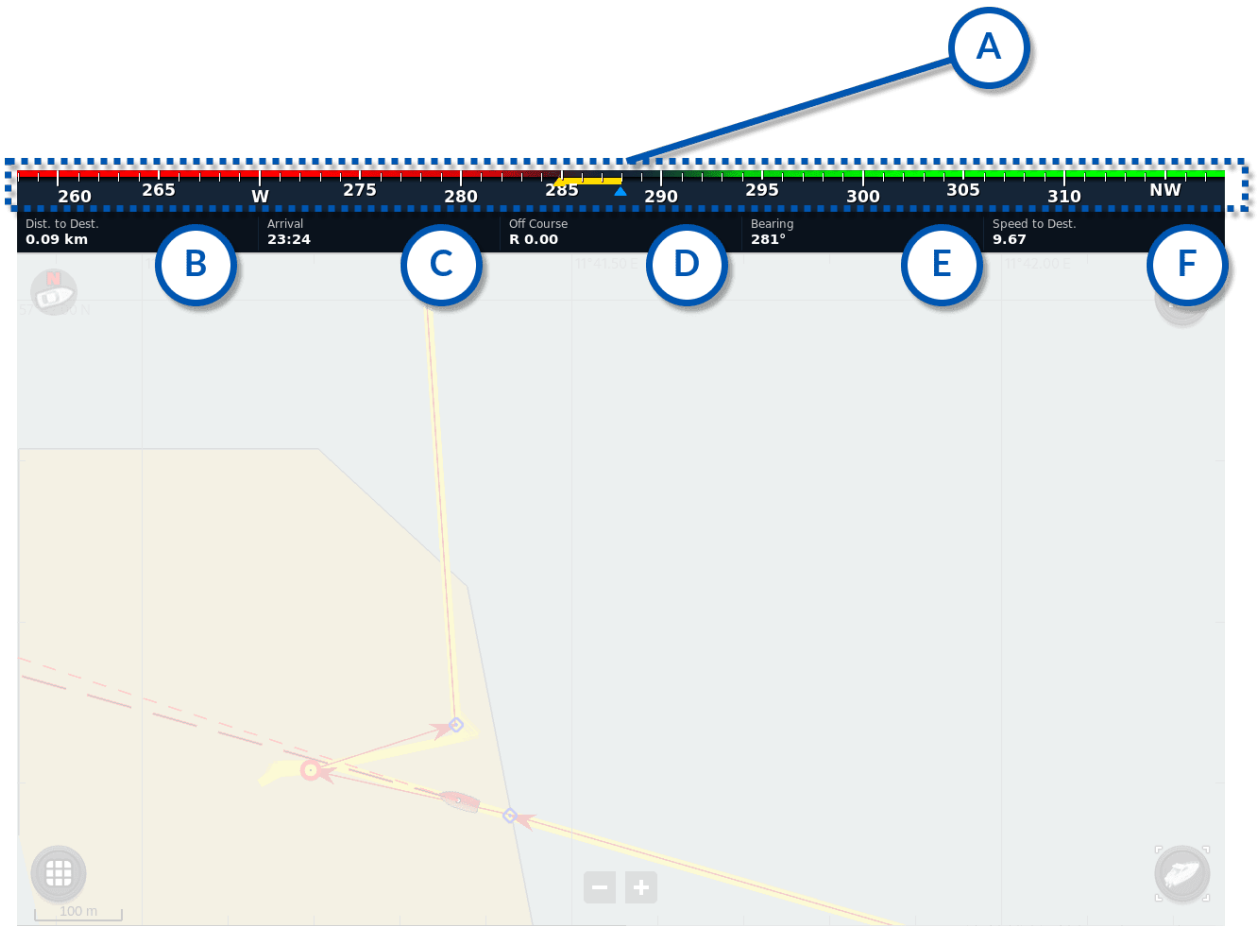
Navigation terminology

The navigation display uses a handful of standard marine navigation terms. Understanding what each one means makes the live readouts in the next section easier to interpret.

Term	Meaning
Heading	The direction the bow of the vessel is physically pointing.
Course (COG)	Course Over Ground. The actual direction the vessel is moving across the water, accounting for wind and current.
Bearing	The direction from the vessel to the destination, measured in degrees true.
XTE	Cross-Track Error. The perpendicular distance between the vessel and the intended route line.
VMG	Velocity Made Good. The component of boat speed that is directed toward the destination.
ETA	Estimated Time of Arrival at the destination, computed from current speed and distance.
Arrival circle	An invisible ring around a waypoint. Entering the ring counts as "arrived" and may advance the route to the next waypoint.

Reading the navigation display

When navigation is active, the top bar transforms into a dedicated navigation display. A full-width steering guidance widget runs along the top, and a row of five live data readouts sits directly underneath. Together they let you monitor course, distance, and direction at a glance.



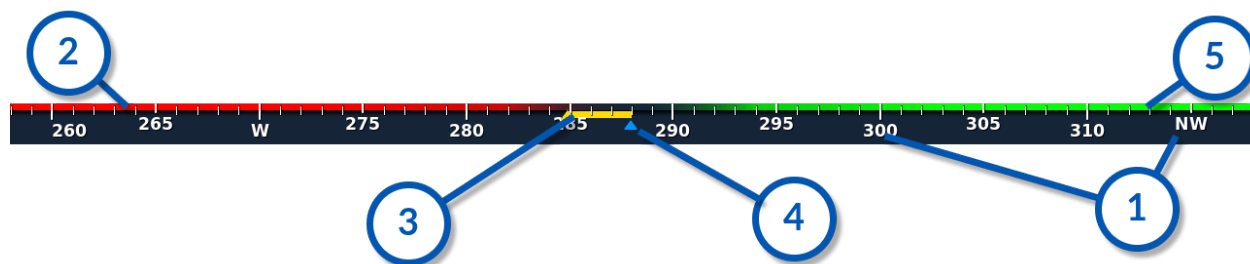
The navigation display with the steering guidance widget on top and the five data readouts below.

A	Steering guidance widget (top row). Full-width compass scale centred on the vessel's current heading, with a fixed current-heading pointer, a moving steering-correction indicator, and red (port) / green (starboard) zones.
B	Dist. to Dest. Distance from the vessel to the active destination. Shown in the unit selected under Settings > Units .
C	Arrival. Estimated time of arrival at the destination, based on current speed over ground.
D	Off Course. Cross-track error (XTE). The perpendicular distance from the vessel to the intended route line, prefixed with L or R to show which side of the track you are off to.
E	Bearing. Bearing from the vessel to the destination, in degrees true.
F	Speed to Dest. Velocity made good. Your effective speed toward the destination, accounting for the angle between your heading and the bearing to the target.

Note The navigation display is shown only while a waypoint or route is active. The five data readouts clear automatically five seconds after the last data update. When navigation is stopped, the top bar reverts to its standard layout.

The steering guidance widget

Callout **A** on the previous figure is where the steering guidance widget lives in the top bar. Zoomed in, the widget is designed to let you correct your course with a single glance:



The steering guidance widget with its sub-elements labelled. The blue target-bearing triangle is shown enlarged for clarity.

1	Heading scale. Compass tape that rolls beneath the fixed pointer. Its centre is always the current heading.
2	Port zone (red, left half). Colour-codes compass directions to port of the current heading.
3	Current-heading pointer (blue triangle). Fixed at the centre. Marks the direction the bow is pointing.
4	Steering-correction indicator (yellow). Slides off-centre to show which way to steer. Centred on the blue pointer means on course.
5	Starboard zone (green, right half). Colour-codes compass directions to starboard of the current heading.

Note The steering guidance widget animates smoothly as the vessel turns, so the indicators glide rather than jump. After a timeout with no new navigation data, the widget resets to its neutral state.

Enabling or disabling steering guidance

The steering guidance widget is enabled by default. To toggle it:

1. Open **Settings > User Interface**.
2. Locate the **Steering Guidance** toggle.
3. Switch it on or off. The change takes effect immediately.

Starting navigation

There are three ways to start navigation, depending on your destination.

Navigate to an existing waypoint

1. Long-press on a waypoint symbol on the chart.
2. Tap **Navigate To This** from the context menu.
3. A direct route is created from the vessel to the waypoint and activated immediately.

Navigate to a chart position

1. Long-press on an empty area of the chart.
2. Tap **Navigate To Here** from the context menu.
3. A direct route is created from the vessel to the pressed position and activated immediately.



Note The **Navigate To Here** option is only available when GPS is active. Without a valid position, the system cannot create a route from the vessel.

Activate a saved route

1. Open the Routes & Waypoints panel and select the **Routes** tab.
2. Select the route to activate.
3. Tap **Activate**. The chart zooms to show the full route and navigation begins from the first waypoint.

Alternatively, long-press on a route line on the chart and tap **Activate** from the context menu.

Following an active route

Once a route is active, the system guides you from one waypoint to the next. The active route is highlighted on the chart to distinguish it from inactive routes.

Waypoint advance

As you follow a route, the system continuously monitors the distance from the vessel to the current waypoint (the one you are steering toward). When arrival is detected, the route skips to the next waypoint and the steering guidance recomputes bearing, distance, and XTE for the new leg.

How arrival is detected

Arrival is declared in one of two ways:

Entering the circle

The vessel passes within the arrival circle radius of the waypoint. This is the primary trigger.

Passing the waypoint

The vessel reaches its closest approach without entering the circle, then starts moving away for at least two seconds. This fallback handles cases where wind, current, or helm lag push the vessel past the waypoint without quite touching the radius.

The **Advance route waypoint on arrival only** setting disables the second trigger. When it is turned on, the vessel must physically enter the arrival circle for the route to advance. This is useful when precision matters, but carries the risk of getting stuck on a waypoint the vessel cannot quite reach.

Choosing the arrival radius

The arrival circle radius is configured under **Settings > Vessel > Routes and Waypoints** (default 0.05 NMi, adjustable between 0.001 and 0.1 NMi).

As a rule of thumb, increase the radius for higher cruising speeds. A faster vessel covers more ground per second, so a wider circle gives the system enough lead time to declare arrival and begin the turn onto the next leg before the waypoint is overshoot. At slower speeds, a tighter radius is acceptable for greater precision.



Warning The distance between two consecutive waypoints in a route should never be smaller than the arrival circle radius. Otherwise the circles overlap and the route may advance through the second waypoint immediately after the first.

Both settings live under **Settings > Vessel** and are listed in the Navigation settings section below.

Persisting the active route across restarts

The system can remember the currently active route and automatically reactivate it the next time the application starts. To enable this:

1. Open **Settings > Vessel**.
2. Scroll to the **Routes and Waypoints** group.
3. Turn on **Persist active route, automatically activate on start up**.



Note Active route persistence is useful when the system is power-cycled mid-voyage: on next startup, navigation resumes automatically without requiring you to reactivate the route.

Chart orientation while navigating

The chart can be oriented in three modes: **North Up**, **Course Up**, and **Head Up**. While navigating, **Course Up** is often the most intuitive choice: the chart rotates so that the direction of travel is always pointing toward the top of the screen, matching what you see through the windshield.

Orientation is changed in the chart menu sidebar. For full details on orientation modes, including the orientation icon, see [Chapter 6](#).

Stopping navigation

To stop navigation at any time, use one of the following methods:

From the chart

Long-press on the active route line and tap **Deactivate** from the context menu.

From the Routes panel

Select the active route in the Routes tab and tap **Deactivate**. The button automatically toggles between **Activate** and **Deactivate** depending on the route state.

When navigation stops, the navigation data bar and steering guidance clear automatically, and the top bar reverts to the standard layout.

Navigation settings

The arrival circle radius, *Advance route waypoint on arrival only*, *Persist active route*, and *Steering guidance* toggle have already been covered earlier in this chapter in their respective sections. The remaining navigation-related settings control visual aids drawn around the vessel on the chart during navigation. They are all located under **Settings > Vessel**.

Setting	Description
COG Predictor Length (min)	How far ahead the Course Over Ground prediction line extends, expressed as the number of minutes the vessel would travel at its current speed. Range: 0 to 100 minutes.
Heading Predictor Length (NMI)	The length of the heading predictor line, drawn forward from the bow along the vessel's current heading. Range: 0 to 100 NMI.
Show Range Rings	Master toggle for concentric distance circles drawn around the vessel.
Number of Rings	The number of range rings drawn around the vessel (0 to 10).
Distance between rings	The spacing between each range ring.
Distance between rings Unit	The measurement unit for the ring spacing (Minutes, Nautical Miles, or Kilometers).
Show direction to Active Waypoint	Draws a directional line from the vessel pointing toward the currently active waypoint.



Note Waypoint, route, and track management settings (default icons, track recording, mark visibility) are documented in [Chapter 7](#).

9

Dashboard

What the Dashboard Pane Is

The Dashboard pane is a full-screen live display of your boat's sensor data --- speed, heading, wind, depth, water temperature, position, trip log, and more --- arranged as a grid of gauges and numeric cards. The data feeds directly from the NMEA sensors connected to your unit.

The Dashboard ships with four pre-built layouts (called **presets**), each tuned to a typical activity on the water. You switch between them with a single tap; the unit remembers which preset you had last and brings it back at the next boot.

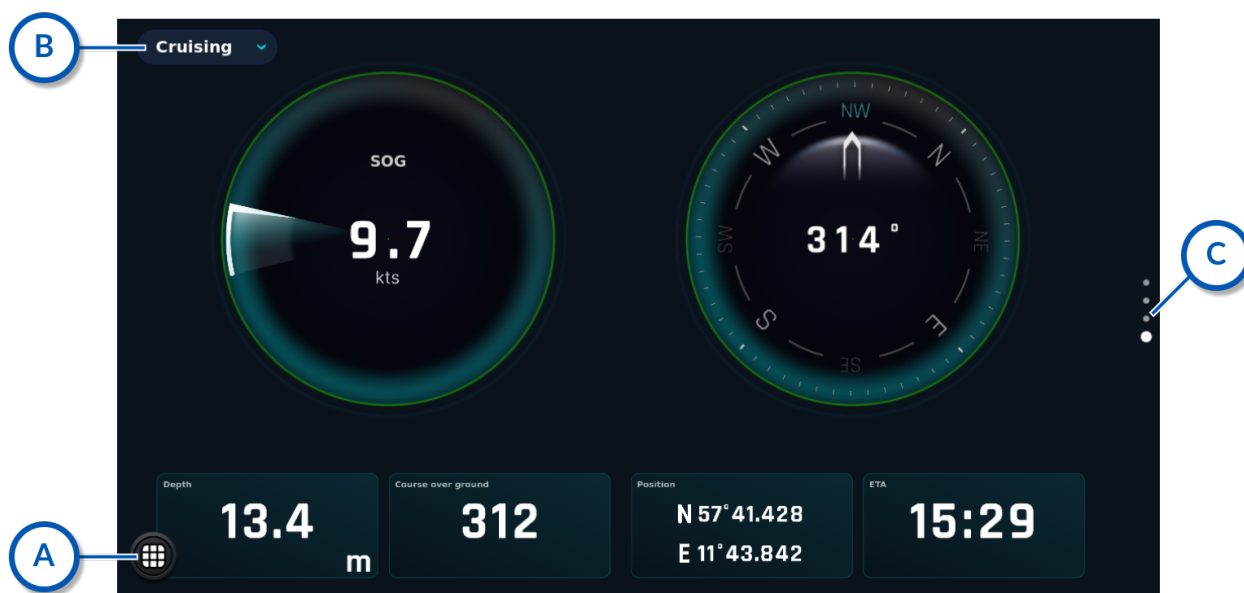


Note All values are shown in the units you picked under [Chapter 17 > Units](#) --- changing the unit there updates every Dashboard gauge and card automatically.

Opening the Dashboard

The Dashboard pane can be opened two ways from the home menu:

- Tap **Views** and pick **Dashboard** --- the gauges fill the whole screen.
- Tap **Combo Views** and pick (or build) a layout that places a Dashboard tile next to your other content. See [Chapter 4](#) for the combo-view workflow.

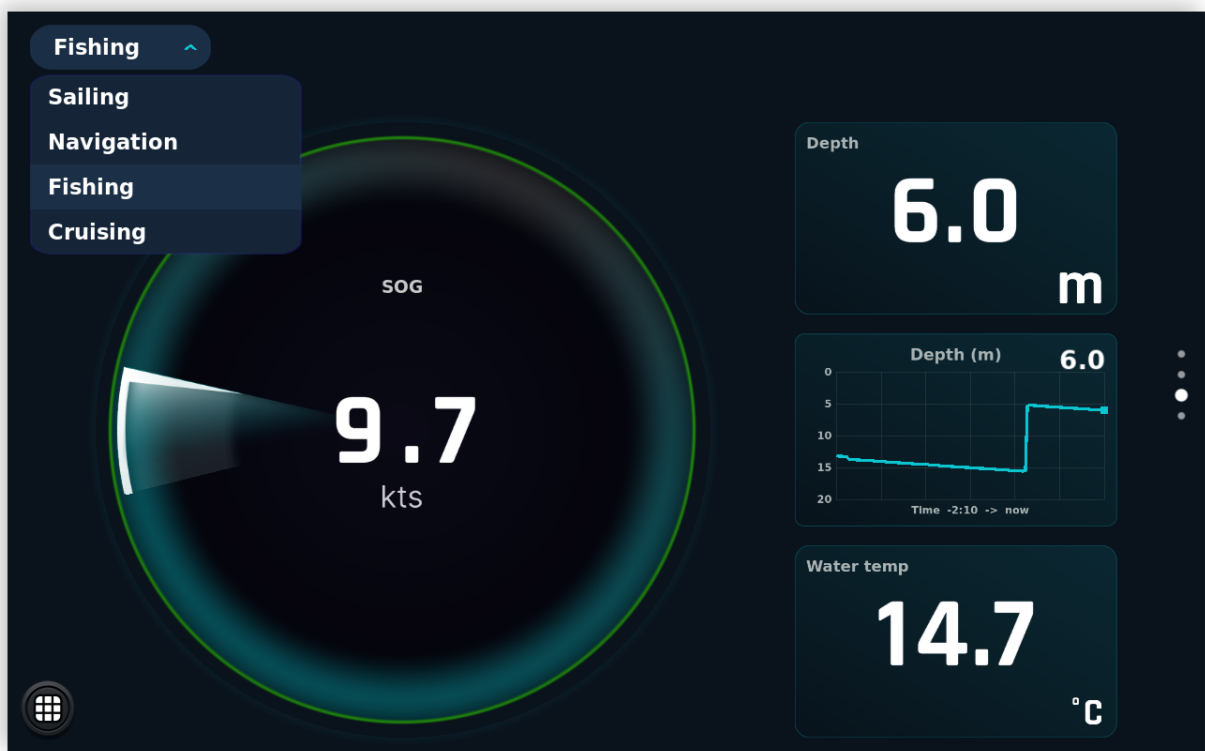


A	Preset dropdown --- tap to pick one of the four presets. See §9.3.
B	Preset dots --- one dot per preset; the highlighted dot shows which one is on screen.
C	Home button --- opens the home menu.

The Four Presets

Each preset is a different mix of gauges and data cards tuned to one kind of trip. There are two ways to switch between them:

- Tap the preset dropdown in the top-left of the canvas and pick a preset --- the new layout slides into view.
- Swipe up or down on the canvas with one finger to step through the presets --- swipe up to advance to the next preset, swipe down to step back to the previous one. The highlighted dot on the right edge moves with you so you can see where you are in the four-preset cycle.



Preset	What it shows
Sailing	A large wind gauge dominates the centre, framed by six numeric cards: Depth, True Wind Speed, COG, Boat Speed, True Wind Angle, and SOG. Best when wind is your primary concern.
Navigation	An SOG dial and a Compass dial across the top, with a 3D heading view of your boat below them and four data cards down the right edge. The right preset for piloting a planned route.
Fishing	A large SOG dial on the left and a stack of Depth, Depth Trend, and Water Temperature cards on the right --- everything you need for finding and holding a spot.
Cruising	An SOG dial and a Compass dial across the top with a bottom row of four data cards. A balanced day-cruise view.

Note The preset you had on screen when you last shut down comes back automatically at the next boot --- you don't need to pick it again.

Note In the **Navigation** preset, the cards that depend on an active route --- such as cross-track error and ETA --- read blank until you start one. Pick a destination from the chart, then re-open the Dashboard and the values populate automatically. See [Chapter 7](#) for the route workflow.

Reading the Gauges

Every preset is built from two kinds of components:

- **Gauges** --- circular instruments with a digital readout in the centre and a moving marker on a coloured ring (the Wind gauge, the Compass, the SOG gauge).
- **Data cards** --- compact rectangular tiles showing a label and a single numeric value (Depth, Boat Speed, Water Temperature, and so on).

The most distinctive gauges:

Gauge	What it shows
Wind gauge	A circular wind rose with a needle that points to the true wind angle and a digital readout of the true wind speed. The needle is smoothed so it tracks gusts without jittering.
Compass	A heading dial showing your true heading. The bow indicator is fixed at the top; the compass rose underneath rotates as you turn.
SOG gauge	A circular speed indicator with a small wedge on the outer ring marking your current speed against the full scale, and the SOG value spelled out digitally in the middle.
3D heading view	A perspective view of your boat with a coloured corridor stretching ahead in the direction the bow is pointing. The corridor shifts as you turn, giving you a visual sense of your heading at a glance. Featured in the Navigation preset.
Depth Trend	A small strip plot showing the last ten minutes of depth readings, useful for spotting drop-offs or trends while fishing or anchoring.

Day and night colours follow the global theme you set in [Chapter 17](#) --- the dials, cards, and accents all re-tint together when you switch the unit between Day and Night.

 **Note** If a sensor is not reporting --- no wind transducer connected, no GPS fix, no depth sounder paired --- the affected gauges and cards read -- instead of a value. Reconnect or restart the sensor and the readouts populate automatically; no Dashboard action is needed.

 **Note** The Dashboard is a separate feature from the [Instruments Bar](#) described in Chapter 5. The Instruments Bar is the slim metric strip that can sit at the top of every screen; the Dashboard is a full canvas you open from the home menu. Both pull from the same NMEA sensors but display them differently.

 **Note** The Dashboard uses standard nautical abbreviations on its cards: **TWS** = True Wind Speed, **TWA** = True Wind Angle, **COG** = Course Over Ground, **SOG** = Speed Over Ground, **HDT** = True Heading, **STW** = Speed Through Water.

10

Radar

Understanding marine radar

Deeprey displays radar returns from an external scanner on a dedicated **radar canvas** (PPI view) and can overlay them on the chart. This chapter covers how to operate the scanner, tune the image, track targets, set up guard zones, and use measurement tools.

Radar terminology

The rest of this chapter uses a handful of standard marine radar terms. Understanding what each one means makes the sidebar controls and menus easier to interpret.

Term	Meaning
PPI	Plan Position Indicator. The circular radar display with the vessel at the centre and returns drawn in their true position and bearing.
Range	The maximum distance the radar is currently configured to display. Changing the range zooms the PPI in or out.
Heading line (SHM)	A line drawn from the vessel's position at the centre of the PPI out to the rim of the display, showing where the bow is pointing. Also called the Ship's Head Marker.
Gain	The amplification applied to returning echoes. Higher gain makes weak targets visible but also increases clutter.
Clutter	Unwanted returns from sea waves (sea clutter) or rain (rain clutter). The system provides filters to suppress each.
Doppler	A scanner mode (supported on Navico 4G / Halo) that colours targets by their radial velocity --- vessels closing on your position appear in a different colour from those opening away.
ARPA	Automatic Radar Plotting Aid. The radar's ability to track a target frame-to-frame and compute its course, speed, and collision-avoidance metrics.
CPA / TCPA	Closest Point of Approach / Time to CPA. The minimum distance a tracked target will pass from your vessel, and how long until that occurs. The primary figures of merit for collision avoidance.
EBL / VRM	Electronic Bearing Line / Variable Range Marker. On-screen tools to measure the bearing and distance of any point on the PPI.
Guard zone	A user-defined region of the PPI that triggers an alarm when any target enters it.
Blind sector	A range of bearings in which the radar is configured not to transmit, typically set to avoid reflections off a mast, stack, or crew area. Also called a no-transmit zone.

Note Radar is an aid to navigation, not a substitute for visual watch and sound navigational judgement. Always cross-check radar returns with visual observation and chart data. See [Chapter 2](#) for radiation hazard distances.

Supported radar scanners

Deeprey supports the following radar hardware. The correct radar type must be selected in **Settings > Radar > Installation** before the scanner will transmit.

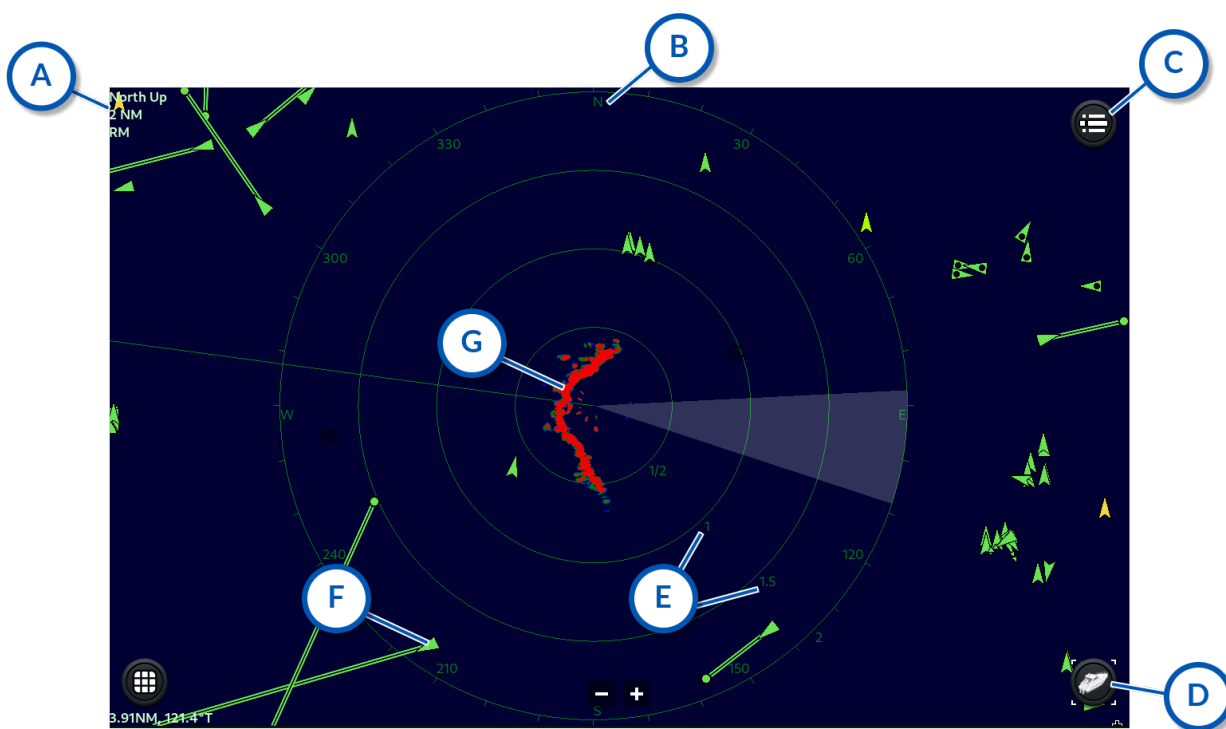
Vendor	Supported models
Navico	BR24, 3G, 4G (A and B variants), Halo (A and B variants).
Garmin	HD, xHD.
Raymarine	E120, Quantum.

Note Deeprey auto-detects the connected scanner over the network. If auto-detection fails, the radar type can be set manually in the Installation settings --- see Radar settings at the end of this chapter.

Note Navico, Garmin, and Raymarine are trademarks of their respective owners. Deeprey is not affiliated with, endorsed by, or sponsored by these manufacturers. Support for their radar scanners is provided through an open-source driver developed by the OpenCPN community through network protocol analysis of publicly transmitted data, and is offered on an as-is basis.

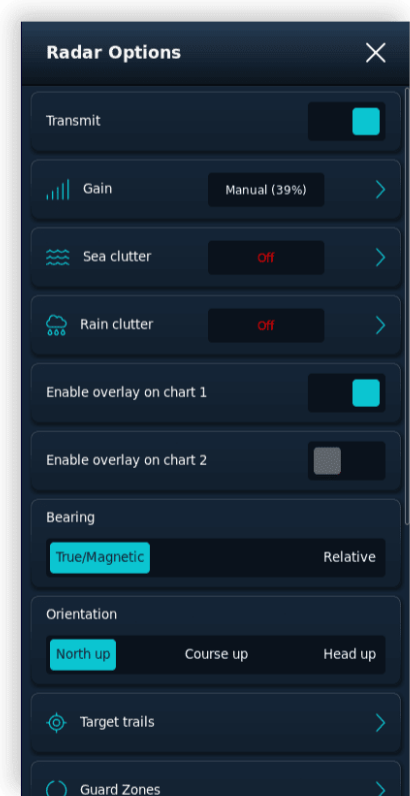
The radar canvas and sidebar

Open the radar view from the home menu by tapping **Radar**, or add the radar canvas to a combo layout (see [Chapter 4](#)). The radar canvas shows a PPI view with your vessel at the centre and returns drawn around it. All scanner controls are grouped in the **Radar Options** sidebar, opened from the chart-style menu button on the canvas.



A	Status readout. Shows current chart orientation (North Up / Course Up / Head Up), range (or Auto + current range), and motion mode (RM = Relative Motion, TM = True Motion).
B	Compass bearing scale. Degree labels around the rim of the PPI. Cardinal letters (N, E, S, W) replace the 0°, 90°, 180°, 270° labels when a heading source is available.
C	Radar Options button. Opens the right-side sidebar with all scanner controls (Transmit, Gain, Sea clutter, Target trails, Guard zones, and so on).
D	Center-on-ownship button. Recenters the PPI on the vessel's GPS position if the view has been panned or offset.
E	Range rings and distance labels. Concentric circles at fixed fractions of the current range; the distance of each ring is printed on one spoke.
F	AIS target. A passing vessel received from the AIS feed (see Chapter 11), drawn on the PPI when the AIS and ARPA Targets toggle is on. The short line from the symbol is the target's course-over-ground vector.
G	Radar returns. Live echoes from the scanner, coloured according to the selected radar palette (see Radar settings --- Display Colors).

The Radar Options sidebar



Note The sidebar scrolls vertically. The screenshot above shows the top of the panel through **Guard Zones**; **Advanced controls**, **AIS and ARPA Targets**, **Timed transmit**, **Targets and EBL/VRM**, and the footer **INFO** button appear below when you scroll.

Note The sidebar adapts to the connected scanner. Controls, modes, and sub-options that your radar does not support are hidden automatically. The sections below describe every control that can appear; your sidebar may show a subset depending on the radar type.

The sidebar is your control panel for the scanner. It is organised into the following groups, each documented in the sections below:

- Transmit** Master on/off toggle for the scanner.
- Gain** Collapsible panel with the gain slider and mode selector (Off / Manual / Auto variants, scanner-dependent).
- Sea clutter** Collapsible panel with the sea-clutter filter slider and mode selector (Manual / Auto variants).
- Rain clutter** Collapsible panel with the rain-clutter filter slider and mode selector (Off / Manual).
- Enable overlay on chart 1** Toggles the radar echo overlay on the first chart canvas.
- Enable overlay on chart 2** Toggles the radar echo overlay on the second chart canvas (when a dual-chart combo layout is active).
- Bearing** Selects how bearings are reported on the PPI --- **True/Magnetic** (absolute, referenced to North) or **Relative** (measured from the vessel bow).

Orientation	Selects the PPI orientation --- North up, Course up, or Head up.
Target trails	Expandable panel for a fading history behind each return. Mode: Off / 15s / 30s / 1m / 3m / 5m / 10m / Continuous. Motion: Relative or True.
Guard Zones	Expandable panel for the two configurable alarm zones.
Advanced controls	Expandable panel with vendor-specific tuning: Noise rejection, Threshold, Target expansion, Interference rejection, Target separation, Fast scan, and Target boost. Each sub-control is hidden when the connected scanner does not support it.
AIS and ARPA Targets	Overlays AIS vessels and ARPA-tracked targets on top of the PPI.
Timed transmit	Expandable panel for automatic transmit / standby cycling. Available on Navico and Garmin xHD; hidden on scanners that do not support it.
Targets and EBL/VRM	Expandable panel grouping ARPA Acquire / Delete actions and the EBL/VRM measurement toggles.



Note The footer of the sidebar shows the currently detected radar model, followed by an **INFO** button that opens a diagnostic dialog with firmware, packet rate, and connection details.

Operating the radar

This section covers the day-to-day operational controls: powering the scanner on and off, changing range, and choosing how the PPI is oriented.

Transmit and standby

1. Open the **Radar Options** sidebar.
2. Tap the **Transmit** toggle at the top. The scanner starts transmitting; returns start to appear on the PPI.
3. Tap the toggle again to return the scanner to standby. In standby, the scanner is powered but not emitting.



Warning Keep clear of the radar antenna while it is transmitting. See [Chapter 2](#) for radiation hazard distances.

Adjusting range

Range is adjusted in two ways:

- Tap the **zoom** buttons at the bottom centre of the radar canvas, between the Home button and the Center-on-ownership button. Tap **+** (right) to step down to a smaller range (closer detail); tap **-** (left) to step up to a larger range (more area).
- Scroll the mouse wheel over the radar canvas. Wheel direction can be inverted with the **Reverse mouse wheel zoom direction** setting in **Settings > Radar > Parameters**.

Each action moves to the next radar range step supported by the scanner. The current range appears in the status readout at the top-left of the PPI.

When the radar is overlaid on a chart canvas (see *Radar overlay on chart* below), the range follows the chart's zoom level automatically --- the status readout then shows **Auto** alongside the current range.

Orientation

The PPI can be displayed in three orientation modes, selected in the sidebar:

North up	North is at the top of the PPI. The radar picture does not rotate as the vessel turns.
Course up	The vessel's Course Over Ground is at the top. The PPI rotates to match your direction of travel.
Head up	The vessel's heading is at the top; the PPI rotates to keep the bow pointing up. Requires a heading source --- if none is available, the picture does not rotate.

Bearing reference

The **Bearing** control in the sidebar chooses how bearings are reported on-screen --- in EBL/VRM readouts, ARPA target labels, and the cursor readout at the bottom-left of the PPI. It does not change the compass scale around the PPI rim, which is controlled by Orientation.

True/Magnetic	Bearings are absolute --- referenced to North. Useful for plotting and cross-referencing chart bearings. Whether readings are True or Magnetic depends on whether a magnetic variation source is configured under Settings > Network .
Relative	Bearings are measured from the vessel's bow. Useful for collision avoidance --- a target on a constant relative bearing is on a collision course with you.



Note If no heading source is available, the Deeprey sidebar forces the Bearing selection to **Relative** regardless of the setting, because absolute bearings require a known heading.

Timed transmit

Timed transmit cycles the scanner between transmit and standby, saving power and reducing thermal load. Useful at anchor, on long passages, or any time full-time radar coverage is not required.

1. Open **Radar Options > Timed transmit**.
2. Turn on **Timed Standby enabled**.
3. Set **Timed Standby** --- the standby duration (0--60 minutes, default 5).
4. Set **Timed Transmit** --- the transmit duration (0--60 minutes, default 5). After each transmit period the scanner returns to standby for the Timed Standby duration, then cycles again.

 **Note** Timed transmit is only available on scanners that support it (Navico and Garmin xHD). If the **Timed transmit** section is missing from the sidebar, your radar does not expose this capability.

Blocking a bearing sector

If the antenna is mounted near a mast, stack, crew area, or other sensitive object, you can define one or more bearing sectors in which the radar will not transmit. This prevents unwanted near-field reflections and keeps high-intensity energy away from people and equipment.

1. Open **Settings > Radar > Installation**.
2. Scroll to the **No transmit** controls.
3. Turn on **No transmit start enabled**.
4. Set **No transmit start** --- the start bearing of the sector, in degrees relative to the vessel's bow (0° ahead, +90° starboard, -90° port, ±180° astern). Accepted range: -180° to +180°.
5. Turn on **No transmit end enabled** and set **No transmit end** to the end bearing of the sector.
6. Repeat for additional sectors if your scanner supports them (sectors are numbered 1--4 when multiple are available).

 **Note** No-transmit sectors are supported on Navico scanners (up to four) and Garmin xHD (one). Garmin HD and Raymarine scanners do not expose this capability --- the No transmit controls are hidden from the Installation panel. Each sector blocks transmission only when both the start and end bounds are enabled.

Tuning the radar image

The three primary image quality controls --- **Gain**, **Sea clutter**, and **Rain clutter** --- are accessed from the main sidebar. Each opens a panel with a 0--100 slider and a mode selector. The modes and named presets offered by the selector depend on the connected radar model; unsupported modes are hidden automatically.

Gain

Gain controls the amplification of returning echoes. Slider range 0--100, default 50.

Manual You set the gain with the slider. Higher values reveal weaker targets but also amplify clutter and noise.

Auto The radar adjusts gain automatically. On Navico and Raymarine scanners a single **Auto** mode is offered. On Garmin HD and xHD two presets are offered: **Low** (less sensitive, fewer false returns) and **High** (more sensitive, better weak-target detection).

Sea clutter

Sea clutter suppresses the strong short-range returns produced by wave crests. Without this filter, the area around the vessel looks like a noisy blob. Slider range 0--100, default 0.

Off Disables the sea-clutter filter entirely. Available on Garmin HD and xHD only, and is the default on those scanners.

Manual You set the suppression level with the slider. Apply the minimum that hides wave clutter while preserving real targets.

Auto The radar adjusts the filter based on sea state. The presets offered depend on your scanner:

- **Navico BR24 / 3G / 4G:** Harbour, Offshore
- **Navico Halo:** single Auto mode
- **Raymarine E120:** Harbour, Offshore, Coastal
- **Raymarine Quantum:** single Auto mode
- **Garmin HD / xHD:** Calm, Medium, Rough

Rain clutter

Rain clutter suppresses the diffuse returns produced by precipitation. No automatic mode is provided on any supported scanner --- it is always a manual control. Slider range 0--100.

Off Disables the rain filter. Available on Raymarine and Garmin scanners, and is the default on those scanners. On Navico scanners, rain clutter is always a **Manual** slider that defaults to 0 (no filtering).

Manual Set the suppression level with the slider (0--100).



Warning

Aggressive clutter suppression can hide weak but real targets. Set each clutter filter to the lowest level that still clears the unwanted returns.

Tuning workflow

A practical sequence for tuning a cluttered or noisy picture:

1. Start with **Gain** set to Auto. This is the best baseline in most conditions.
2. If the area around the vessel is a solid blob, increase **Sea clutter**. If a named preset matches your conditions (Harbour, Offshore, Coastal, Calm, Medium, or Rough, depending on scanner), use it; otherwise switch to Manual and start near 25, increasing until wave returns fade.
3. If precipitation is visible as a diffuse haze, increase **Rain clutter** in Manual. Start near 25.
4. Fine-tune **Gain** in Manual if you need to reveal weaker targets, but watch for clutter returning.
5. Always confirm a real target is not being filtered out by briefly reducing each filter one at a time.

Advanced controls

Tap **Advanced controls** in the sidebar to open vendor-specific tuning options. Seven controls can appear, depending on what the connected radar declares --- unsupported controls are hidden automatically.

Control	Purpose
Noise rejection	Suppresses random electronic noise in the raw return. Available on Navico 3G / 4G (Off / Low / High) and Navico Halo (Off / Low / Medium / High). Not offered on Navico BR24, Raymarine, or Garmin.
Threshold	Blanks any pixel whose signal strength is below the set percentage. Slider 0--100 %, default 0 (no blanking). Available on every supported scanner.
Target expansion	Enlarges small targets so they remain visible at long range. Off / On on Navico BR24 / 3G / 4G and Raymarine Quantum; four-level Off / Low / Medium / High on Navico Halo. Not offered on Raymarine E120 or Garmin.
Interference rejection	Filters interference caused by other radars in the area. Levels vary: Off / Low / Medium / High on Navico, Off / Low / Medium on Raymarine E120, numeric 0--5 on Raymarine Quantum, Off / On on Garmin HD and xHD.
Target separation	Helps distinguish two close returns instead of merging them into one blob. Off / Low / Medium / High. Available on Navico 4G and Halo only.
Fast scan	Speeds up the antenna rotation rate. Off / On on Navico BR24 / 3G / 4G and Garmin xHD, Off / Medium / High on Navico Halo, Slow / Fast on Garmin HD. Not offered on Raymarine.
Target boost	Increases the apparent brightness of targets at the expense of range resolution. Off / Low / High on Navico and Raymarine E120. Not offered on Raymarine Quantum or Garmin.

Targets on the PPI

This section covers everything related to spotting and tracking targets on the radar display: overlaying AIS and ARPA on the PPI, drawing target trails, and acquiring and deleting ARPA tracks.

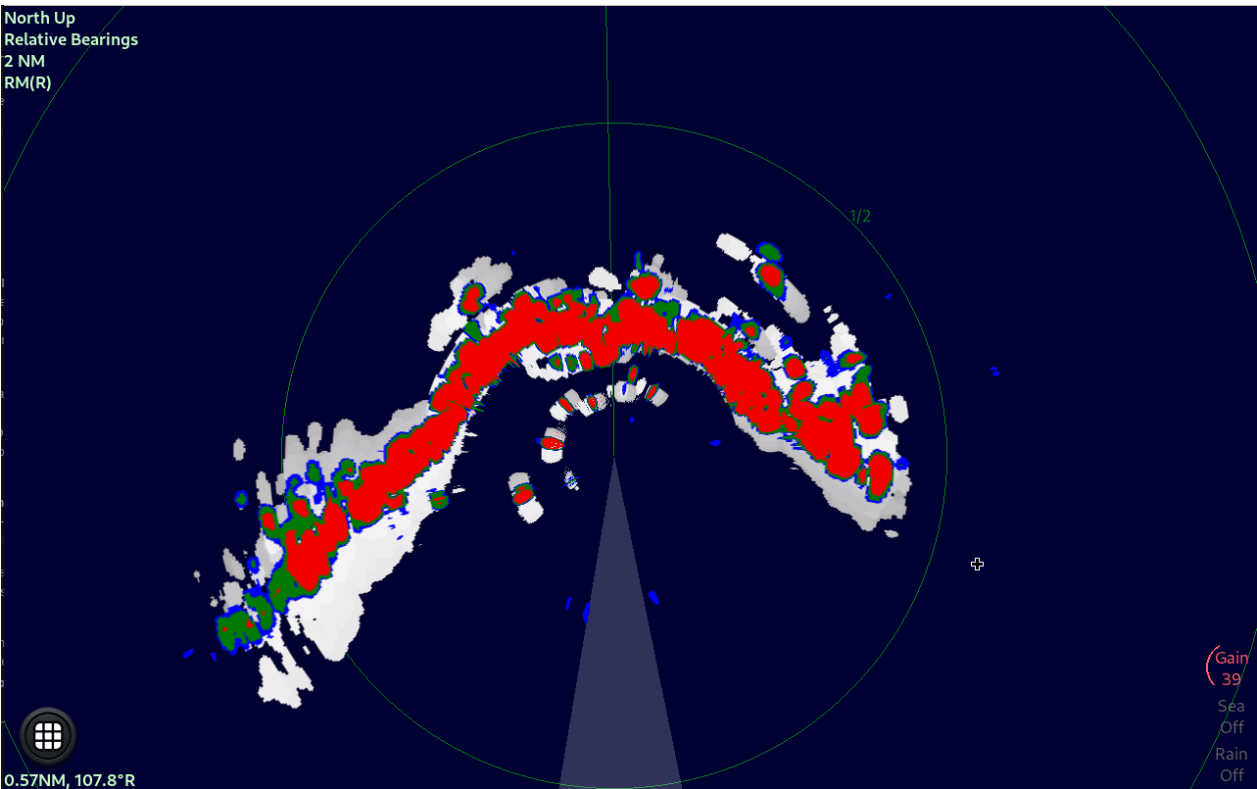
Showing AIS and ARPA on the PPI

The **AIS and ARPA Targets** toggle in the main sidebar controls a single overlay layer that draws both AIS vessels and ARPA-tracked targets on top of the raw radar image. When off, the PPI shows raw returns only; when on, target symbols are drawn over them.

Note This overlay only renders when the system has a valid heading source. With no heading data, target symbols are not drawn on the PPI even if the toggle is on. Connect a compass (or enable *Enable COG as heading* in the radar settings) to restore the overlay.

Target trails

Target trails draw a fading history behind each radar return, making it easy to spot moving vessels against static returns such as land.

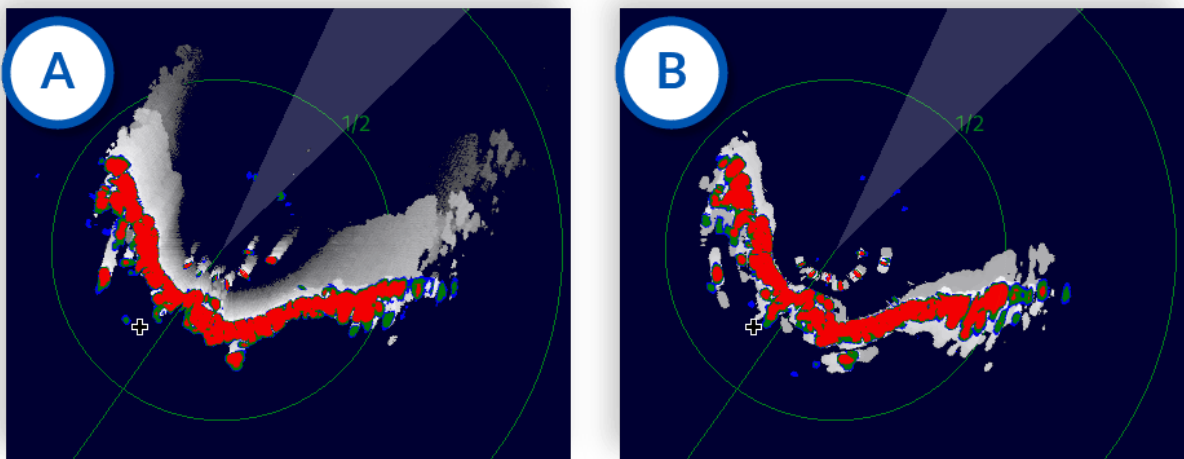


PPI with target trails in Relative Motion (RM) --- red returns are the current sweep; the grey/white halo behind them is the decaying trail history.

Open **Radar Options > Target trails:**

- Target trails** Master on/off toggle.
- Target trails mode** Trail length. Choose one of **15s**, **30s**, **1m**, **3m**, **5m**, **10m**, or **Cont.** (continuous --- trails never fade).
- Motion** **Relative motion** draws trails in the PPI frame --- stationary targets leave no trail; moving targets trail behind them and a vessel on a constant-bearing collision course leaves a trail pointing straight at your own ship. **True motion** draws trails in true geographic coordinates --- your own vessel leaves a trail as it moves and stationary objects on the ground stay put.

Clear trails Erases all current trails and starts fresh.

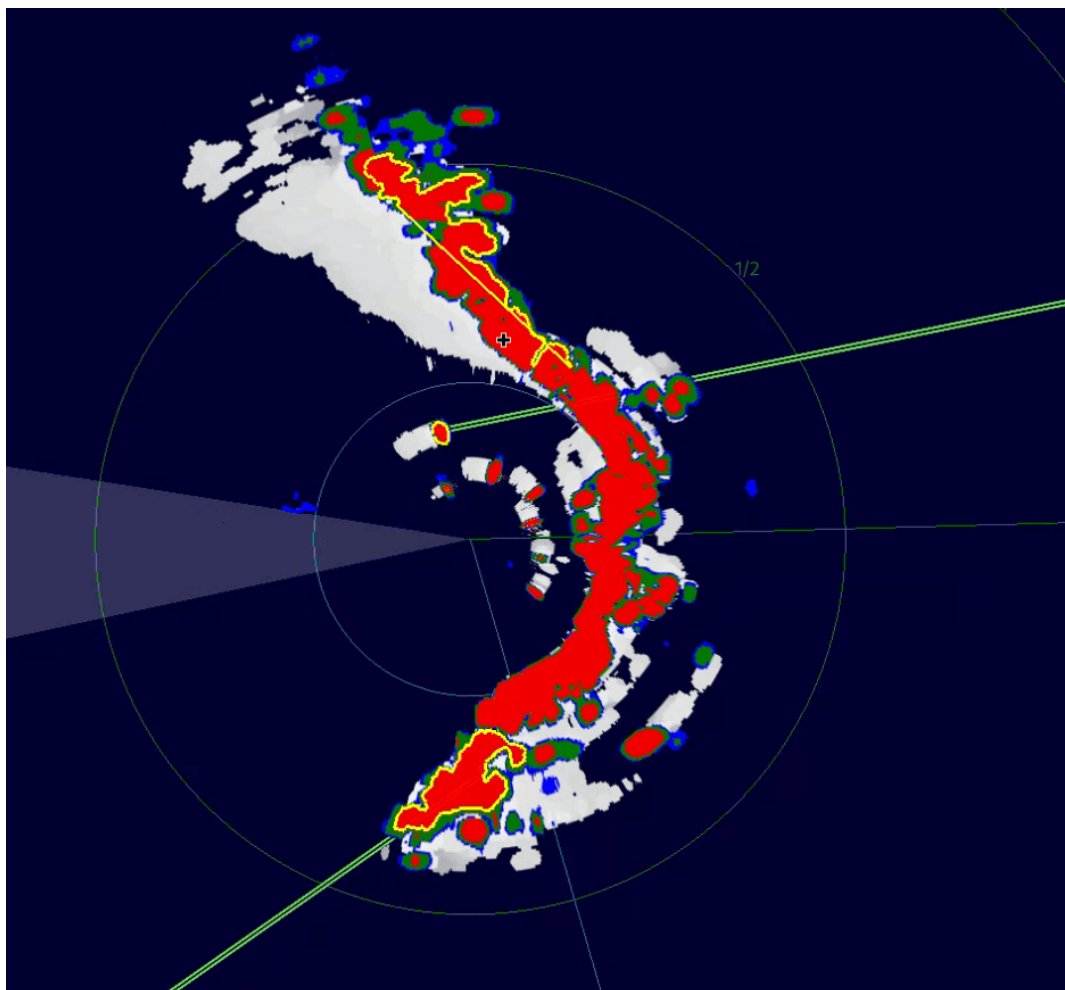


A	True motion. Trails are drawn in ground-fixed coordinates. The coastline shows the large sweeping halo as the buffer shifts each scan to keep ground positions anchored; moving vessels would leave trails along their actual ground tracks.
B	Relative motion. Trails are drawn in the PPI frame with your vessel fixed at centre. A stationary coastline and a stationary own-ship produce only tight halos around the current returns. When the own vessel moves, the coastline appears to slide opposite to your motion and its trail grows.

Note Use **Relative motion** for collision avoidance --- a target on a steady collision course leaves a trail pointing directly at your vessel. Use **True motion** to see the actual ground tracks vessels are following.

Tracking targets (ARPA)

ARPA (Automatic Radar Plotting Aid) tracks acquired returns sweep to sweep and computes each target's course and speed. Tracked targets are drawn on the PPI as a contour outline around the radar blob (in the ARPA colour set in Radar settings) and are also listed in the chart's AIS targets list alongside AIS contacts, under the class **ARPA**. Up to 100 concurrent targets can be tracked.



Several ARPA targets outlined by their yellow contour lines on the PPI. The contour traces the edge of each acquired radar blob and is redrawn on every sweep.

Acquiring a target

The same procedure works from either the sidebar or the context menu --- both paths invoke the same **Acquire Target** action, which uses the cursor position on the PPI.

1. Tap the return on the PPI. A crosshair cursor is placed at that position and the geographic coordinates of the cursor are recorded.
2. Invoke **Acquire Target** either from the context menu (long-press the canvas) or from **Radar Options > Targets and EBL/VRM**.
3. A new tracked target is added at that position. It passes through several acquisition states --- *first seen*, *contour found*, *speed and course measured*, *speed and course verified* --- before becoming fully active, which typically takes four to five antenna rotations.
4. Once active, the target's contour is drawn on the PPI and the target appears in the chart's AIS targets list.



Note Without first tapping the PPI to place the cursor, **Acquire Target** has no position to work from and will do nothing. Always tap the return first. If the tap position is not on a detectable return, the acquisition attempt will be dropped during the contour search and no target will appear.

Deleting targets

Delete Target

Removes the single tracked target whose position is closest to the cursor. As with **Acquire Target**, tap the PPI first to place the cursor near the target you want to remove.

Delete All Targets

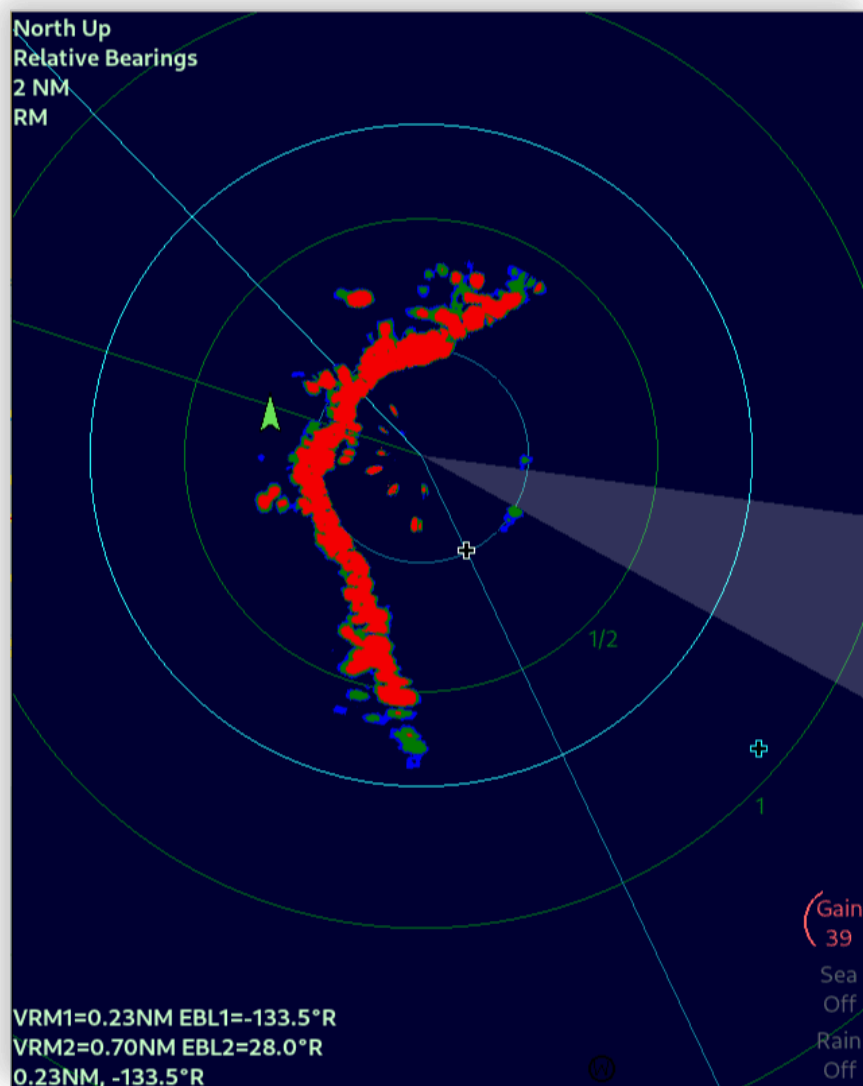
Removes every currently tracked ARPA target in one action.

Both actions appear in the radar context menu and in the **Targets and EBL/VRM** sidebar panel. Targets also disappear automatically if they are missed for more than three consecutive antenna sweeps or if their estimated speed exceeds sensible limits.

Measuring with EBL and VRM

EBL (Electronic Bearing Line) and VRM (Variable Range Marker) are measurement tools for reading off the bearing and distance to any point on the PPI. In Deeprey the two are placed together as a pair: the EBL is the straight line from your vessel's position out to the point of interest, and the VRM is the full circle at that point's range. The bearing is reported as degrees and the distance in the configured range units.

Deeprey supports **two independent pairs**, labelled **1** (dark teal) and **2** (cyan), so you can simultaneously mark two points of interest. When at least one pair is active, a numerical readout of the form **VRM1=... EBL1=...** appears on the canvas.



Two EBL/VRM pairs placed on separate points. The bearing line runs from the vessel centre through each point to the rim; the circle passes through the point at its current range. The numerical readout in the lower-left gives the exact range and bearing for each pair --- pair 1 in dark teal, pair 2 in cyan.

Placing an EBL/VRM

Placement uses the cursor position on the PPI, so you first need to tap the point you want to measure. The same **Place EBL/VRM** action is available from both the context menu and the sidebar --- they invoke identical logic.

1. Tap the point on the PPI you want to measure. A crosshair cursor appears at that location.
2. Either long-press the canvas to open the context menu and tap **Place EBL/VRM 1** (or **Place EBL/VRM 2**), or open **Radar Options > Targets and EBL/VRM** and turn on **Show EBL/VRM1** (or **Show EBL/VRM2**).
3. The bearing line and the range ring for that pair are drawn on the PPI in their assigned colour, and the bearing/distance readout appears on the display.



Note The action is a toggle. Invoking **Place EBL/VRM 1** a second time while the pair is already displayed removes it --- there is no separate clear button. The sidebar **Show EBL/VRM1** toggle reflects this state.

Moving an EBL/VRM

To reposition a pair, clear it first (tap **Show EBL/VRM1** off or re-invoke **Place EBL/VRM 1** from the context menu), tap a new point on the PPI, then place the pair again. The pair always re-locks to the current cursor position.

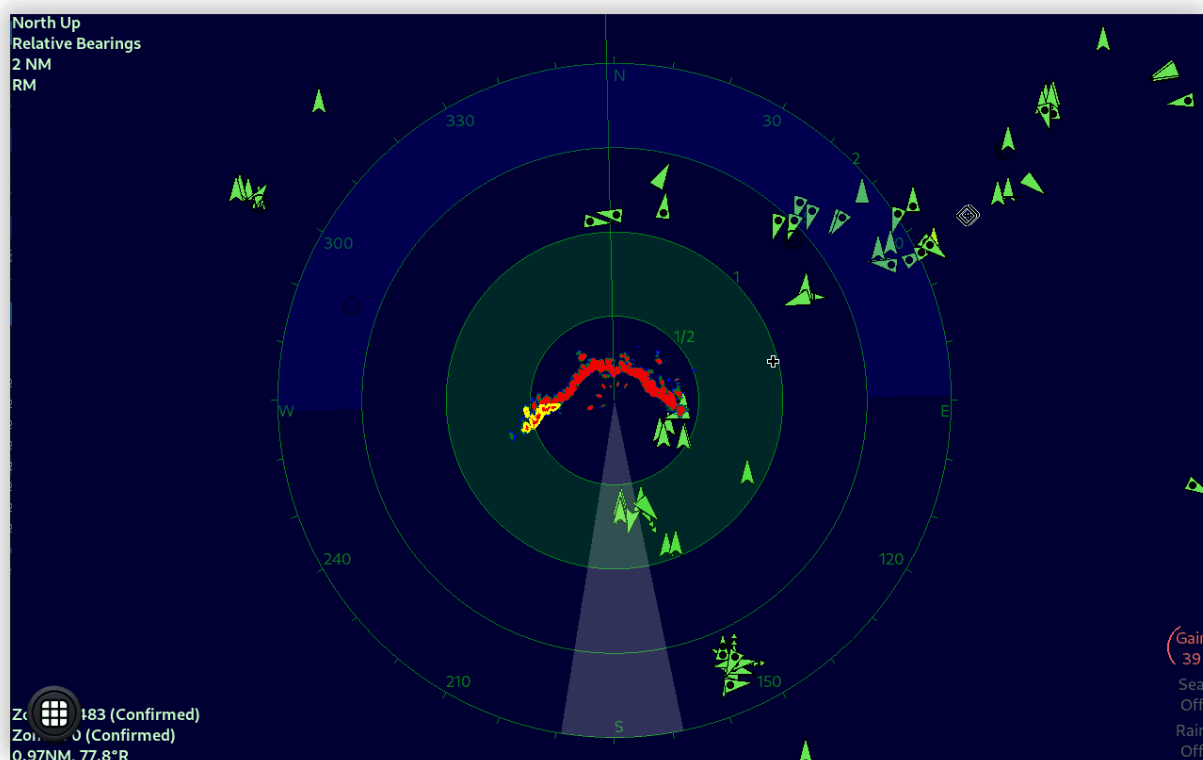
Clearing an EBL/VRM

Tap **Show EBL/VRM1** or **Show EBL/VRM2** off in the sidebar, or invoke **Place EBL/VRM 1** / **Place EBL/VRM 2** again from the context menu. Both actions remove the line and the circle from the display and hide the readout for that pair.

Guard zones

A **guard zone** is a region of the PPI that the radar watches continuously. When enough echoes appear inside the zone, the system sounds an alarm and can optionally start ARPA tracking on the detected targets. Guard zones are the standard way to set up an unattended watch --- for instance, a wedge ahead of the bow that beeps if anything gets within a mile, or a full ring that alerts if anything enters a standoff distance while you're at anchor.

Deeprey supports **two independent zones**: Zone 1 (green) and Zone 2 (blue). Each can be configured separately, and both can be armed at the same time.



Two armed guard zones on the PPI: Zone 1 (green) configured as a **Circle** at inner range, and Zone 2 (blue) configured as an **Arc** covering the forward bearings at longer range. The lower-left readout shows both zones as **Confirmed**, and an ARPA contour (yellow) is tracking a detected target near the centre.

Configuring a guard zone

1. Open **Radar Options > Guard Zones**.
2. Tap **Guard Zone 1 Green** or **Guard Zone 2 Blue** to open that zone's settings.
3. Choose **Zone type**: **Arc** (a wedge defined by a bearing range) or **Circle** (a full ring at all bearings).
4. Set **Inner range** and **Outer range** to define the radial extent of the zone. The values are in the radar's configured range units (see *Range Units* in Radar settings): nautical miles when Range Units is set to Mixed or Nautical Miles, kilometers when set to Kilometers.
5. For Arc zones, set **Start bearing** and **End bearing** (in degrees, -180 to $+180$, *relative to the bow*: 0° is dead ahead, $\pm 180^\circ$ is astern, positive to starboard, negative to port).
6. Turn on **Alarm On** to sound an audible alert when targets enter the zone.
7. Turn on **ARPA On** to automatically start ARPA tracking on any new return detected inside the zone.

<

Guard Zone 1 Green

×

Simulation ☐

Zone type

Arc

Circle

Inner range

−

0.50

+

Outer range

−

1.00

+

Start bearing

−

-90.00

+

End bearing

−

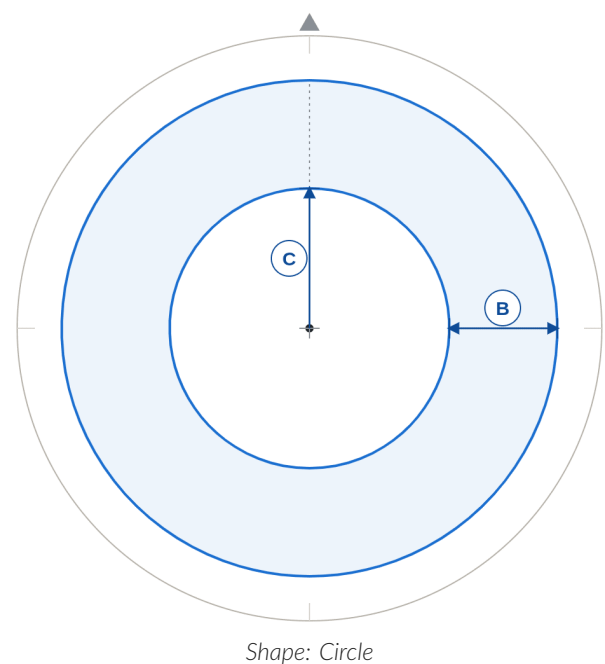
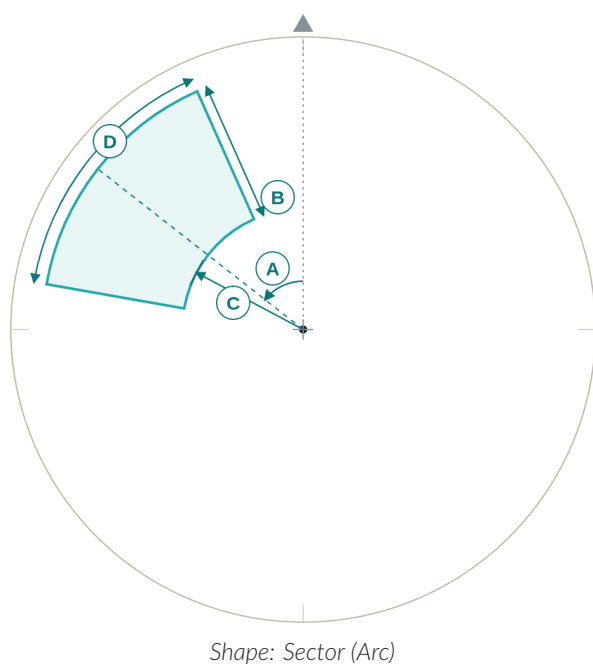
90.00

+

ARPA On ☒

Alarm On ☒

Per-zone settings panel for **Guard Zone 1 Green**. The same layout is used for Zone 2 Blue. **Start bearing** and **End bearing** appear greyed when **Zone type** is set to **Circle**, since a circular zone spans all bearings.



- A** Bearing of the sector (angular direction from the bow to the middle of the wedge). Corresponds to the midpoint of the Deeprey **Start bearing** and **End bearing** settings.
- B** Sector width (Arc) or ring depth (Circle) --- the angular or radial thickness of the zone. In Deeprey this is the difference between **Start/End bearing** (Arc) or between **Inner/Outer range** (Circle).
- C** Inner range --- distance from the vessel to the inner edge of the zone. Corresponds directly to **Inner range**.

D Outer range (Arc only) --- distance to the outer edge of the wedge. Corresponds directly to **Outer range**.

 **Note** Arc zone bearings are **relative to your vessel's heading** --- the zone rotates with the bow as the ship turns. A zone set to cover ahead of the bow stays ahead of the bow no matter which way you point. ARPA auto-acquisition requires a valid heading source; without a compass (or the *Enable COG as heading* option), new targets inside the zone will not be picked up.

 **Note** A guard zone is only drawn on the PPI when it is armed --- that is, when **Alarm On** or **ARPA On** is enabled (or within a few seconds of being edited). A zone that is configured but fully disarmed is invisible on the display.

Enabling and disabling

Guard zones can be armed or disarmed in two ways:

- From the sidebar, open the zone's settings panel (**Radar Options > Guard Zones > Guard Zone 1 Green / 2 Blue**) and toggle the individual **Alarm On** and **ARPA On** switches. This lets you control the alarm and ARPA features independently.
- From the radar context menu on the PPI, pick **Enable Guard Zone 1 / 2** (or **Disable**). The context-menu action flips *both* Alarm On and ARPA On for that zone in a single tap --- the quickest way to arm or disarm a pre-configured zone.

Alarm behaviour

When the radar sees enough target pixels inside the zone on a complete sweep, an alarm is raised. A bogey dialog opens showing a per-zone detection count and a **Confirm** button. The alarm sound then repeats at the interval configured in **Settings > Radar > Parameters > Guard zone sound alarm** (1--120 s, default 30 s) until you tap **Confirm** or until the targets leave the zone. Confirming silences the sound but leaves the guard zone armed; the alarm fires again the next time a fresh detection occurs.

The visual appearance of the guard zone on the PPI is controlled by **Settings > Radar > Parameters > Guard Zone Styling**. Three choices:

- **Shading** --- the zone area is filled with a translucent tint in its zone colour (green for Zone 1, blue for Zone 2). Default.
- **Outline** --- only the zone's borders are drawn, in red. This style uses a single alarm-cue colour rather than the per-zone colour.
- **Shading and outline** --- translucent fill plus a translucent outline, both in the zone colour.



Warning A guard zone alarm is only as reliable as the radar image inside the zone. If **Sea clutter** or **Rain clutter** is suppressing weak returns inside the zone, those returns will not trigger the alarm. Tune the radar image first, then arm the guard zone.

Radar overlay on chart

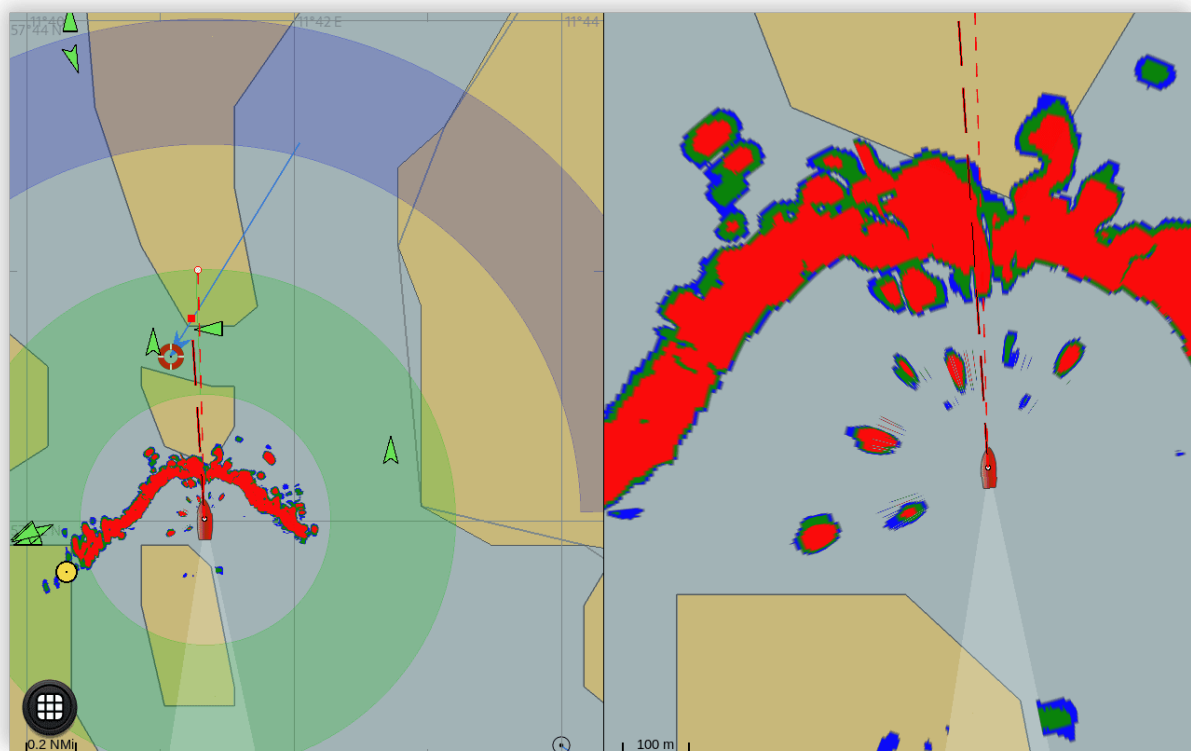
Radar returns can be drawn on top of a chart canvas to show contacts alongside charted features. This is especially useful in restricted visibility: you can see both the charted environment and the live radar echoes in the same view, with the overlay automatically following the chart's orientation, scale, and position.

Enabling the overlay

1. Open **Radar Options**.
2. Turn on **Enable overlay on chart 1** to overlay the radar on the first chart canvas. **Enable overlay on chart 2** does the same for a second chart canvas in combo layouts; the toggle is always available but only has a visible effect when chart 2 is actually on screen.
3. The radar returns appear on top of the chart, rotated and scaled to match the chart's current view.

Note The overlay only draws when the system has a valid heading source. With no compass and no *Enable COG as heading* option set, the toggles have no visible effect --- the radar image will not appear on the chart even though it is still visible on the PPI.

Note When the overlay is on, the radar's range follows the chart's zoom level. The radar range is adjusted automatically to roughly half of the chart viewport's diagonal, so echoes always fill the chart view. Your PPI range switches to **Auto** as a result; to return to manual range control, turn the overlay off.



The radar overlay on a chart canvas (left) shows live radar echoes layered on top of the chart, rotated and scaled to match the chart view. The right panel is the same radar scene on the dedicated PPI for comparison --- the red blobs in both panels are the same coastline echoes, drawn in different reference frames.

Overlay appearance

The following overlay parameters are configured under **Settings > Radar > Parameters**:

- Overlay transparency**

Slider 0--90, default 5. Sets how see-through the radar image is on the chart. Lower values (near 0) make the overlay more solid and dominant; higher values (near 90) make it nearly invisible. Raise this value if the radar returns are hiding charted features you need to read.
- Show Guard Zone on Overlay**

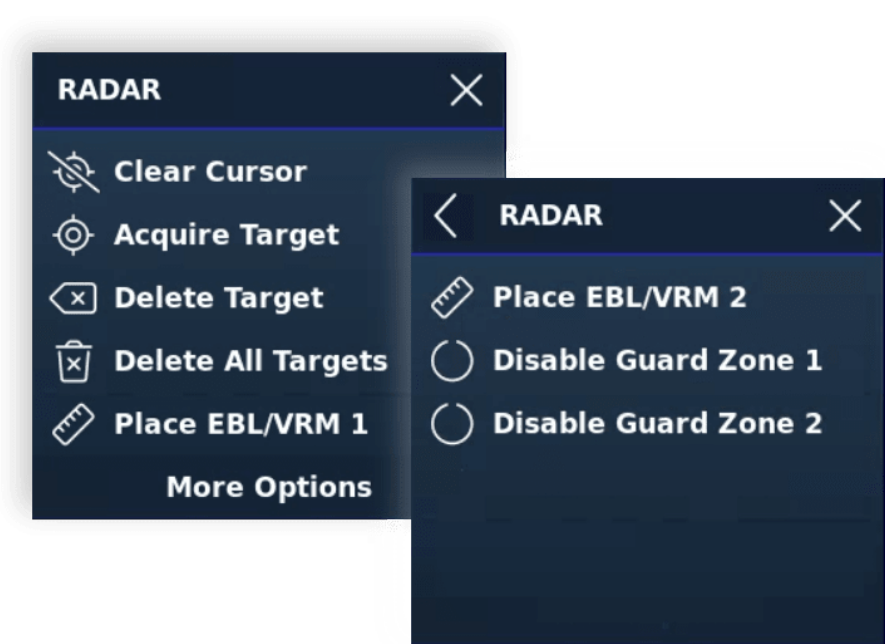
Draws guard zone boundaries on the chart overlay as well as on the PPI. Useful for visualising a configured zone against the charted environment (for example, how an anchor-watch ring sits relative to surrounding shoals).
- Show target trail on overlay**

Draws target trails on the chart overlay as well as on the PPI.
- Show data on overlay when radar is standby**

Keeps the last-known radar image visible on the chart even when the scanner is in standby. Useful if you put the scanner on standby briefly and do not want the chart overlay to blank out.

Radar context menu

Long-press anywhere on the radar canvas to open the radar context menu.



The radar context menu spans two pages. The first page (left) lists Clear Cursor, Acquire Target, Delete Target, Delete All Targets, Place EBL/VRM 1, with **More Options** paging to the second page (right): Place EBL/VRM 2, Disable/Enable Guard Zone 1, and Disable/Enable Guard Zone 2.

The available actions are:

Action	Description
Clear Cursor	Removes the current cursor mark on the PPI.
Acquire Target	Starts ARPA tracking on the return under the long-press point.
Delete Target	Removes the ARPA target under the long-press point.
Delete All Targets	Removes every currently tracked ARPA target.
Place EBL/VRM 1	Draws the first EBL/VRM pair through the long-press point.
Place EBL/VRM 2	Draws the second EBL/VRM pair through the long-press point.
Enable/Disable Guard Zone 1	Quick toggle for guard zone 1 alarm and ARPA.
Enable/Disable Guard Zone 2	Quick toggle for guard zone 2 alarm and ARPA.

Radar settings

System-wide radar settings are configured under **Settings > Radar**, which is divided into three categories in this order: **Installation**, **Display Colors**, and **Parameters**.

Installation

These settings calibrate the radar to the way it is physically mounted on the vessel. The available fields depend on the selected radar model --- rows not supported by the connected scanner are hidden automatically.

Setting	Description (and scanners it applies to)
Radar Type	Picks the connected radar hardware model from an image gallery. Must match the connected scanner; the Installation fields below change according to the chosen model.
Bearing alignment, °	Offset applied to all bearings to compensate for a misaligned antenna. Entered at 0.1° resolution on Raymarine (E120, Quantum), 1° on other vendors. All scanners.
Range adjustment, %	Compensates for systematic range errors (e.g. a scanner that consistently reads 5% short). Resolution 0.1%. All scanners.
Display timing	Fine timing adjustment for the return signal. Raymarine E120 only.
Main bang suppression	Toggle that reduces the strong short-range return produced by the antenna itself (the ``main bang''). Raymarine E120 only.
No transmit start / end	Defines bearing sectors in which the radar will not transmit (to avoid reflections off a mast, funnel, or crew area). Each sector has an enable toggle and start / end bearing inputs. Up to 4 sectors on Navico Halo; 1 sector on Garmin xHD.
Antenna height	Height of the antenna above the waterline, in meters. Used by the scanner to calibrate short-range returns. Navico only.
Antenna forward	Offset of the antenna forward of the GPS reference point, in meters (negative values = aft). All scanners.
Antenna starboard	Offset of the antenna to starboard of the GPS reference point, in meters (negative values = port). All scanners.
Local interference rej.	Suppresses interference from equipment on board your own vessel (Off / Low / Medium / High). Navico only.
Side lobe suppression mode	Selects Manual (use the slider below) or Auto (scanner picks the level). Navico only.
Side lobe suppression	Slider 0--100 that sets the suppression level when the mode above is Manual. Suppresses artefacts produced by the antenna's side lobes. Navico only.
Main bang size	Slider 0--100. Sets the radius around the vessel that is blanked to hide the main-bang return. All scanners.
Accent light	Controls the pedestal accent light on scanners that have one (Off / Low / Medium / High). Navico Halo only.

Parameters

Setting	Description
Range Units	Units for range labels on the PPI: Mixed, Kilometers, or Nautical Miles.
Guard Zone Styling	Visual style of guard zones: Shading, Outline, or Shading and outline.
Guard zone sound alarm	Interval in seconds between repeated alarm sounds.
Ignore radar heading	Disregards heading data from the radar feed.
Pass radar heading	Forwards the radar's heading to the navigator.
Enable COG as heading	Uses Course Over Ground as the heading source when no compass is available.
Reverse mouse wheel zoom direction	Inverts the zoom behaviour of the mouse wheel on the radar canvas.
Show ring at extreme range	Draws an outer ring at the maximum detection limit.
Overlay transparency	Transparency of the radar overlay when drawn on the chart.
Show Guard Zone on Overlay	Draws guard zone boundaries on the chart overlay.
Show target trail on overlay	Draws target trails on the chart overlay.
Show data on overlay when radar is standby	Keeps the last radar image visible on the chart in standby.

Display Colors

The **Display Colors** category customises the radar palette. Each row opens a colour picker.

Setting	Purpose (default)
Radar theme	Preset colour scheme matching ambient light: default, light, dark . Picking a preset overrides the individual colour rows below until you edit them.
Target trail start color	Colour at the head of a target trail --- the freshest return. (Default: white.)
Target trail end color	Colour at the tail of a target trail --- the oldest return still visible. The display interpolates between start and end colours for a gradient. (Default: dark grey.)
Doppler approaching color	Colour applied to targets moving toward your vessel when Doppler mode is active. (Default: yellow.)
Doppler Receding color	Colour applied to targets moving away from your vessel when Doppler mode is active. (Default: cyan.)
Weak Return Color	Colour for low-intensity radar returns (light precipitation, distant objects). (Default: blue.)
Intermediate Return Color	Colour for medium-intensity radar returns. (Default: green.)
Strong Return Color	Colour for high-intensity radar returns (heavy precipitation, solid targets). (Default: red.)
ARPA Edge Color	Colour of the contour outline drawn around tracked ARPA targets. (Default: white.)
Background Color	Base colour of the radar display area. (Default: dark navy, RGB 0, 0, 50.)
AIS Text Color	Colour of text labels on AIS symbols (vessel name, call sign, speed). (Default: medium grey.)



Note The Deeprey sidebar does not currently expose controls for dual-radar mode.

11

AIS

Understanding AIS

AIS (Automatic Identification System) is a short-range VHF radio protocol that lets vessels and shore stations continuously broadcast their position, course, speed, and identity. Every AIS-equipped vessel within VHF range shows up on the chart as a target with its name, course-over-ground arrow, and speed --- turning the chart into a live traffic display.

Deeprey presents AIS traffic in three ways: as symbols on the chart, in a dedicated AIS target list, and overlaid on the radar PPI (see [Chapter 10](#), §Targets on the PPI).

How AIS works and target classes

Vessels transmit AIS messages on VHF channels 87B and 88B. Each message contains the sender's MMSI (a unique 9-digit identifier), position, course and speed, and --- for Class A transmitters --- additional fields such as destination, navigation status, and rate of turn.

Deeprey recognises the following broadcast sources:

Source	Meaning
Class A	Mandatory transceivers on commercial and large vessels (SOLAS). Transmit at higher power and with richer message content than Class B. Shown in the list as A .
Class B	Voluntary transceivers typically found on recreational and small commercial vessels. Transmit less often and at lower power. Shown in the list as B .
SART	Search and Rescue Transponder. A distress beacon that broadcasts an SOS message when activated. MMSI prefixes 970/972/974 (SART, MOB, EPIRB). Deeprey plays a dedicated audio alert (see §11.7); see also §11.9.
DSC	Digital Selective Calling position reports and distress messages relayed by a DSC-capable VHF radio. Shown as DSC Distress or DSC Position Report .
Aid to Navigation	Stationary AIS transmitter on a buoy, lighthouse, or other navigational mark (AIS message type 21). MMSI prefix 992.
Base Station	Shore-based AIS stations that rebroadcast traffic information and time references (AIS message type 4). MMSI prefix 00.
Meteorologic	Meteorological and hydrographic stations broadcasting weather, currents, and sea-state data via AIS binary message type 8. Shown as Meteorologic .



Note Deeprey is **receive-only** and does not transmit AIS. MMSI, call-sign, and any other self-identity fields that a transceiver would broadcast are configured at the transceiver itself --- not in Deeprey settings. See §11.10 for details.

Reading AIS targets on the chart

When an AIS source is connected, Deeprey draws traffic on top of the chart as triangles, arrows, and other shapes described below. The settings in §11.8 control which visual elements appear (names, COG predictor arrows, real-size vessels, and so on).

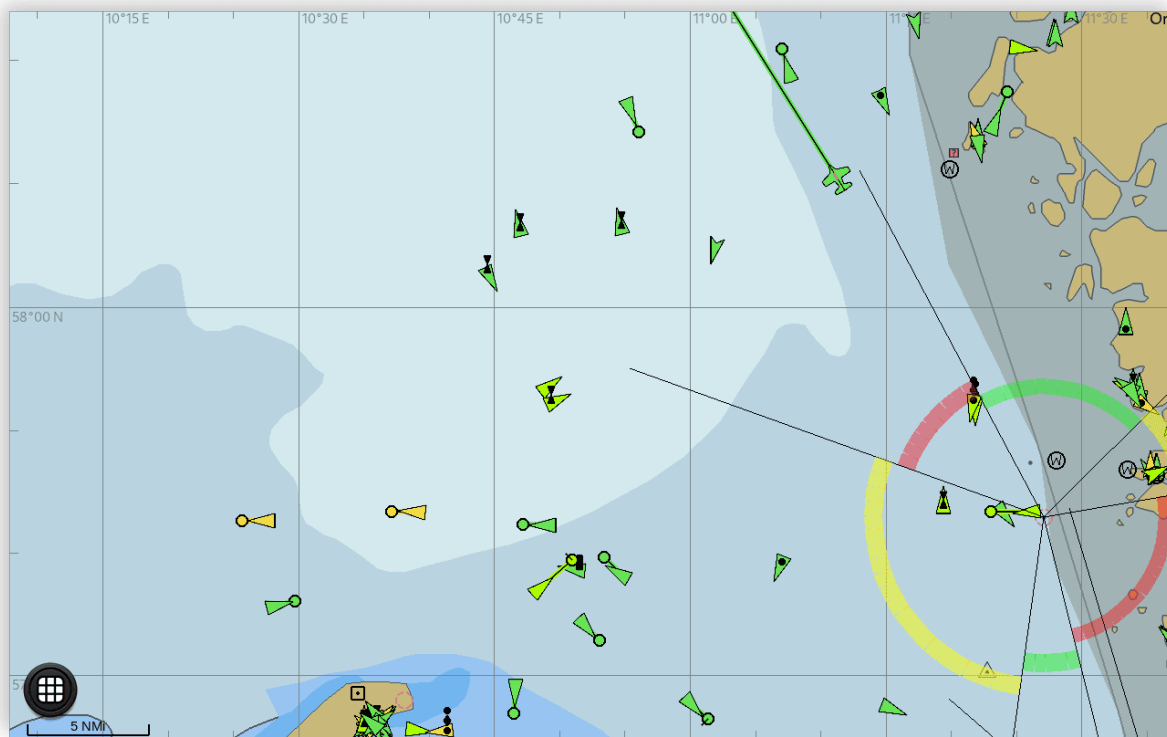


Chart view with a mix of live AIS traffic: Class A / B vessels are drawn as green-filled quads with COG predictor arrows, AtoNs as yellow diamonds, and a lighthouse sector light is visible at right. The boat icon at lower-left is own-vessel.

Target symbols and visual states

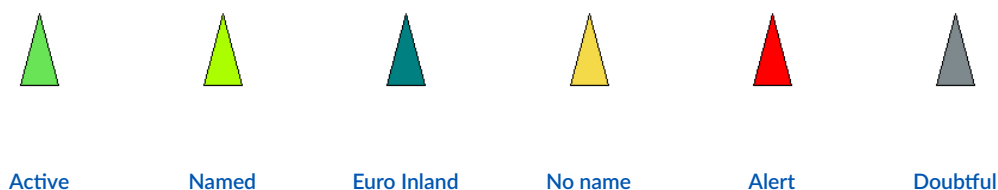
Deeprey draws each AIS target using a combination of *symbol shape* (which tells you what kind of source the target is) and *colour* (which tells you the target's current condition).

Vessel shapes



Class A is mandatory on commercial and SOLAS-regulated vessels; Class B is voluntary on recreational and small commercial boats. The octagon is a fallback drawn only in *Inland ECDIS* mode when a target has no valid heading or course.

Vessel colour variants

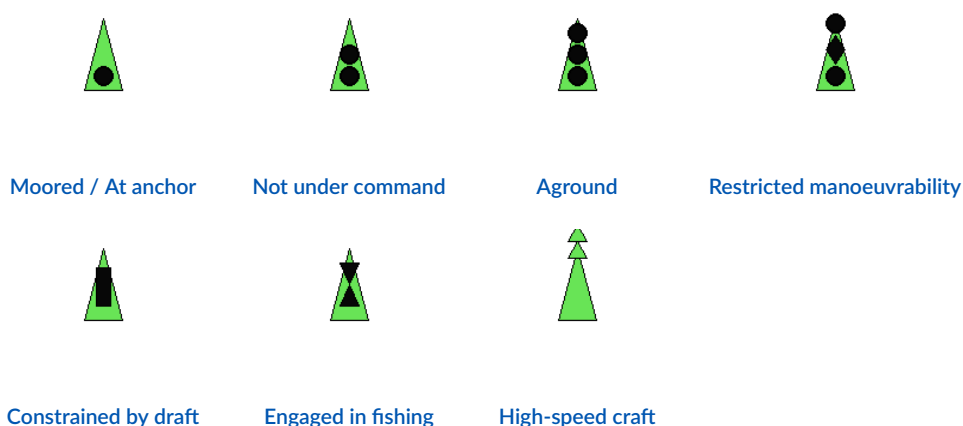


- **Active** --- normal green; the target is fresh and is not a collision threat.
- **Named** --- slightly brighter green; Deeprey recognises this target from an earlier session and has restored its name from the persistent cache.
- **Euro Inland** --- teal fill for vessels broadcasting Inland AIS (EUR) messages outside of Inland ECDIS mode.
- **No name** --- yellow; the vessel's identity has not yet been received.
- **Alert** --- red; the target breaches your CPA / TCPA thresholds or is a SART / DSC distress transmission.
- **Doubtful** --- cyan; the most recent broadcast carried invalid coordinates, so the position shown may be unreliable.

Lost targets are not drawn at all. After the **Mark targets as lost** interval (default 8 min) the vessel disappears from the chart; after **Remove lost targets** (default 8 min more) the entry is dropped from the target list too. See §11.8.

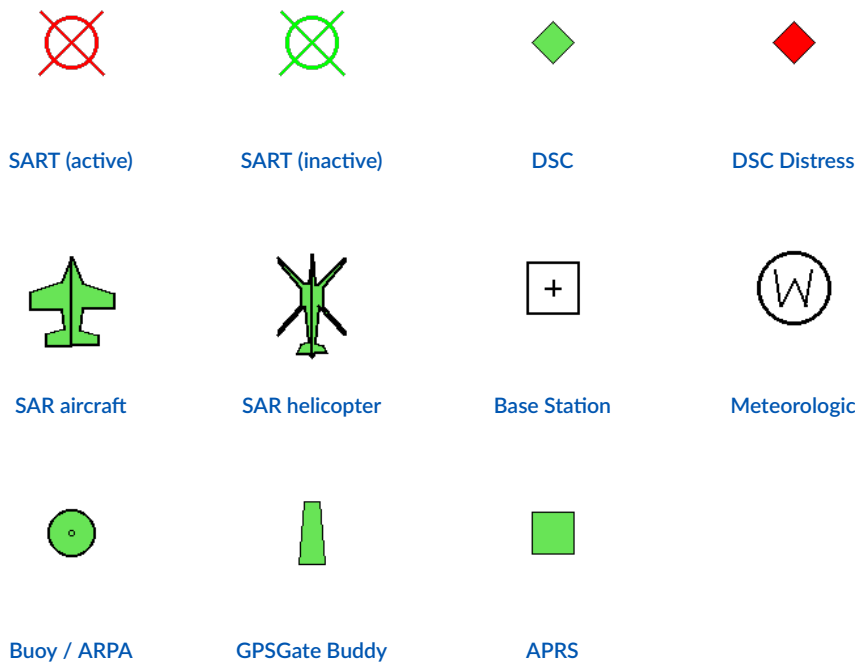
Navigation status markers

When a Class A vessel broadcasts a specific **navigation status** (At anchor, Restricted manoeuvrability, Engaged in fishing, etc.), Deeprey draws a small black day-shape marker above the vessel symbol. These markers follow the same IMO visual convention used on real ships (round, diamond, or cylinder shapes hoisted in the rigging), so they can be recognised at a glance.



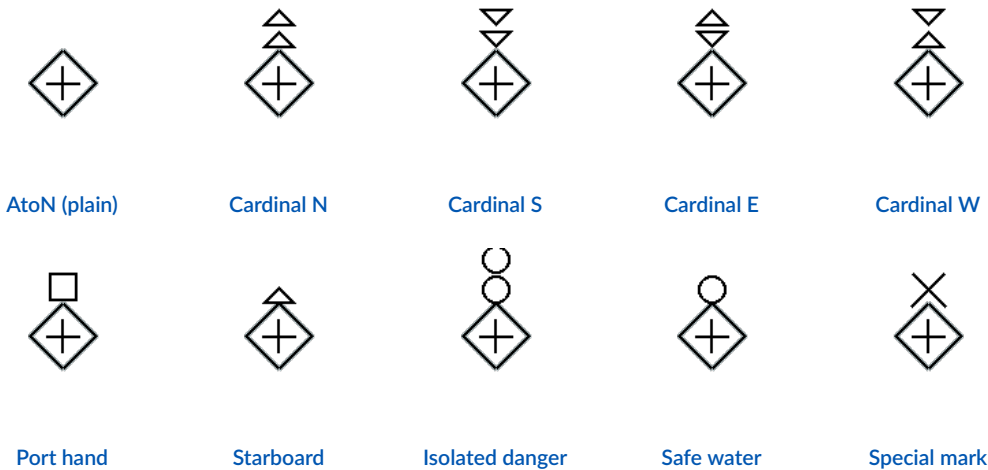
Note These markers are only drawn for Class A vessels (Class B does not broadcast a navigation status) and only appear when the chart is zoomed in closely enough to render the vessel at full detail. Zoom out and they disappear along with the other fine-grained markings.

Other AIS target types



SART beacons use a distinct red circle + cross so distress transmissions stand out from normal traffic. DSC distress relays use the same diamond as ordinary DSC position reports but are drawn in red. Meteorologic stations broadcast weather and current data and are drawn as a circle with an inscribed **W**. Buoy / ARPA targets (ARPA targets come from radar plotting --- see [Chapter 10](#)) share the same small-circle glyph.

Aids to Navigation



Every Aid to Navigation is drawn as a diamond with an internal cross; the glyph above the diamond shows the mark's purpose. **Virtual** AtoNs --- aids broadcast from a base station but not physically present at the charted location --- use the same symbols, but the diamond outline is drawn with short dashes instead of a solid line.

Note When you acknowledge a CPA alert the audible re-alarm is silenced until the **Enable Target Alert Acknowledge** timeout expires (see §11.7). The target keeps being drawn in red for as long as it is still on a collision course --- acknowledging only silences the sound, it does not remove the visual warning.

Note Anchored and moored targets stay green (Active) unless you enable **Suppress anchored/moored targets** (§11.8). In *Inland ECDIS* mode Deeprey keeps stationary targets on the chart for longer before marking them Lost; the default profile uses the same lost / removal timeouts for every target.

Tapping a target for details

To inspect a target's broadcast data:

1. Long-press the target symbol on the chart.
2. From the context menu, tap **Target Query...**
3. The **AIS Target Query** dialog opens, showing every broadcast and computed field for that target.

AIS Target Query

DEEREY PIONEER 2DRY5

MMSI	Class	IMO
235117842	A	9821046
Flag	United Kingdom	
Offshore Supply, Under way using Engine		
86 m × 18 m × 6.1 m		
Position	Report Age	
56° 29' 03.174" N	7 s	
002° 14' 56.820" W		
Destination	ETA (UTC)	
GB ABD > GB LER	Apr 21 19:45	
Speed	Course	Heading
10.8 kts	031°	029°
Range	Bearing	Turn Rate
9.3 NMi	214°	No Turn Info
CPA		
1.46 NMi in	1 h 12 min	

Create Waypoint

Record Track

OK

The dialog groups its content as follows:

- **Identity** --- Ship name, call sign, MMSI, IMO (Class A only), class, flag / nation, handheld indicator (Class B MMSIs starting with 8).
- **Status** --- Vessel type (``Cargo'', ``Tanker'', ``Offshore Supply'', ``Fishing'', ...) combined with navigation status (``Under way using engine'', ``At anchor'', ``Moored'', ...), and dimensions (L×B×D in metres).
- **Voyage** (Class A) --- Destination, ETA (UTC), draft.
- **Position** --- Latitude, longitude, and the *report age* (time since the last received update). If the target's most recent message arrived with invalid coordinates, the dialog appends ``(Last Known)'' after the position --- the numbers shown are the last valid fix received, not the current broadcast.

- **Motion** --- Speed over ground, course over ground, heading, and turn rate (where supported by class).
- **Relative position and collision risk** --- computed by Deeprey from your own-ship fix: range and bearing to the target, plus the predicted CPA distance and time-to-CPA.
- **Safety broadcast** --- the text of any AIS safety broadcast message (message 14) the target has transmitted, if present.

Two action buttons at the bottom of the dialog let you act on the target immediately:

- **Create Waypoint** --- drops a waypoint at the target's current position in the active layer (same action as **Create WPT** in the target list, §11.3).
- **Record Track** --- starts recording this target's track so its historical trail is drawn on the chart. Equivalent to toggling **Show Target Track** in the context menu.

Note Fields that the target has not broadcast appear as ``---" or blank. Class B transmitters send a limited subset of information (no destination, no navigational status, no turn rate, no draft), so many fields remain blank for Class B vessels.

AIS target list

The AIS target list shows every tracked target as a sortable, filterable table. Open it in either of two ways:

- Long-press any AIS target on the chart and pick **Target List...** from the context menu.
- From the home menu, open **Routes & Waypoints** and select the **AIS Targets** tab.

The screenshot shows the 'AIS targets' interface. At the top, there's a header bar with 'AIS targets', 'Monday 15:08', 'GPS' signal strength, and 'WiFi' status. Below the header is a search bar labeled 'Find'. The main area contains a table with 8 columns: Trk, Name, Call, MMSI, Class, Type, Flag, and Nav Status. The table lists 14 vessels. To the right of the table is a sidebar with buttons: 'Target info', 'Center view', 'Center-Info-Close', 'Create WPT', 'Hide All Tracks', 'Show All Tracks', 'Toggle track', 'Copy MMSI', and an 'AutoSort' toggle switch. At the bottom, there's a navigation bar with tabs: 'Waypoints', 'Routes', 'Tracks', 'Layers', and 'AIS targets' (which is highlighted). Below the tabs are icons for 'MOB', 'Views', 'Combo Views', 'System Control', 'Routes & Waypoints', and 'Settings'.

Trk	Name	Call	MMSI	Class	Type	Flag	Nav Status
No	GG100 BARE		265627530	B	Unknown	Sweden	Undefined
No	LILLY		265043400	B	Unknown	Sweden	Undefined
No	Unknown		235113489	A	Unknown	United Kingdom	Moored
No	METEO 554		199400044	Meteorologic	Unknown		Undefined
No	POLSTJERNAN		265509460	B	Unknown	Sweden	Undefined
No	FRONT OCELOT		538006621	A	Unknown	Marshall Islands	At Anchor
No	ATLANTICA		265599950	B	Unknown	Sweden	Undefined
No	LIPPO		265613750	B	Unknown	Sweden	Undefined
No	Unknown		265515570	A	Unknown	Sweden	Moored
No	GAS MYTH	A8YP9	636015105	A	Unknown	Liberia	At Anchor
No	ESSENCE		255916590	A	Unknown	Madeira	At Anchor
No	ASTREA	SBDA	266466000	A	Unknown	Sweden	At Anchor
No	METEO 864		199400037	Meteorologic	Unknown		Undefined
No	DON QUIJOTE		265634880	B	Unknown	Sweden	Undefined
No	EBBA HARD	SBOK	265623240	B	Unknown	Sweden	Undefined
No	MARINELLE		265653680	B	Unknown	Sweden	Undefined

The AIS Targets tab: sortable / filterable list on the left, action buttons on the right (Target info, Center view, Center-Info-Close, Create WPT, Hide / Show All Tracks, Toggle track, Copy MMSI, AutoSort). The Find box at top right filters rows live.

The list has 14 columns:

Column	Meaning
Trk	Track visibility indicator --- shows Yes when the target's track is being recorded and drawn on the chart, No when it is not. The state is changed with the Toggle track button (see below), not by tapping the cell.
Name	Ship name as broadcast by the target (may be blank).
Call	Call sign as broadcast (may be blank).
MMSI	The target's 9-digit Maritime Mobile Service Identity.
Class	Source type label as shown in the list: A / B (AIS Class A / B), SART , DSC Distress / DSC Position Report , Aid to Navigation , Base Station , ARPA (radar-plotted target --- see Chapter 10), GPSGate Buddy , ARPS , Meteorologic , or BUOY .
Type	Ship type broadcast by the target (e.g. ``Cargo'', ``Tanker'', ``Pleasure craft'', ``Fishing'').
Flag	Country of registration, derived from the first three digits of the MMSI.
Nav Status	Navigational status text: <i>Under way</i> , <i>At anchor</i> , <i>Moored</i> , <i>Restricted manoeuvrability</i> , and so on. Only Class A vessels broadcast this field; it is also used by Aid to Navigation targets to indicate ``on position'' or ``off position''. Blank for Class B and other sources.
Brg	Bearing to the target from your own vessel, in degrees.
Range	Distance to the target, in nautical miles.
CoG	Course over ground of the target, in degrees.
SoG	Speed over ground of the target, in knots.
CPA	Predicted closest point of approach, in nautical miles. Blank if the target's CPA cannot be computed (no valid own-vessel fix, or target not moving).
TCPA	Time to CPA, in minutes. Shows ``---'' when CPA cannot be computed or when the closest approach is already past.

Sorting and filtering

- **Sort:** tap any column header to sort by that column. Tap again to toggle ascending / descending.
- **AutoSort:** when on, the list re-sorts itself continuously as target data updates. When off, the list holds its current order even as CPA / range change.
- **Find:** type in the Find box at the top of the list to filter rows live (matches any column).
- **Limit range:** a numeric input at the bottom of the list (default 40 NM). Only targets within this range are displayed; useful for hiding distant traffic in busy coastal areas.
- **Target Count:** a read-only label below the controls showing the current number of visible targets.

Create Waypoint from target

1. Select a target row in the list.
2. Tap **Create WPT**.
3. A new waypoint is created in the active layer at the target's current latitude and longitude, with a default symbol. The waypoint appears immediately on the chart and in the waypoint list in [Chapter 7](#).



Note The waypoint is a *snapshot* of the target's position at the moment you tap Create WPT --- it does not follow the target as the target moves.

Center View on target

1. Select a target row in the list.
2. Tap **Center view**. The chart canvas pans so the target is centred in view.

A **Center-Info-Close** button combines the Center view, Target info, and Close-list actions in one tap for quick inspection. Additional list-level actions include **Target info** (opens the detail panel), **Toggle track** (starts or stops recording the selected target's track --- the result is reflected in the **Trk** column), **Copy MMSI** (copies the MMSI to the clipboard for use in a DSC call or logbook entry), and the bulk-track toggles **Hide All Tracks** / **Show All Tracks**.

CPA and TCPA

- **CPA** (Closest Point of Approach) --- the minimum distance another vessel will pass from your own vessel if both of you maintain your current course and speed.
- **TCPA** (Time to CPA) --- the number of minutes until that closest approach occurs.

Together they are the primary figures of merit for collision avoidance:

- A target with a **short** CPA and **short** TCPA is about to pass close, and soon --- the classic collision-risk profile.
- A target with a **long** CPA or a **long** TCPA is not an immediate concern.

Deeprey raises a *dangerous target* alert when *all* of the following are true:

- the predicted CPA is below your safe-distance threshold,
- the TCPA is positive and below your safe-time threshold,
- the target is within the **No (T)CPA Alerts** range, if that range filter is enabled.

A negative TCPA means the closest approach is already in the past --- the target is safely separating and no alert fires.

Warning distance and time settings

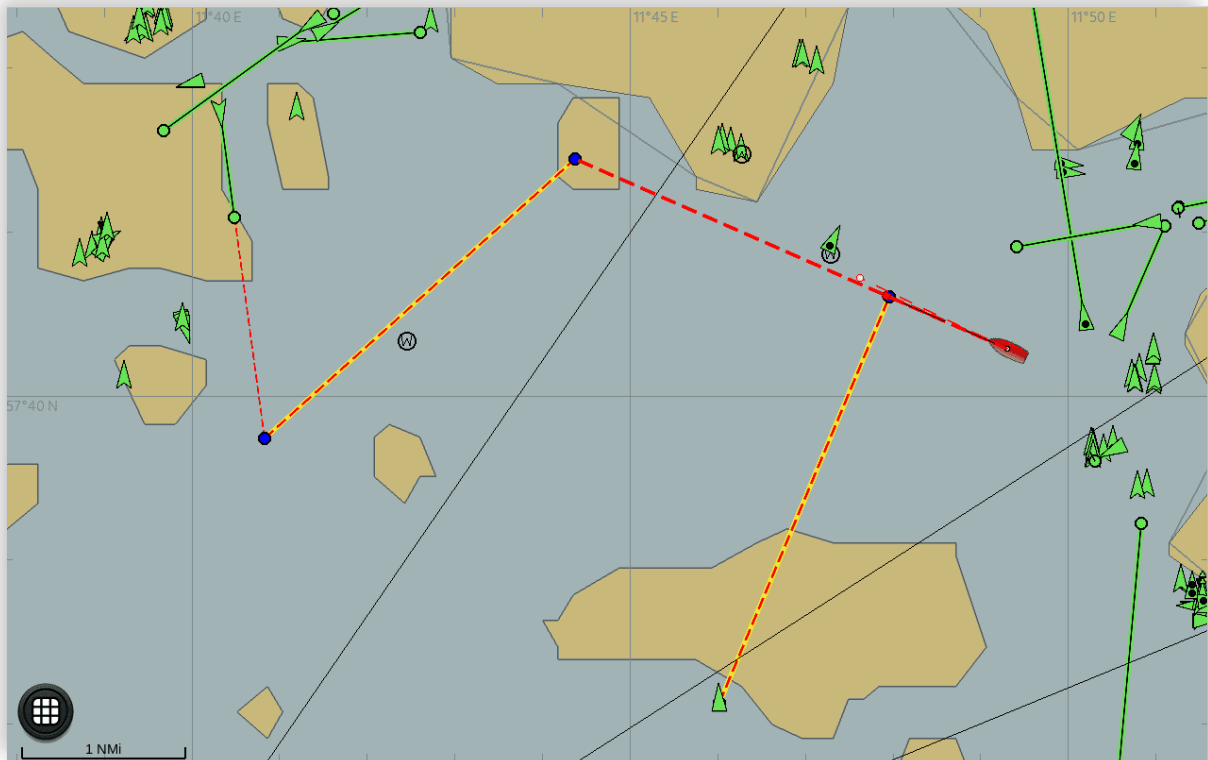
The thresholds are set in **Settings > AIS**. See §11.8 for the full reference; in summary:

- **No (T)CPA Alerts** --- master range: targets beyond this range never generate CPA alerts regardless of their computed CPA / TCPA. Default 20 NM.
- **Minimum safe distance** --- the CPA threshold. Targets whose CPA is less than this value are candidates for the alert. Default 2 NM.
- **Minimum safe time** --- the TCPA threshold. Targets whose TCPA is positive and below this value (and whose CPA is below the distance threshold) trigger the alert. Default 30 min.

CPA lines on chart

When you want to see the predicted CPA geometry for a specific target, toggle the CPA line via the chart context menu:

1. Long-press the target on the chart.
2. Tap **Target CPA** to show the CPA line, or **Hide Target CPA** to remove it.



Own-vessel (right, in red) with an active CPA line to a target on the left. The yellow bars mark each vessel's projected path to the moment of closest approach; the dashed red line between the two blue circles shows the separation *at* that moment --- the CPA itself.

The CPA line is drawn as a **dashed red line** connecting your own-vessel's predicted position to the target's predicted position at the moment of closest approach. Small circles mark the two endpoints. The numerical CPA distance and TCPA time are read from the target list or the **Target Query** dialog rather than from labels on the line itself.

Responding to CPA / TCPA alerts

When a target becomes dangerous:

- The target symbol is drawn in red.
- If **Show CPA/TCPA Alert Dialog** is enabled, an alert dialog pops up with the target's broadcast details (ship name, MMSI, class, position, course, speed) and two action buttons:
 - **Acknowledge** --- marks the alert as seen and closes the dialog. The target stays red for as long as the CPA condition is still breaching; if it is, a re-alarm is gated by the **Enable Target Alert Acknowledge** timeout before the dialog can pop up again.
 - **Silence Alert** --- silences the audio tone only. The dialog stays open and the alert stays active until you acknowledge it or the target stops being dangerous.

- If **Play Sound on CPA/TCPA Alerts** is enabled, an audio tone plays and repeats for as long as the target remains in the danger envelope. **Silence Alert** stops further replays of the tone; **Acknowledge** silences and closes the dialog.



Note SART and DSC distress alerts open the same dialog but with different button sets: SART adds a **Jump To** button, and DSC distress replaces **Acknowledge** with a **Create Waypoint** button (so you can mark the distress position while responding). See §11.9.

If the target stops being dangerous while the dialog is still open (for example, it changes course or drops below your range filter), Deeprey closes the dialog automatically and the red colour clears from the symbol.



Warning A CPA / TCPA alert is computed from broadcast course and speed. If a vessel changes course or speed abruptly the prediction can change very quickly, or temporarily drop an alert. Always keep a visual watch as the primary means of collision avoidance.

Target tracks

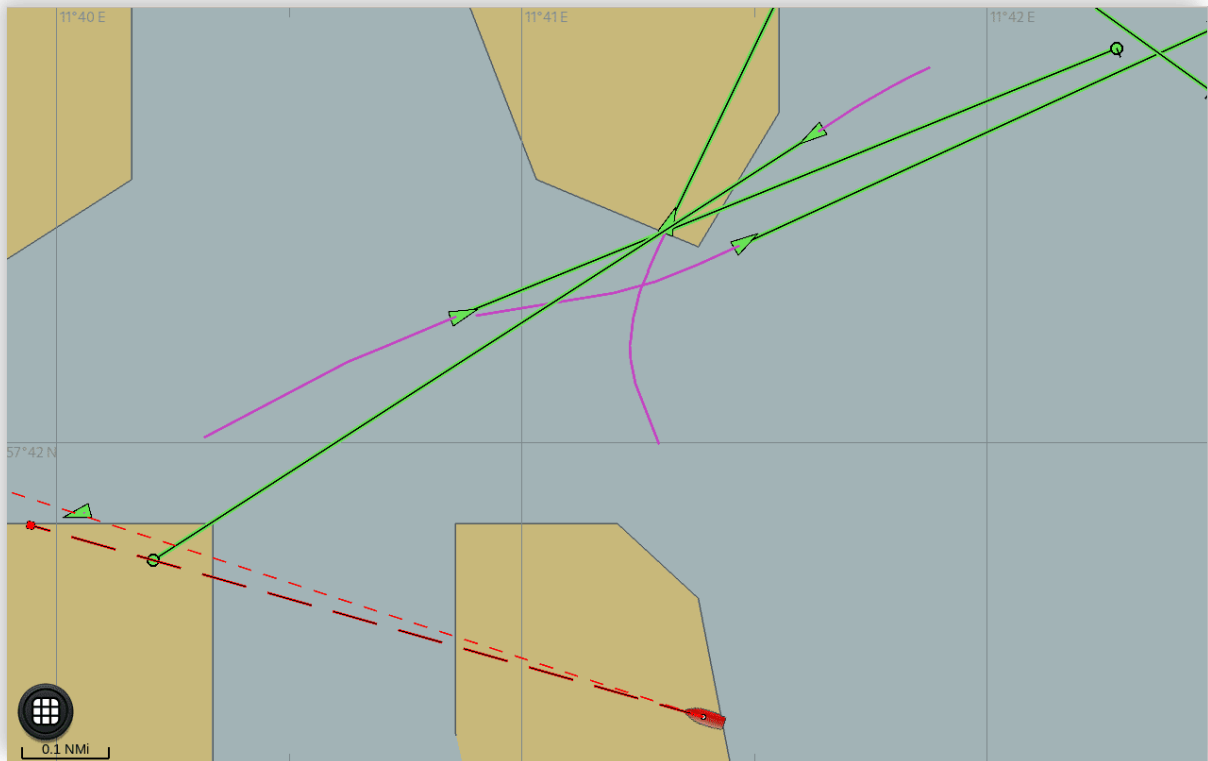
A **target track** is a trail drawn on the chart showing where a specific vessel has been over the last few minutes. Tracks are useful for verifying whether a target's reported course matches its actual trajectory, and for observing manoeuvres.

Showing a track for a vessel

Tracks are enabled per-target in three ways:

- **From the AIS target list** --- select the target's row and tap the **Toggle track** button in the right-hand button strip. The **Trk** column switches to **Yes** and the track starts recording.
- **From the chart context menu** --- long-press the target and pick **Show Target Track**. The menu label toggles to **Hide Target Track** when on.
- **From the AIS Target Query dialog** --- tap **Record Track** at the bottom of the dialog (see §11.2.2).

The track is drawn on the chart as a magenta polyline connecting the target's recorded past positions; a new point is added each time the target broadcasts an updated position. The trail's length (how far back in time it extends) is controlled by the **Show target tracks length (min)** setting in §11.8. Default 20 min; range 1--60 min.



Close-up of several AIS targets with tracks enabled: the magenta trails show the route each vessel has taken, while the green lines ahead of each vessel are the COG predictor arrows. Own-vessel is visible at lower right with a CPA line to a target on the left.

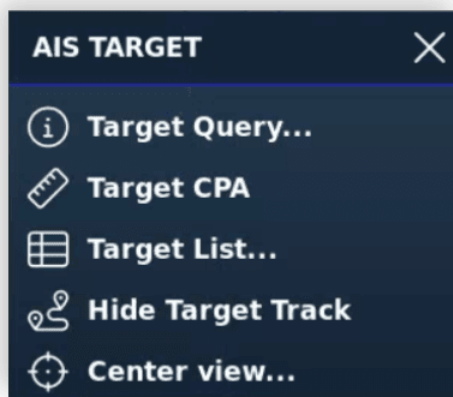
Bulk operations are available from the button strip of the AIS target list:

- **Show All Tracks** --- enable tracks for every target currently in the list.
- **Hide All Tracks** --- disable tracks for every target in the list.

Note Target tracks are drawn until the target is lost or removed. Track history does not persist across restarts --- if you restart Deeprey, tracks are empty and begin recording again.

AIS target context menu

Long-press an AIS target on the chart to open the context menu.



The menu entries are:

Action	Description
Target Query...	Opens the AIS Target Query dialog (name, MMSI, class, position, course, speed, and other broadcast fields). See §11.2.2.
Target CPA / Hide Target CPA	Toggles the predicted CPA line between this target and your own vessel. See §11.4.
Target List...	Opens the AIS target list and selects this target's row. See §11.3.
Show Target Track / Hide Target Track	Toggles the track recording and display for this target.
Center view...	Pans the chart so the tapped position is centred in view.

AIS alerts

Deeprey plays audio tones and can open a popup dialog for several AIS events. Each is driven by its own toggle so you can enable only the alerts you need.

Audio alerts

Three of the four audio toggles live on **Settings > General > Sound**:

- **Play Sound on AIS Alert** --- general audio signal for AIS alert events.
- **Play sound on AIS SART alert** --- dedicated tone when a SART (or MOB / EPIRB) distress transponder is received. See §11.9.
- **Play sound on DSC notification** --- tone when a DSC position report or distress message is received.

The fourth toggle lives on the AIS settings page itself:

- **Play Sound on CPA/TCPA Alerts and DSC/SART emergencies** --- combined tone for dangerous targets and emergency broadcasts, replayed for as long as the condition remains.

Visual alerts

- **Show CPA/TCPA Alert Dialog** --- opens the AIS Target Alert popup for each dangerous target (see §11.4).
- **Suppress Alerts for anchored/moored targets** --- prevents a harbour full of stationary vessels from raising CPA alerts when your own vessel enters the area.

Acknowledging an alert

When you dismiss an alert dialog with **Acknowledge**, the **Enable Target Alert Acknowledge** setting controls whether (and when) the same target is allowed to re-raise it:

- **Toggle off** --- the target stays acknowledged until it drops out of the danger envelope; no re-alert while the condition persists.
- **Toggle on, timeout 0--60 min** --- after the configured time has elapsed, the alert is allowed to pop up again if the target is still dangerous. A timeout of 0 effectively re-alerts immediately.

The setting applies to CPA/TCPA alerts and to DSC distress alerts in the same way. **SART** alerts behave differently: they always have a *fixed 10-minute* acknowledge timeout regardless of this setting --- an acknowledged SART that is still transmitting will re-raise its alert after 10 minutes, so a distress signal cannot be accidentally dismissed and forgotten.



Note Lost targets do not raise an alert --- when a target has not been heard from for longer than the **Mark targets as lost** interval it is simply removed from the chart and, later, from the target list. Only *dangerous* targets (CPA/TCPA breaches) and *distress* targets (SART / DSC distress) open the alert dialog.

AIS settings

System-wide AIS settings are configured under **Settings > AIS**. The settings are grouped by function below.

Display and rendering

Setting	Description (default)
Show target COG predictor arrow	Toggle. Draws a forward-pointing arrow on each target symbol showing its predicted position at the chosen arrow length.
Arrow length (min)	Length of the COG predictor arrow, in minutes of forward projection. 1--30 min (default 6).
Sync AIS arrow length with own ship's COG predictor	Toggle. When on, the arrow length above is driven by the navigation settings' own-ship COG predictor instead of its independent value.
Show target tracks length (min)	How far back in time a target track extends. 1--60 min (default 20).
Show AIS targets real size	Toggle. When on, Class A targets are drawn at their reported hull size scaled to the chart's zoom (rather than fixed-size icons).
Show names with AIS targets	Toggle + chart-scale threshold. Labels (ship names) are drawn only when the chart is zoomed in closer than the threshold. Threshold 10,000--500,000 (default 250,000).
Show area notices (from AIS binary messages)	Toggle. Draws area notices (warning zones, regulated areas) received as AIS binary messages on the chart.

CPA and TCPA thresholds

Setting	Description (default)
No (T)CPA Alerts	Master range. Targets beyond this distance never generate CPA/TCPA alerts. 1--50 NM (default 20).
Minimum safe distance	CPA threshold. Targets whose predicted CPA is below this value are candidates for the alert. 0.2--10 NM (default 2).
Minimum safe time	TCPA threshold. Both distance and time thresholds must be breached for a target to be flagged as dangerous. 1--120 min (default 30).

Anchored and moored suppression

Setting	Description (default)
Suppress anchored/moored targets	Toggle + max-speed threshold. Targets broadcasting an ``anchored" or ``moored" navigation status and travelling slower than the threshold are hidden. 0.1--40 kn (default 0.2).
Draw AIS real-time prediction	Toggle + min-speed threshold. Draws the dead-reckoned live position of moving targets (updates between AIS messages). Applies only to targets travelling faster than the threshold. 0.1--30 kn (default 0.7).

Target attenuation

Setting	Description (default)
Allow attenuation of less critical targets	Toggle + count threshold. When the number of tracked targets exceeds the threshold, less critical targets (low-speed, distant) are drawn smaller or dimmed to reduce chart clutter. 1--100 (default 10).
Minimise less critical AIS targets	Toggle. When on, attenuated targets are drawn as small dots instead of full symbols.

Target lifecycle

Setting	Description (default)
Mark targets as lost	Time after the last received message before a target is flagged Lost and removed from the chart. 1--30 min (default 8).
Remove lost targets	Additional time after Lost before the entry is dropped from the target list as well. 1--30 min (default 8).

Alert behaviour

Setting	Description (default)
Show CPA/TCPA Alert Dialog	Toggle. Opens a popup dialog for each dangerous target.
Play Sound on CPA/TCPA Alerts and DSC/SART emergencies	Toggle. Plays the combined alert tone for dangerous targets and distress signals. Audio toggles per alert class live on a separate audio settings page --- see §11.7.
Suppress Alerts for anchored/moored targets	Toggle. Prevents stationary targets from raising CPA alerts even if they technically breach the distance threshold. Recommended when entering a busy anchorage.
Enable Target Alert Acknowledge	Toggle + timeout (0--60 min, default 0). When the toggle is off, acknowledging a target silences it until the danger condition clears. When on, the alert is allowed to pop up again after the timeout has elapsed; a timeout of 0 effectively re-alerts immediately. SART alerts always use a fixed 10-minute timeout regardless of this setting (see §11.7).

Tooltip content

Setting	Description
Show [Class] Type (Status) in tooltip	Toggle. Adds ship class, type, and navigational status to the hover tooltip.
Show SOG And COG in tooltip	Toggle. Adds speed and course to the tooltip.
Show CPA And TCPA in tooltip	Toggle. Adds CPA and TCPA to the tooltip.

WPL / APRS interoperability

Some radios and AIS receivers forward non-AIS position messages as NMEA 0183 **WPL** sentences (waypoint list) --- typically APRS (Automatic Packet Reporting System) position reports.

- **Use WPL position messages** --- toggle. When off, incoming WPL sentences are ignored.
- **Handle received WPL messages** --- dropdown with two choices: **APRS position report** (treated as a transient position that expires like an AIS target) or **Create mark** (creates a persistent waypoint at that position).

AIS SART distress signals

A **SART** (Search and Rescue Transponder) is a dedicated emergency beacon carried in life-rafts and some commercial vessels. When activated it broadcasts a distinctive AIS message that marks it as a distress signal requiring immediate response.

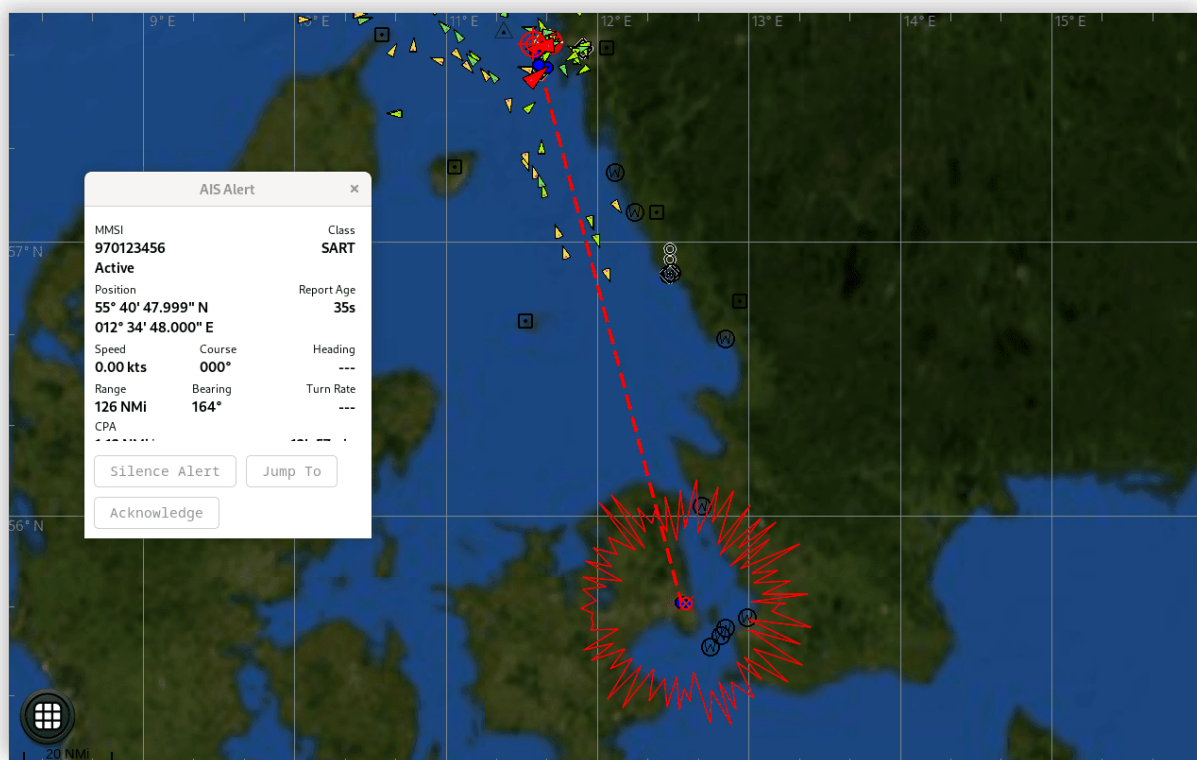
SART transmissions and related emergency beacons are identified by their MMSI prefix:

- **970xxxxxx** --- SART (Search and Rescue Transponder, general).
- **972xxxxxx** --- MOB (Man Overboard beacon).
- **974xxxxxx** --- EPIRB (Emergency Position Indicating Radio Beacon).

What Deeprey does when a SART is received

- **Distinct symbol.** The target is drawn as a red circle with a diagonal cross --- a visually unambiguous distress marker different from any normal vessel symbol. All three MMSI ranges (SART, MOB, EPIRB) use the same symbol.
- **High-priority alert.** Deeprey opens the alert dialog immediately for these targets, with no deferral delay.
- **Jump To button.** The alert dialog exposes a **Jump To** button that pans the chart to the distress position in one tap.
- **Dedicated audio alert.** The **Play sound on AIS SART alert** setting (see §11.7) plays an independent tone when a distress signal is first received, separate from the CPA / TCPA alert audio, and repeats while the condition is active.
- **Fixed 10-minute acknowledge timeout.** An acknowledged SART / MOB / EPIRB that is still broadcasting re-raises its alert after 10 minutes, regardless of the **Enable Target Alert Acknowledge** setting (see §11.7) --- so a distress signal cannot be dismissed and forgotten.
- **List entry.** The target appears in the AIS target list with class label **SART** --- Deeprey does not break out MOB / EPIRB as separate class labels in the list; to distinguish them, read the first three digits of the **MMSI** column (970, 972, or 974).
- **DSC distress.** DSC distress messages are shown on the chart with the DSC diamond symbol, drawn in red. DSC position reports (non-distress) use the same diamond shape but keep the normal green fill. The DSC

distress alert dialog offers a **Create Waypoint** button in place of **Acknowledge**, so you can drop a mark at the distress position while responding.



A received SART distress broadcast. The AIS Alert dialog (left) shows the distress target's details and the three action buttons (Silence Alert, Jump To, Acknowledge). Around the SART position on the chart, a jagged red attention circle surrounds the symbol to make it easy to spot; the dashed red line is the CPA line from own-vessel to the distress position.

Note The SART alert dialog has no **Create Waypoint** button --- that action is reserved for DSC distress alerts (see below). To place a mark at the SART position, use **Jump To** and then long-press the target to open its context menu.

Warning A SART or DSC distress entry is a live emergency. Mark its position, note the MMSI, and respond according to established maritime distress procedures (relay to Coast Guard, alter course if practicable and safe, stand by on VHF channel 16, etc.).

AIS transponder --- transmit

Deeprey is **receive-only**. It displays AIS broadcasts from any connected AIS source --- a USB AIS receiver, an AIS transceiver running in receive mode, an N2K AIS device, or an NMEA 0183 AIS feed. Deeprey itself does not transmit AIS; your vessel's AIS identity is broadcast by the transceiver, not by Deeprey.

Because of this, MMSI, call sign, ship name, hull dimensions, and any other self-identity fields that a transceiver broadcasts on your behalf are configured at the transceiver itself (via its own web UI, dedicated programming software, or physical controls), not in Deeprey. Deeprey has no settings for these fields.

12

Sonar (Fishfinder)

**Warning**

Sonar is a tool for situational awareness and fishing --- it is *not* a substitute for proper depth alarms, up-to-date nautical charts, or a careful watch. Readings can be affected by aeration under the hull, electrical noise, steep bottom slopes, weed, and transducer misalignment. Never use the sonar waterfall alone to decide whether it is safe to navigate in shallow or unfamiliar water.

Understanding Sonar Basics

Sonar shows you what is happening below the hull: the depth, the shape of the seabed, and anything between --- fish, bait balls, weed, rocks, wrecks. A transducer mounted on the hull sends short pulses of sound (*pings*) into the water; echoes bounce back off anything solid, and Deeprey renders the stream as a picture you can read at a glance.

Deeprey is built around **CHIRP** (Compressed High-Intensity Radiated Pulse) sonar. Instead of pinging at a single fixed frequency, a CHIRP transducer sweeps across a band of frequencies on every ping. The returns carry more information than a single-frequency echo, so the waterfall shows better target separation, cleaner bottom detail, and crisper fish arches --- particularly in the medium-frequency range used for offshore fishing and bottom-contour reading.

That picture has two parts:

- **Waterfall** --- the big scrolling image. Vertical axis is depth; each new strip on the right is the latest ping.
- **A-Scope** --- an optional narrow column on the right edge that shows *only* the latest ping, coloured in the same palette as the waterfall.

**Note**

Beam width and frequency are fixed by the transducer you have installed (see §12.2.1). Everything else --- gain, noise rejection, depth range, and so on --- is adjusted directly in Deeprey.

Connecting a Transducer

Deeprey works with the Airmar **Integrated Chirp (AIC)** family of transducers. An AIC transducer does all the sonar work on its own --- every piece of sounder electronics sits inside the transducer housing, so there is no separate sounder box to install or to wire into the boat's network. A single 10 m (33 ft) cable leaves the transducer and ends at a Y-cable adapter that splits into an Ethernet plug for the sonar data and a pair of leads for DC power.

Three AIC models are currently supported. The IC-TM90M and IC-P90M are the same 100 W transducer offered in two mountings; the IC-B190M is a 1 kW model for deeper water:

- **Airmar IC-TM90M** --- transom-mount transducer for trailerable and small inshore boats.
- **Airmar IC-P90M** --- Tilted Element thru-hull version of the same transducer, supplied with a 0°, 12°, or 20° offset to match the hull deadrise.

- **Airmar IC-B190M** --- 1 kW Tilted Element thru-hull transducer for larger vessels and deeper offshore work.

Plug the Ethernet leg of the adapter into the same network as the MFD, connect the power leads, and Deeprey picks the transducer up automatically and starts drawing the waterfall. The default setup works out of the box for most installations. If your transducer was shipped with a different network address, you can adjust it under **Settings > Sonar** (see §12.8) --- but in practice your installer sets this once and you will not need to touch it again.

Supported Transducers

All three supported AIC models are medium-frequency CHIRP transducers that report depth and water temperature alongside the echogram, and all expose the same Deeprey controls. The IC-TM90M and IC-P90M are electrically identical and differ only in mounting, so they are listed together below.

Specification	IC-TM90M / IC-P90M	IC-B190M
Mounting	Transom-mount (IC-TM90M) or Tilted Element thru-hull, 0°, 12°, or 20° deadrise offset (IC-P90M)	Tilted Element thru-hull (0°, 12°, or 20° deadrise offset)
Transmit power	100 W	1 kW / 500 W / 250 W (software-selectable)
Frequency	Medium CHIRP, 95--155 kHz	Medium CHIRP, 85--135 kHz
Bandwidth	60 kHz	50 kHz
Beamwidth	26°--17°	16°--11°
Max depth	200 m (656 ft)	400 m (1300 ft)
Min depth	0.5 m (1.6 ft)	0.5 m (1.6 ft)
Max speed	40 knots	---
Cable	10 m (33 ft) integrated cable to a Y-cable adapter (Ethernet data + DC power)	10 m (33 ft) integrated cable to a Y-cable adapter (Ethernet data + DC power)
Power supply	10.5--16 VDC	10.5--30 VDC

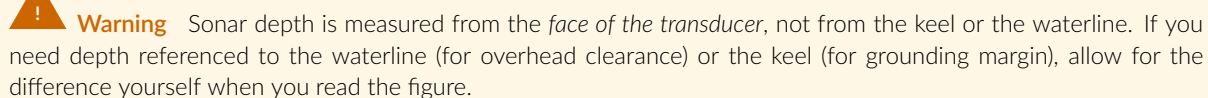


Note Pick the **IC-TM90M** for a simple transom installation on smaller inshore boats running up to 40 knots, with bottom reading down to 200 m. Pick the **IC-P90M** for the same performance where a thru-hull fitting is preferred to a transom bracket. Pick the **IC-B190M** when you need more transmit power, a narrower beam, or readings in deeper water down to 400 m.

About the Transducer

The transducer pings the water, listens for the echoes, and tracks the bottom. Deeprey draws those echoes as the scrolling waterfall and gives you the controls to fine-tune what you see, drop marks, and record sessions.

Every sonar adjustment --- gain, noise rejection, depth range, and so on --- is made from the sonar sidebar or from **Settings > Sonar**, and your changes stay in place the next time you power up the boat.



When the Sonar Doesn't Connect

If Deeprey cannot reach the transducer, the sonar canvas stays empty, the sidebar controls are greyed out, and the **Settings > Sonar** page shows **Not Connected** where the transducer details would normally appear.

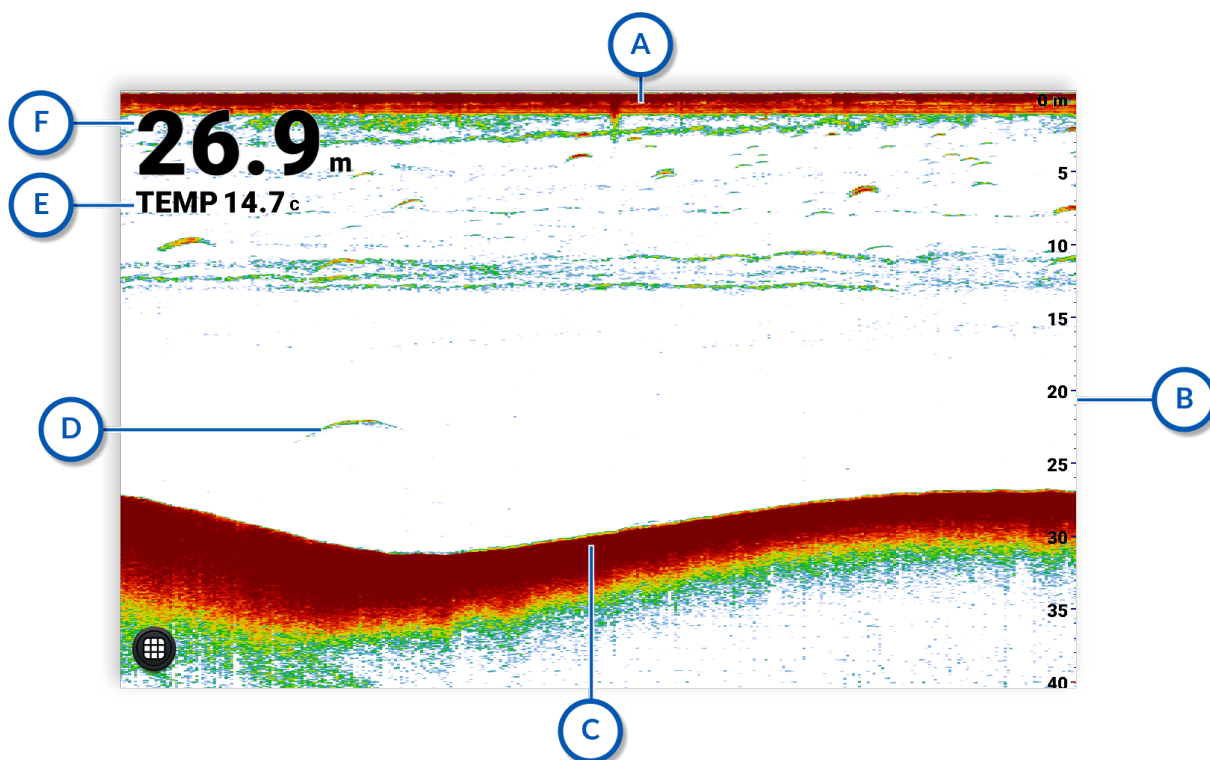
A few quick checks:

- Make sure the transducer is powered on and the data cable is connected to the same network as the MFD.
- Under **Settings > Sonar > Parameters**, check the address matches what your installer configured (the default is **192.168.1.60**).
- If your boat's network was recently changed or re-wired, ask your installer to review the sonar network settings.

Reading the Sonar Display

When a sonar canvas is open and a transducer is connected, Deeprey draws the echogram as a scrolling waterfall --- the freshest ping appears at the right edge of the screen and previous pings scroll to the left as new pings arrive.

Elements of the Sonar Display



A	Surface --- the busy, colourful band along the top of the echogram. It is the strong return from the water surface itself together with any near-surface bubbles, turbulence, or debris under the hull. Ignore it when reading fish.
B	Range scale --- a numeric depth axis on the right edge, with tick marks at adaptive intervals that widen as the depth range grows.
C	Bottom --- the strongest, brightest band across the bottom of the echogram. Deeprey tracks the seabed automatically and uses it to anchor Auto depth range, Bottom Lock, and Bottom Zoom.
D	Fish arches --- echoes from individual fish passing through the beam. They appear as shallow arches rather than dots because the boat moves between pings. Bigger arches usually mean bigger fish or a longer time in the beam.
E	Temperature --- the current water temperature, displayed at the top-left of the canvas when the transducer reports it.
F	Depth --- the current depth under the boat, rendered as a large figure above the temperature readout.

Note If the **A-Scope** is enabled, a 50 px-wide column is fixed to the right edge of the waterfall showing the latest ping rendered in the same palette as the main image --- a frozen, non-scrolling snapshot that is overwritten every time a new ping arrives. It is on by default; toggle it from the sonar sidebar (see §12.4.5). This particular screenshot was captured with A-Scope off.

What You See on the Waterfall

The waterfall is not a photograph --- it is a scrolling mosaic of echoes, and it takes a little practice to read. These are the returns you will see most often:

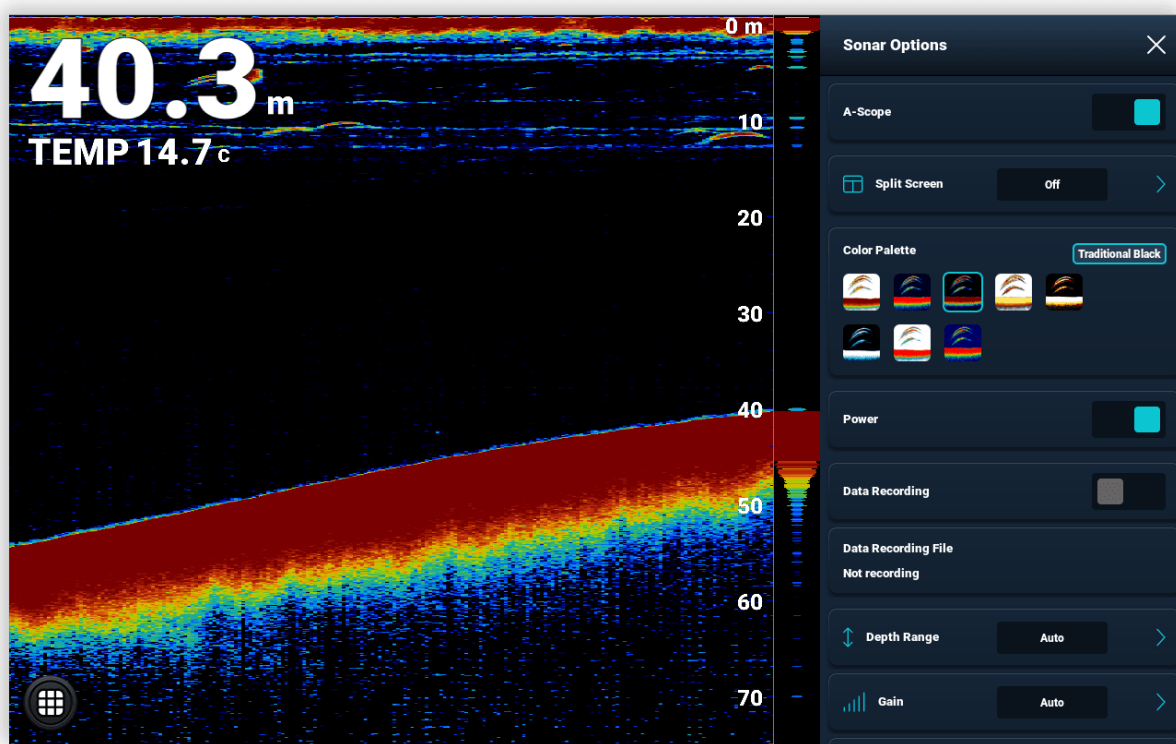
- **Fish arches** --- a single fish passing through the beam draws a shallow arch rather than a dot, because the boat moves between pings and each ping illuminates the fish from a slightly different angle. Arch size is affected by beam width, by how long the fish stays in the beam, and by how close it passes to the centre of the beam --- so a bigger arch does not always mean a bigger fish. Use the *thickness* and *brightness* of the trace as additional cues.
- **Half-arches** --- a fish that only grazes the edge of the beam draws one half of an arch instead of a full one. Common, harmless, and still a fish.
- **Bait balls** --- tightly packed schools of small fish appear as broad, fuzzy clouds, often stretched vertically as the school reacts to the boat. A streaked or "splintered" cloud usually means predators are cutting through it.
- **Thermocline** --- a faint, continuous horizontal band at a constant depth, marking the boundary between two water layers of different temperature. Fish are often found just above or below it.
- **Bottom hardness** --- the *thickness and brightness* of the seabed trace tells you how hard the bottom is: a thick, saturated trace means hard bottom (rock, gravel); a thin, dull trace means softer material (mud, silt). Colour transitions along the bottom often mark changes in substrate.
- **Structure** --- rocks, wrecks, pipes, and reef edges rise above the seabed as sharp, solid features. Weed and vegetation look similar at first but tend to show as diffuse vertical lines rather than solid blocks.
- **Drop-offs** --- sudden changes in depth show as near-vertical cliffs on the seabed trace. Productive fishing is frequently found along them.
- **Clutter** --- weak speckled returns throughout the water column, caused by bubbles, plankton, weed, or electrical interference. Wake turbulence under the hull also shows up as clutter near the surface. Noise Rejection (§12.4.6) can suppress most of it.

- **Second echo (false bottom)** --- in shallow water over a hard bottom, the seabed return can bounce off the surface and reappear as a faint second seabed at roughly twice the real depth. Ignore it --- the real bottom is the first, stronger trace.

Note Use scroll-back (see §12.6.2) to revisit pings you have already passed over. Features you ignored at the time often turn out to be good fishing marks when you come back and look at them carefully.

Sidebar Controls

The sonar sidebar menu holds all the display controls. Open it the same way as on any other Deeprey canvas: long-press the pane or tap the pane button. The sidebar mixes single-tap toggles (**Power**, **Data Recording**, **A-Scope**), a **Color Palette** picker, a **Scroll Speed** dropdown, and four expandable detail panels: **Depth Range**, **Gain**, **Noise Rejection**, and **Split Screen**. Tap a panel's header to open it and reveal the full controls.



Depth Range (Auto and Manual)

Open the **Depth Range** panel in the sonar sidebar. Three modes are available:

- **Auto** --- Deeprey follows the seabed automatically, keeping it near the bottom of the waterfall as depth changes.
- **Manual** --- set the shallow (minimum) and maximum depth yourself with two sliders. Range: 0--210 m. Useful when you want to concentrate on a specific layer (e.g. 20--40 m) without the chart re-scaling every time the seabed moves.
- **Custom** --- a one-tap shortcut that resets the manual range to 0--30 m. Behaves identically to Manual afterwards, so you can drag the sliders from there to any other range you like.

Gain (Auto and Manual)

Gain is the sonar's sensitivity to echoes. Higher gain brightens weak returns (you see more fish and fine structure) but also amplifies noise and surface clutter; lower gain cleans up the display but can hide weaker targets.

- **Auto** --- Deeprey adjusts gain for you based on depth and conditions.
- **Manual** --- set the level with a slider (0--100%, default 50%).



Note A good starting point for manual gain is the level at which the seabed is a strong, clearly visible band and the water column has a mild speckle but no solid haze. Raise gain to reveal targets you are searching for; lower it when the screen is overwhelmed.

Scroll Speed

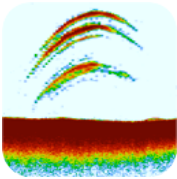
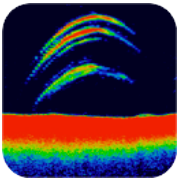
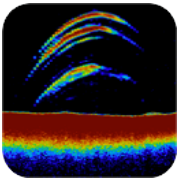
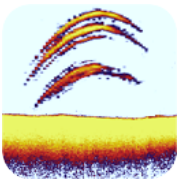
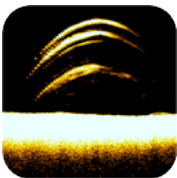
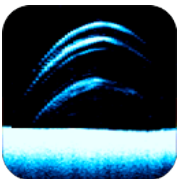
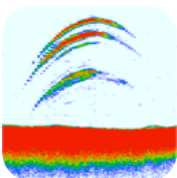
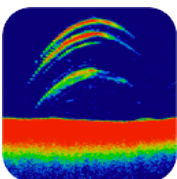
The **Scroll Speed** dropdown controls how fast new pings scroll across the waterfall. Five steps:

- **Very Slow**
- **Slow**
- **Normal** (default)
- **Fast**
- **Very Fast**

A slow scroll compresses more time onto the screen (useful when anchored or moving slowly so you can see recent history). A fast scroll spreads pings out for cleaner target separation at speed.

Color Palette

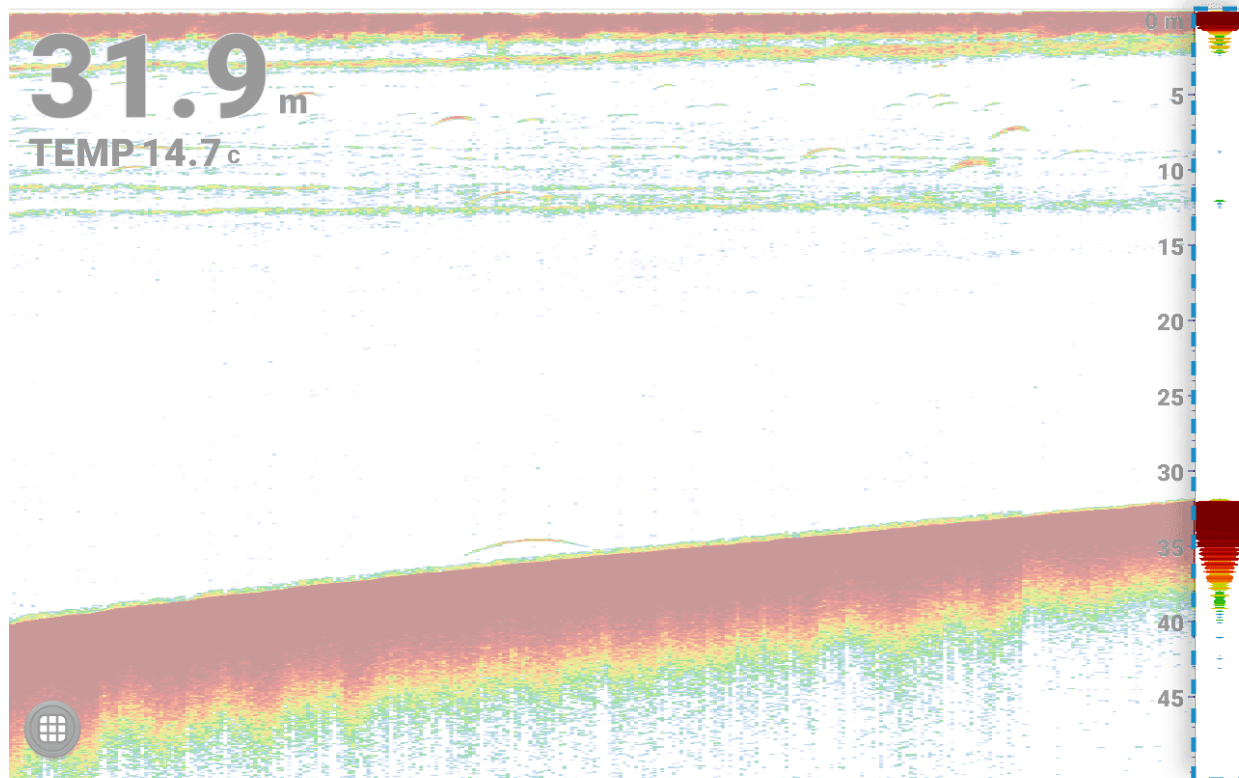
The **Color Palette** selector changes how echo amplitude is mapped to colour. Deeprey ships eight palettes --- each one renders the same echogram differently. Pick the one that matches your eyes and lighting conditions:

Preview	Palette	Meaning
	Traditional white	Classic fishfinder look on a white background. High contrast, easy to read in bright daylight.
	Traditional blue	Classic blue-background rendering. Good general-purpose choice.
	Traditional Black	Black background with bright returns; easiest on the eyes at night.
	Amber ridge	Amber-tone palette that makes subtle bottom structure stand out.
	Yellow imaging	Bright-yellow scheme optimised for detail and shallow-water imaging.
	Blue imaging	Blue-dominant imaging palette; good for picking out fish in the water column.
	Classic white	Alternative light-background palette.
	Classic blue	Alternative blue-background palette with different contrast curve.

A-Scope Visibility

The **A-Scope** toggle on the sidebar adds a narrow 50 px column fixed to the right of the waterfall. Unlike the waterfall (which scrolls and keeps history), the A-Scope shows *only the latest ping*, rendered in the same colour palette as the main image --- every new ping overwrites it.

Because it is always up to the minute, the A-Scope is a useful cross-reference when reading live activity or confirming a target you see on the waterfall is still really there right now. On by default; toggle from the sidebar.



Noise Rejection

Noise Rejection suppresses electrical interference and self-noise that can otherwise show up as speckled clutter on the waterfall. Three modes:

- **Off** --- no filtering (default).
- **Manual** --- slider sets the filter strength (0--100).
- **Auto** --- Deeprey adapts the filter strength to current conditions.

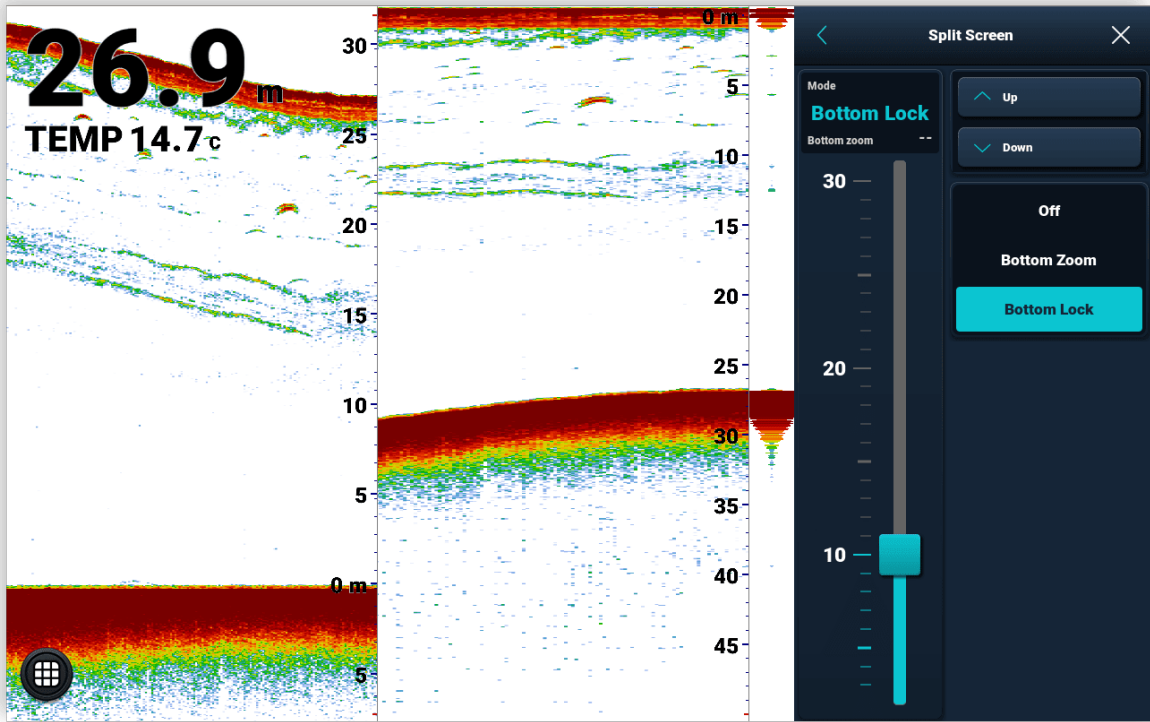


Note Noise Rejection can mask weak legitimate returns along with noise. Start with the filter off or at a low strength and raise it only until interference stops appearing --- otherwise you risk losing faint fish and bottom-structure traces.

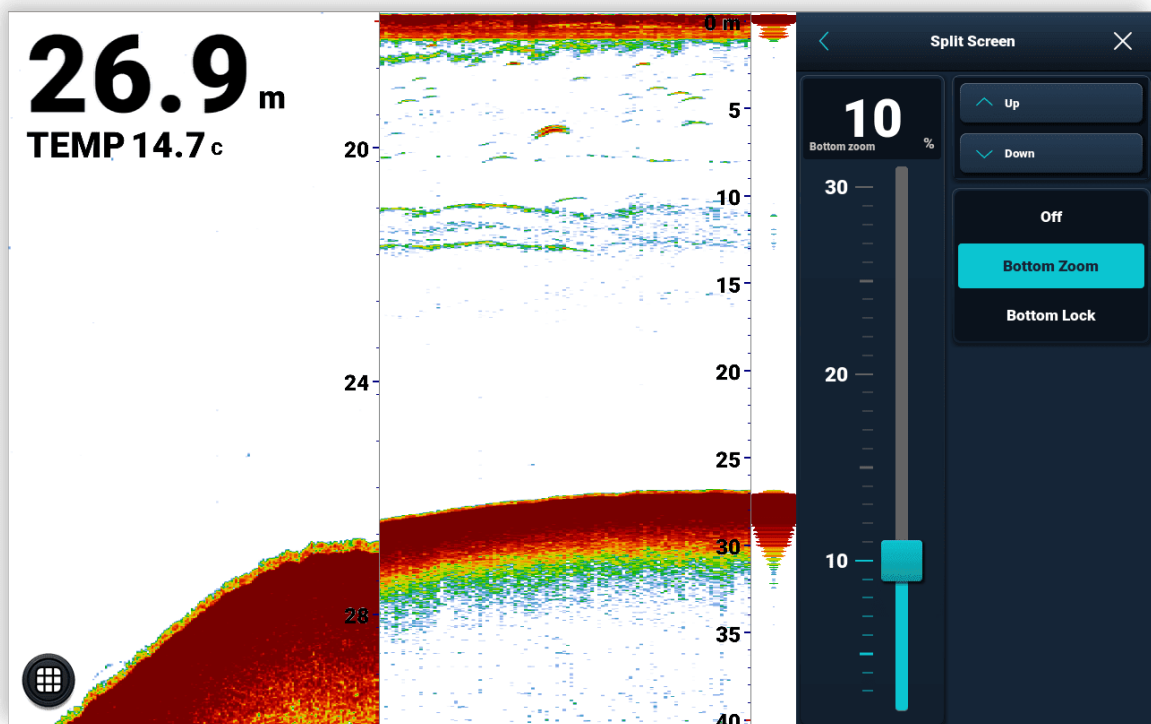
Split Screen

The **Split Screen** panel divides the waterfall into a main view and a secondary view that focuses on the seabed. Three modes:

Mode	What it does
Off	Standard single-pane waterfall (default).
Bottom Zoom	Secondary pane shows a magnified view of the seabed. Use the Bottom zoom slider (3--30 m, default 10 m) to choose how far above the seabed the zoomed section starts.
Bottom Lock	Secondary pane keeps the seabed locked at a constant screen position regardless of depth changes. Very useful when following contour over uneven terrain. The Bottom zoom slider has no effect in this mode.



Bottom Zoom --- the secondary pane shows a magnified view of the seabed, letting you read bottom structure in more detail.



Bottom Lock --- the secondary pane holds the seabed at a fixed screen line even as depth changes, making it easy to follow contour over uneven terrain.

Fish Detection

Fish Detection scans every incoming ping for the short, isolated returns typical of free-swimming fish and tags them on the waterfall with a coloured fish icon, optionally annotated with the depth. Use it to pick fish out of a busy waterfall when you do not yet recognise their signature, or to sort returns by size --- the icon scales with the strength of the echo.

Note Fish Detection is a display aid, not a guarantee. It can mistake bait schools, thermoclines, or moving debris for fish, and it can miss targets that overlap with bottom returns. Treat the icons as hints to look closer, not as confirmed catches.

Opening the Controls

Fish Detection lives in the Sonar sidebar under the **Fish Detection** row (water-drop icon). The row carries a small status badge that reads **Off** in red when detection is disabled, or the current sensitivity level (**Very Low** through **Very High**) when it is on --- so you can tell at a glance whether the feature is armed without opening the sub-page. Tap the row to expand its sub-page; the master toggle is at the top, with the remaining controls below it. Those controls are greyed out until the master toggle is on.

Reading the Display

When Fish Detection is on, Deeprey draws a coloured fish-shaped icon over each detected return on the waterfall.

- **Icon size scales with target size** --- three steps (small, medium, large) matching the visual thickness of the echo. A larger icon means the sonar saw a stronger or thicker return --- not always a bigger fish (a tight school can read big), but a useful sorting cue.

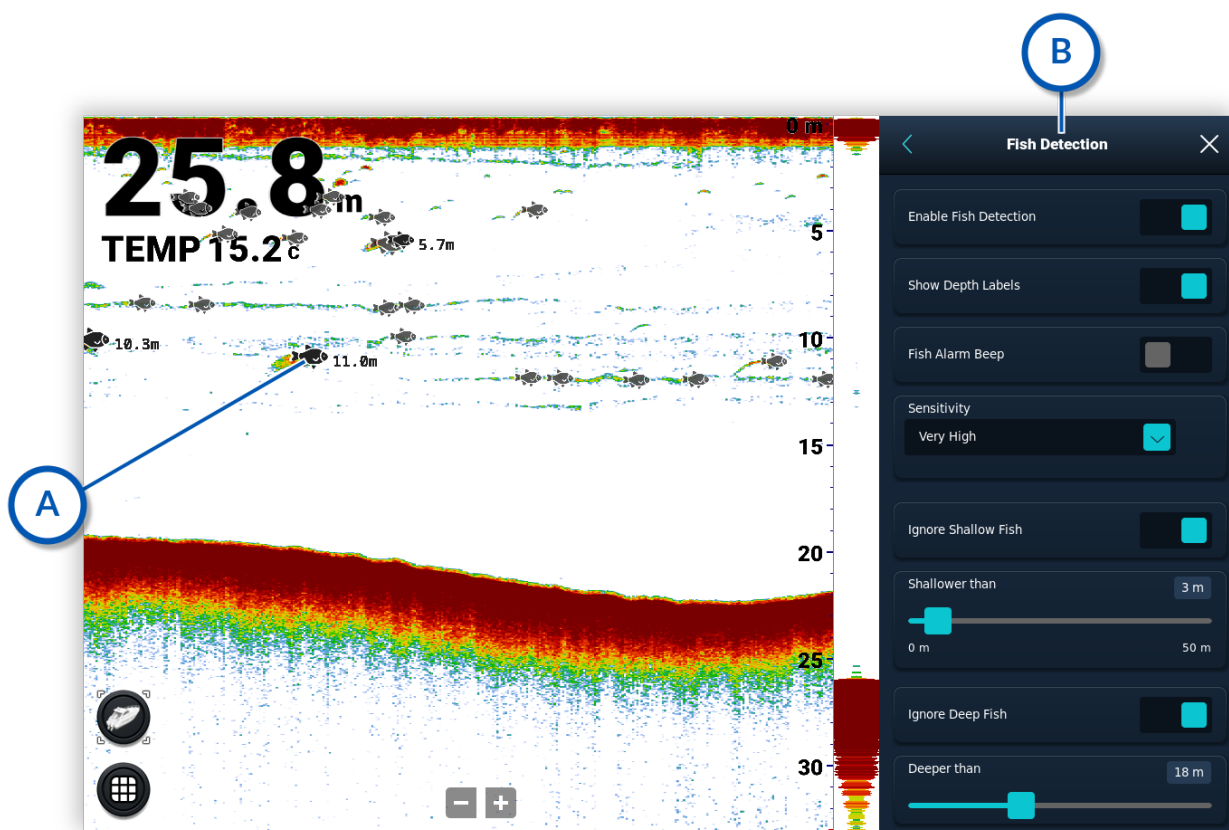
- **Icon colour adapts to the palette** --- the fill colour is picked for contrast against whatever palette you have chosen. On dark or blue palettes the icons are white with a black outline; on light or amber palettes the icons switch to a dark fill with a white halo. The aim is to keep the icons readable without hiding the underlying echo.
- **Faint vs. solid** --- the detector works in two stages. A target first has to show up in a few consecutive pings before any icon is drawn at all. When it does, it appears as a *faint* icon: ``we are tracking something here." Once it sees a clean fish-arch shape across the buffered pings, the icon goes *solid*: ``we are confident this is a fish." Solid targets also get a depth label (when labels are on); faint targets do not.
- **Icons scroll with the waterfall** --- once placed, an icon moves left at the same speed as the echogram, so a cluster you saw a few seconds ago is still labelled when you scroll back to look (see §12.6.2).

Controls

Control	What it does
Enable Fish Detection	Master switch. When off, no icons are drawn and the rest of the controls are disabled. Turning it back on resets the detector so old returns do not carry over.
Show Depth Labels	Toggle, on by default. When on, each <i>solid</i> icon is annotated with the depth at the target (e.g. 22.3 m , in your selected depth units). Overlapping labels are skipped automatically to keep the screen readable; the icon is still drawn. Faint (tracking-only) icons are never labelled.
Fish Alarm Beep	Toggle. When on, Deeprey plays a short alarm tone every time a new fish is confirmed. Turning the toggle on plays one immediate confirmation tone so you can check the speaker volume. The alarm is throttled to at most one beep every three seconds, so a busy school does not turn into a continuous tone.
Sensitivity	Dropdown with five steps --- Very Low , Low , Medium (default), High , and Very High . A higher setting catches fainter and smaller returns at the cost of more false positives; a lower setting only flags the strongest, most isolated targets.
Ignore Shallow Fish	Toggle. When on, a Shallower than slider appears below it. Any return at a depth less than the slider's value is ignored. Use it to hide surface noise or boat wash. The slider defaults to 3 m (in your selected depth units) the first time you switch the toggle on.
Ignore Deep Fish	Toggle. When on, a Deeper than slider appears below it. Any return at a depth greater than the slider's value is ignored. Use it to focus on a target layer and drop bottom clutter. The slider defaults to roughly seventy percent of the sonar's current maximum depth the first time you switch the toggle on.



Note Both depth-gate sliders scale to your current sonar range, so the numbers always line up with the depth scale on the waterfall. Change the sonar's depth range and the gate sliders re-scale automatically. Moving a gate also clears the existing icons immediately --- they re-populate as new pings arrive that fall inside the new band.



A	Fish icons on the waterfall, each marking a detected target. The labels next to them (e.g. 5.7 m, 11.0 m) show the depth at the target --- only solid (arch-confirmed) icons are labelled.
B	The expanded Fish Detection sub-page in the sidebar, with the master Enable Fish Detection toggle at the top, the Show Depth Labels and Fish Alarm Beep toggles below it, the Sensitivity dropdown, and the two depth-gate sections (Ignore Shallow Fish with the Shallower than slider, and Ignore Deep Fish with the Deeper than slider).

Behaviour Notes

- All settings persist across reboots --- your Sensitivity, depth-label preference, and depth-gate choices come back the way you left them.
- Turning Fish Detection off clears icons from the waterfall immediately, but the underlying echoes are unaffected --- the same returns are still there in the raw waterfall and in any recording you have made (see §12.7).
- Detection runs on whatever pings are coming through, including playback of a saved recording, so you can review a session and re-tune the controls until the icons match what you see in the data.

Canvas Gestures

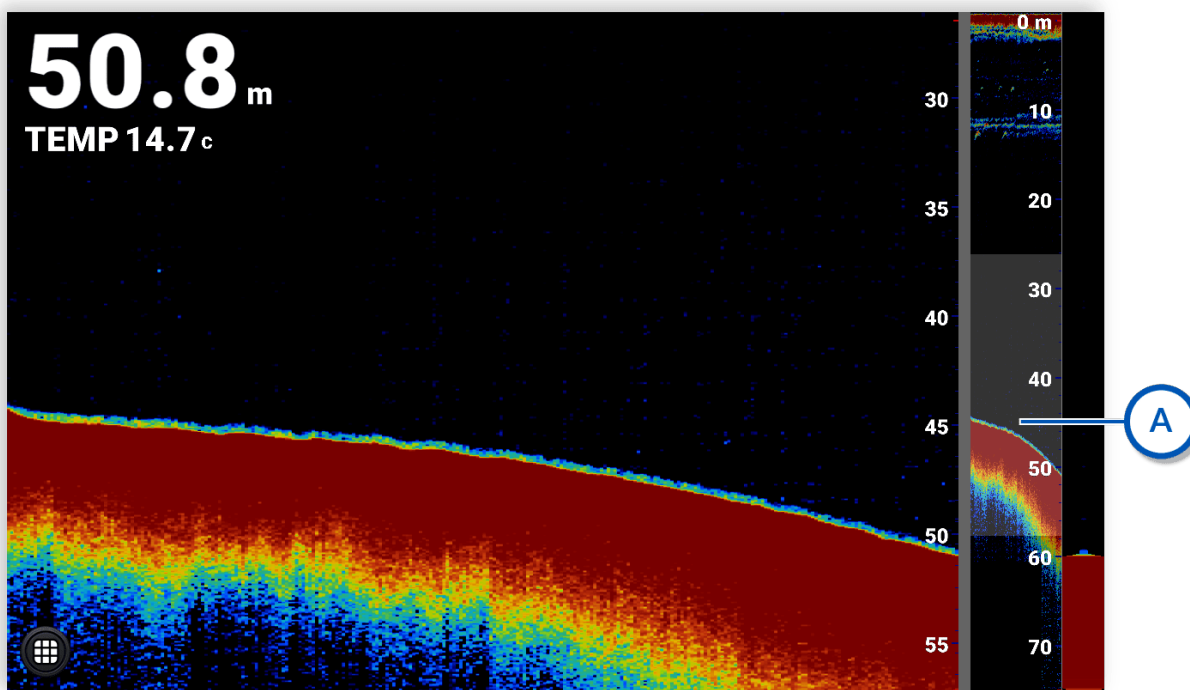
The sonar canvas accepts a few direct gestures that do not go through the sidebar. They let you magnify a depth band, scroll back through recent history, and drop a waypoint on an interesting return --- all without leaving the canvas.

Zoom

Use zoom to magnify a specific depth band on the waterfall. It is the fastest way to get a closer look at targets near the bottom or at fish that are too small to read at the current range.

- **Zoom in / Zoom out buttons** --- two buttons at the bottom of the sonar canvas. Each tap doubles (zoom in) or halves (zoom out) the vertical magnification.
- **Pinch gesture** --- pinch out on the canvas to zoom in, pinch in to zoom out.

When zoom is active, the canvas splits into two parts: the *main* view on the left shows the magnified slice of the water column at the current zoom factor, and a *zoom bar* on the right shows the full depth range with a highlighted band marking the section being magnified. Drag the zoom bar up or down to choose which part of the water column to zoom into. When you zoom all the way back out, the canvas returns to a single full view.

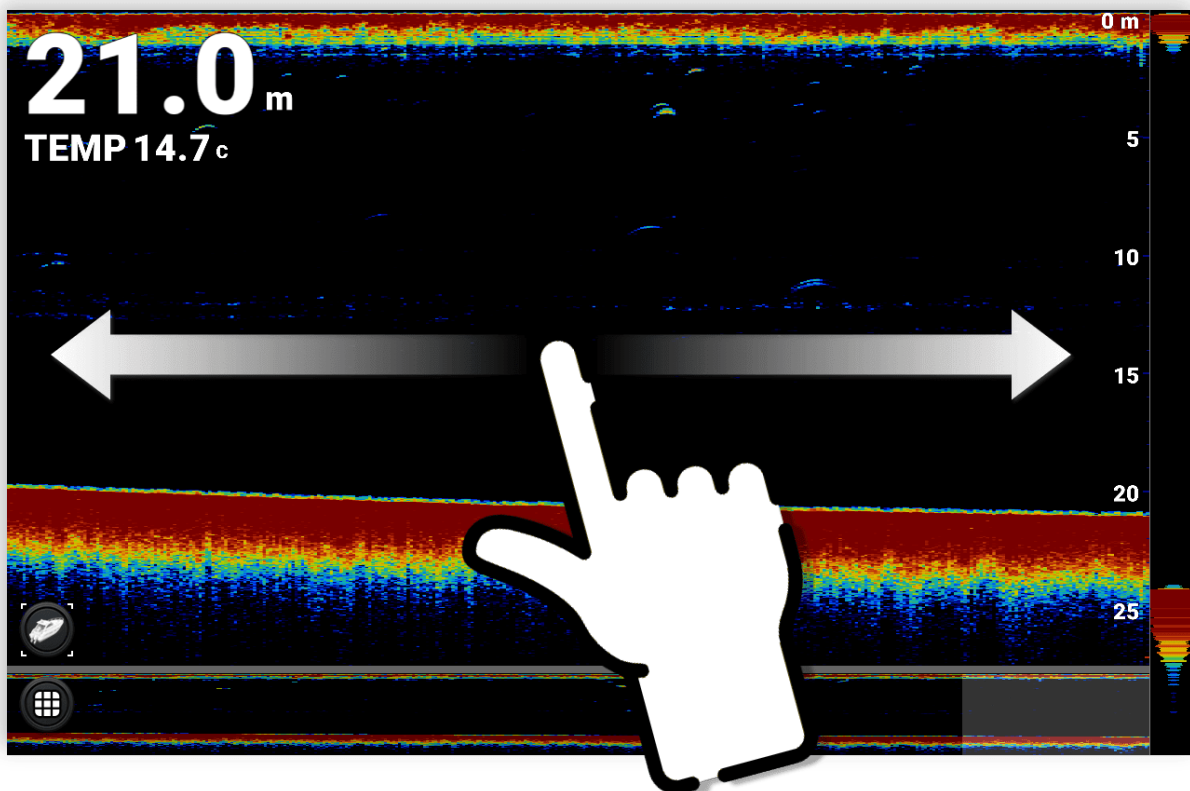


A

Zoom bar --- the narrow strip on the right showing the full depth range, with a highlighted band indicating where the main (left) view is magnified. Drag it up or down to change which part of the water column is zoomed in.

Reviewing Sonar History

You do not need to start a recording just to look at something that has already scrolled past. The sonar canvas supports *live scroll-back*: press and drag the waterfall to the right, and the whole echogram slides backwards through its retained history. New pings keep arriving behind the scenes, but the visible edge pauses on the past so you can study it.



To return to the live view, tap the **jump-to-live** button that appears in the bottom-left corner of the canvas whenever you are scrolled back --- it snaps the waterfall straight back to the most recent ping. As an alternative, you can drag the waterfall back to the left until the live edge reaches the right of the screen.

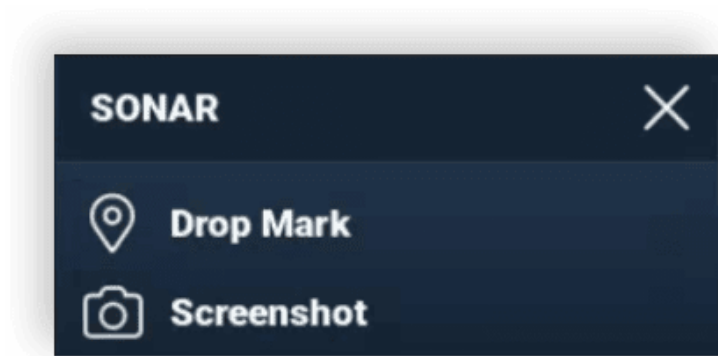
If **Horizontal slider** is enabled in Settings (see §12.8), a horizontal timeline scrubber also appears below the waterfall whenever you are scrolled back. Drag the scrubber to jump to any point in the retained history; when the waterfall catches up to the latest ping, both the scrubber and the jump-to-live button disappear automatically.

Note Drop Mark works on historical pings. If you scroll back to an interesting return and drop a mark on it, Deeprey uses the GPS position recorded *at the time of that ping*, not your current position --- so your waypoint lands on the real spot under the hull when the echo was recorded.

Context Menu

Long-press the sonar canvas to open its context menu. Two actions are available:

Action	Description
Drop Mark	When you see something worth remembering on the waterfall --- a wreck, a productive fishing spot, a drop-off, a bait school --- long-press the return and choose Drop Mark . Deeprey saves a waypoint at the exact GPS position of the ping under your finger (works on historical pings too), shows a small confirming marker on the canvas, and adds the new waypoint to the chart and to the waypoint list (see Chapter 7).
Screenshot	Captures the current sonar canvas as an image for your records.



Recording

The **Data Recording** toggle on the sonar sidebar saves the live sonar stream while you fish or sail. Tap it to start --- the current recording's filename appears just below the toggle while it is running. Tap again to stop, and the file is saved automatically.

Recordings are a raw capture of the session. Copy the file off the device whenever you want to keep an archive of a productive day, share an interesting run with support, or review the data on a computer later.



Note Display-only settings (palette, scroll speed, A-Scope) only change how the waterfall is drawn on screen --- they do not affect your recording. Gain, Noise Rejection, and Depth Range do change what the sonar measures, so adjusting them during a recording will change the saved stream from that point on.

Sonar Settings

System-wide sonar settings are configured under **Settings > Sonar**. The page is organised into two categories.

Display Options

Setting	Description
Horizontal slider	Toggle, off by default. When on, a horizontal timeline scrubber appears below the waterfall whenever you are viewing historical pings (i.e. you have scrolled the waterfall back from the live edge). Drag the scrubber to navigate through recorded history; when you are caught up to the current time no scrubber is drawn.

Parameters

Setting	Description
Device Information	Read-only block showing the transducer's model, sensor name, firmware version, and IP address. Blank or ``Unknown" when no transducer is connected.
Sensor Name	A short, human-friendly name you can assign to the transducer (up to 20 characters), useful when you have more than one boat or need to tell two units apart on the same network.
IP Address	The transducer's network address. Default 192.168.1.60 . Change this if your network uses a different subnet.
Subnet Mask	Dropdown. Two choices: 255.255.0.0 or 255.255.255.0 , depending on your network topology.

13

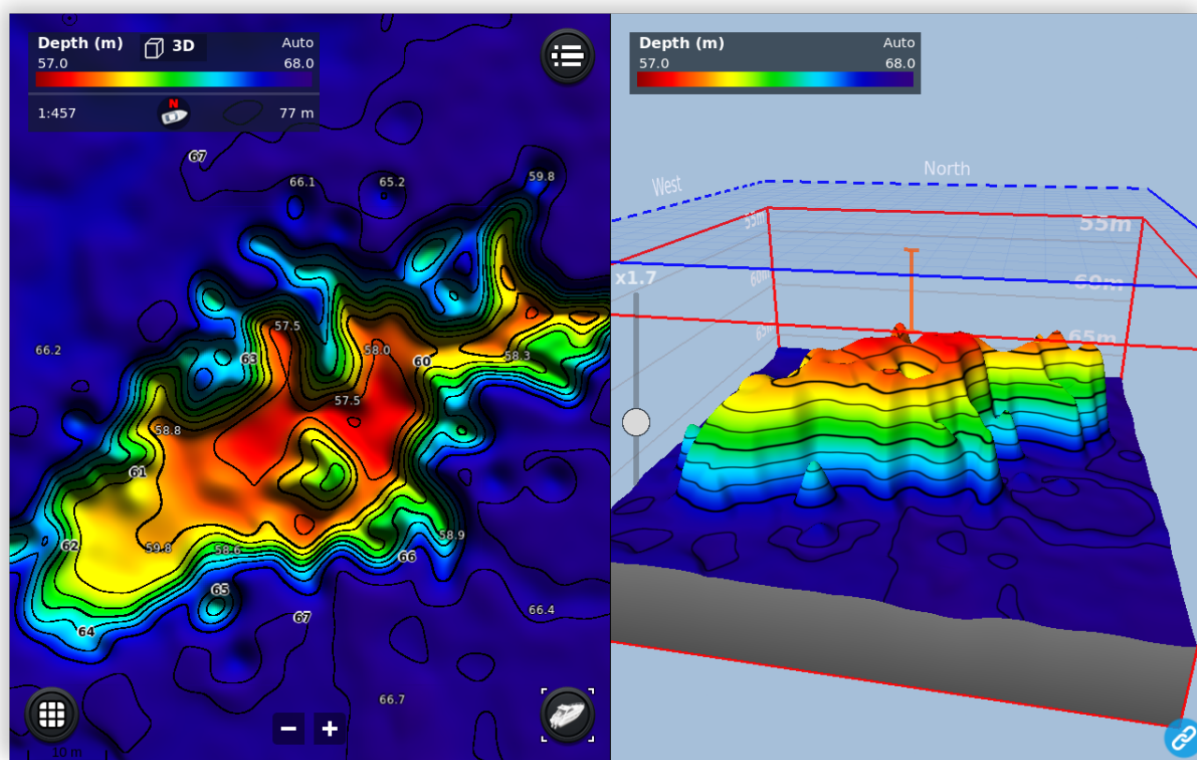
Bathymetric Survey

**Warning**

Bathymetric survey data is informational only. It shows what you or others have previously sailed over --- not what is actually there today. Never rely on it as a primary depth source over uncharted ground, in poorly surveyed areas, or anywhere safe clearance matters. Keep the official chart, your depth alarm, and a careful watch as your primary references.

Understanding Bathymetric Survey

As you sail, Deeprey records every sonar depth, tags it with the boat's GPS position, and saves it to an on-device database. The accumulated points are rendered on the chart as colour fills, contour lines, shaded relief, and an optional 3D terrain view. Areas you have never crossed stay blank until you sail over them; what you record persists across reboots.



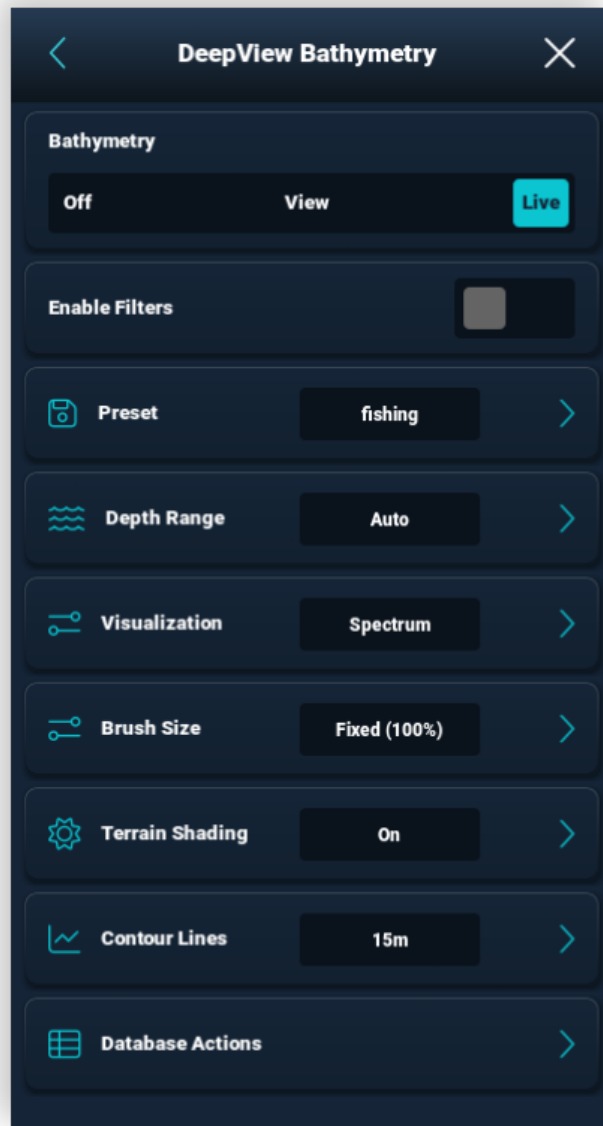
Recording Live Data

The bathymetry sidebar opens from the chart menu. A **Bathymetry** mode picker and an **Enable Filters** toggle sit at the top of the strip; everything else (panels and the Database Actions sub-menu) is greyed out until the mode is set to **View** or **Live**.

- **Bathymetry** --- a three-way picker that sets what your survey does on the current chart canvas:
 - **Off** --- the survey is hidden and nothing is recorded; the chart shows its normal content.
 - **View** --- the chart paints your saved survey as colour fills, contour lines, and (when shadows are on) shaded relief, but no new depths are added. Use it to read back existing data without changing it.
 - **Live** --- the survey is shown *and* every valid depth that arrives from the sonar is tagged with the boat's GPS position and written to the database. This is the mode for building up a survey as you sail.
- **Enable Filters** --- global master switch for the data-quality filters described in §13.3.



Note Each chart canvas remembers its own **Off** / **View** setting and restores it after a reboot; a fresh install starts at **Off**. Recording runs only in **Live** with the overlay visible --- there is no way to record while the survey is hidden, so switching a canvas to **Off** also stops recording. Changing the mode never alters what is already saved; it only controls whether *new* depths are added.



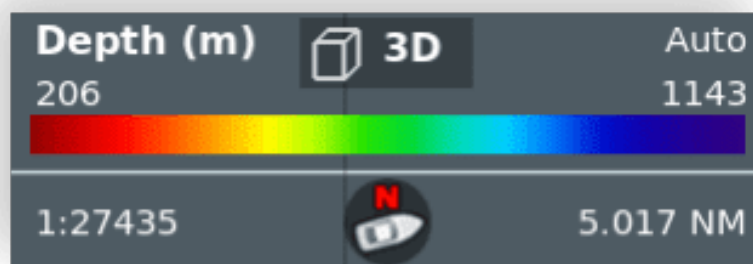
The bathymetry sidebar --- the **Bathymetry** Off / View / Live mode picker and the **Enable Filters** toggle at the top.

The On-Chart Info Bar

When the overlay is showing --- the mode picker set to **View** or **Live** --- a small info bar appears at the top-left of that canvas. It is a live readout of the bathymetry overlay --- the labels, gradient, and indicators all track changes you make on the sidebar.

- **Top row** --- a **Depth (unit)** header, a **3D** button (cube icon) that opens or closes the 3D terrain cube (\$13.9), an **Auto** or **Manual** label showing the current depth-range mode, and a horizontal colour-gradient bar matching the active palette with the shallow value on the left and the deep value on the right.

- **Bottom row** --- the chart scale ratio (e.g. **1 : 50k**), a tappable nav-mode icon in the centre that cycles through **North-up**, **Course-up**, and **Head-up**, and the current view width in nautical miles.



On-chart info bar --- depth header, 3D button, mode label, palette gradient on top; scale ratio, nav-mode icon, view width on the bottom.

Note Tide correction, set under **Settings > Sonar > Deepview**, normalises depths to the chart datum so a reading taken at high tide does not disagree with the same spot recorded at low tide. Recommended for areas with a significant tidal range.

Configuring Data Quality Filters

Four filters reject bad sonar readings before they reach the survey database. The master **Enable Filters** switch on the bathymetry sidebar (§13.2) gates the whole pipeline; each filter is then turned on or off individually under **Settings > Sonar > Deepview**, where its threshold also lives.

Note Both the master switch and every individual filter are *off* on a fresh install. Turn on **Enable Filters** in the sidebar, then enable each filter you want in Settings --- otherwise every depth still flows through unchanged.

The Four Filters

Filter	What it rejects
Depth Range Filter	Depths outside a minimum / maximum band. Minimum Depth 0.1--50 m (default 0.3 m), Maximum Depth 10--1000 m (default 200 m). Catches turbulence near the surface and the sonar losing lock over very deep water.
Speed Filter	Depths captured above a speed threshold. Maximum Speed 5--30 kn (default 15 kn). Points recorded at high speed tend to smear because of the gap between sensor sample and GPS fix; the filter pauses recording until you slow down.
Spike Detection	Single abrupt jumps measured as the percentage variation from the median of the last few readings. Maximum Variation 10--100% (default 50%). Catches fish arches, bubbles, and suspended debris that the sonar briefly mistakes for the bottom. A Reset Spike Filter State button clears the running history when a noisy stretch has poisoned it.
Frozen Sonar Detection	Sequences of identical consecutive readings. Maximum Identical Readings 3--20 (default 5). Guards against a stalled sonar feed writing the same depth over and over.

Note Defaults are tuned for a typical fishing boat. Fast vessels should raise the speed cap or turn that filter off for long transits.

Filter Statistics

Below the four filters, the **Filter Statistics** block shows live counters for how many points were accepted and how many were rejected by each filter. Tap **Reset Statistics** to zero the counters when you want to measure a specific stretch of sailing.

A healthy run shows rejections rising slowly in step with accepted points; a sudden surge in one column flags a transducer, speed, or environmental problem worth looking into.

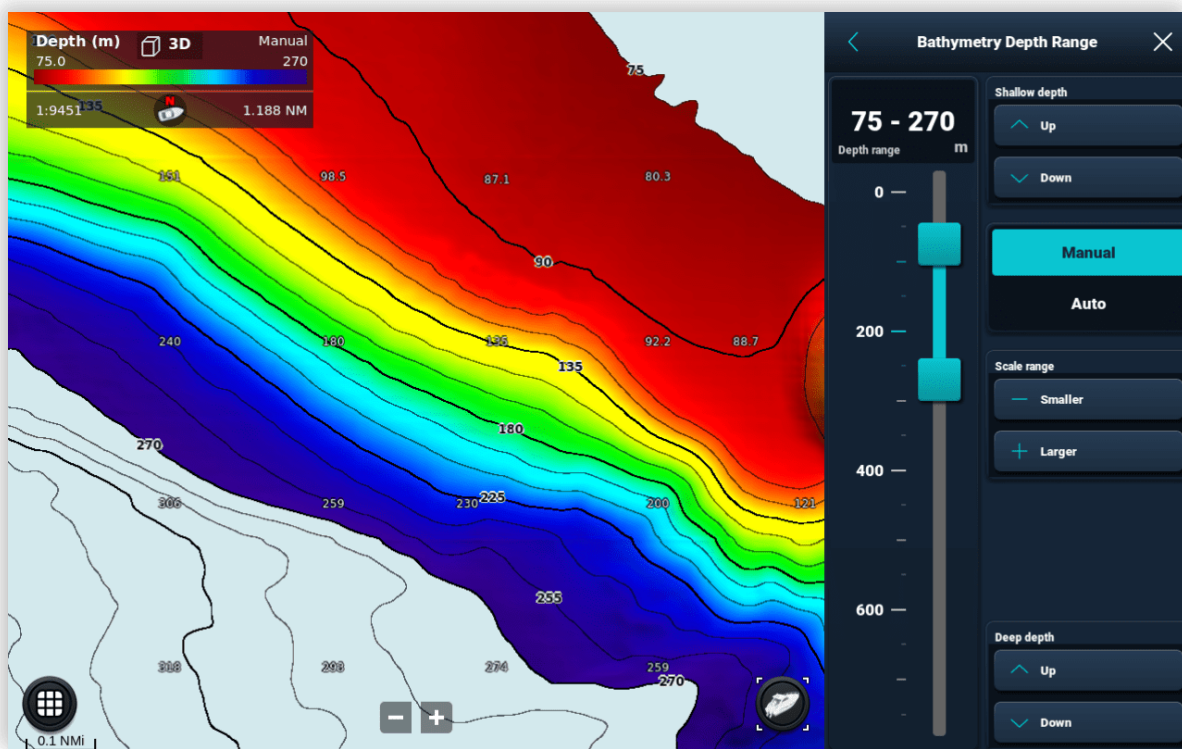
Adjusting the Display

These controls change how the survey is drawn on the chart. They affect only what you see --- they do not modify the recorded data.

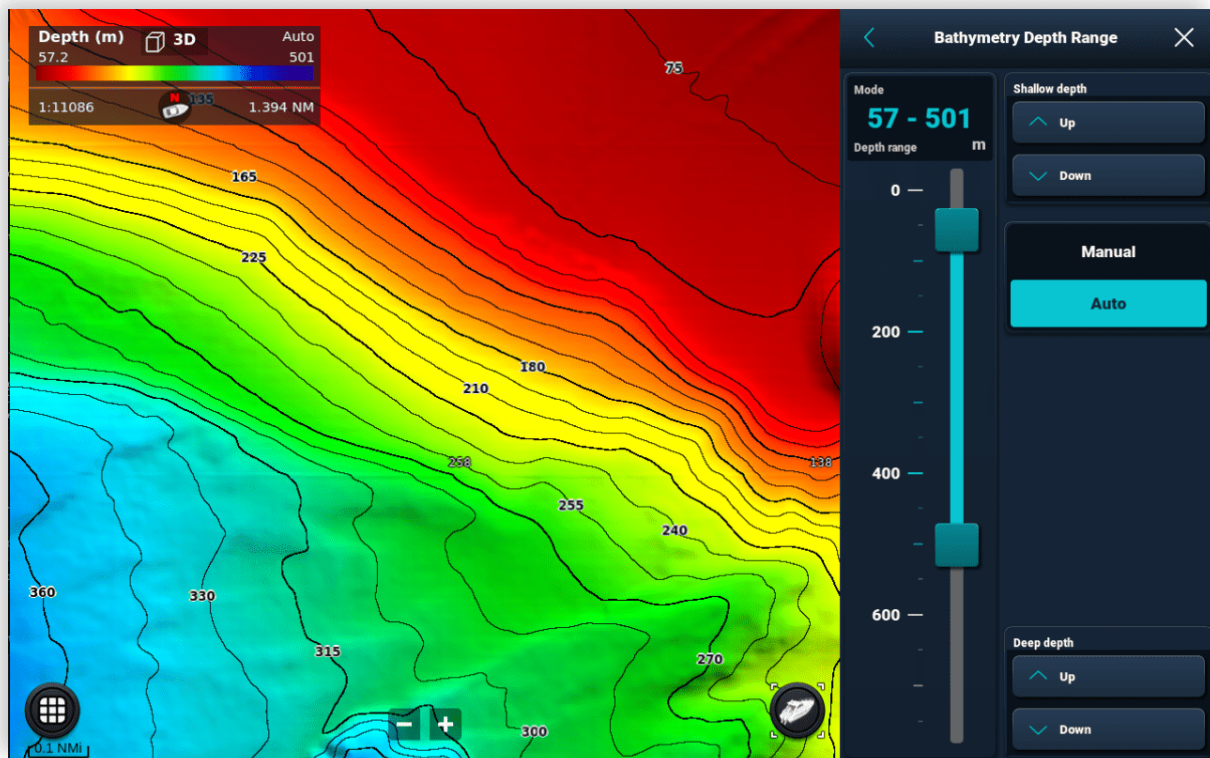
Depth Range (Manual and Auto)

The **Depth Range** panel in the bathymetry sidebar controls the depth band the colour palette is mapped to. A two-thumb slider sets the shallow and deep ends; **Up** / **Down** buttons next to the slider nudge each thumb (**Shallow depth** pair for the bottom thumb, **Deep depth** pair for the top thumb) when you want fine control without dragging.

- **Manual** --- you control the thumbs and the slider's full-scale. A **Scale range Smaller** / **Larger** button pair appears in this mode and steps the full-scale through a preset list: 100, 200, 300, 400, 500, 750, 1000, 1500, 2000 m. Useful when you want the palette locked onto a specific band (for example 0--30 m) so colours stay consistent as you move.
- **Auto** --- Deeprey picks the scale based on what is visible in the current chart view. Sail into deeper water and the palette rescales to stretch across the new depths.



Manual mode --- the **Scale range Smaller / Larger** buttons appear so you can step through the preset list.



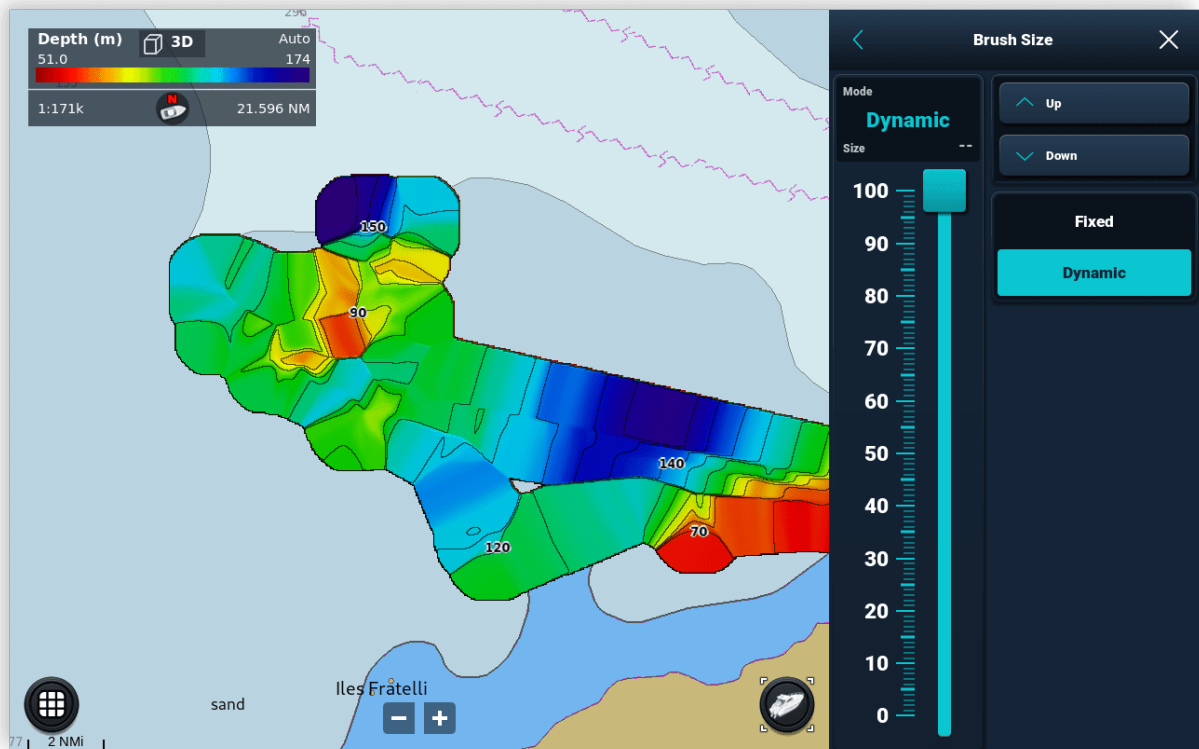
Auto mode --- the **Scale range** buttons are hidden because Deeprey picks the scale itself based on the visible chart depth.

Brush Size (Fixed and Dynamic Mode)

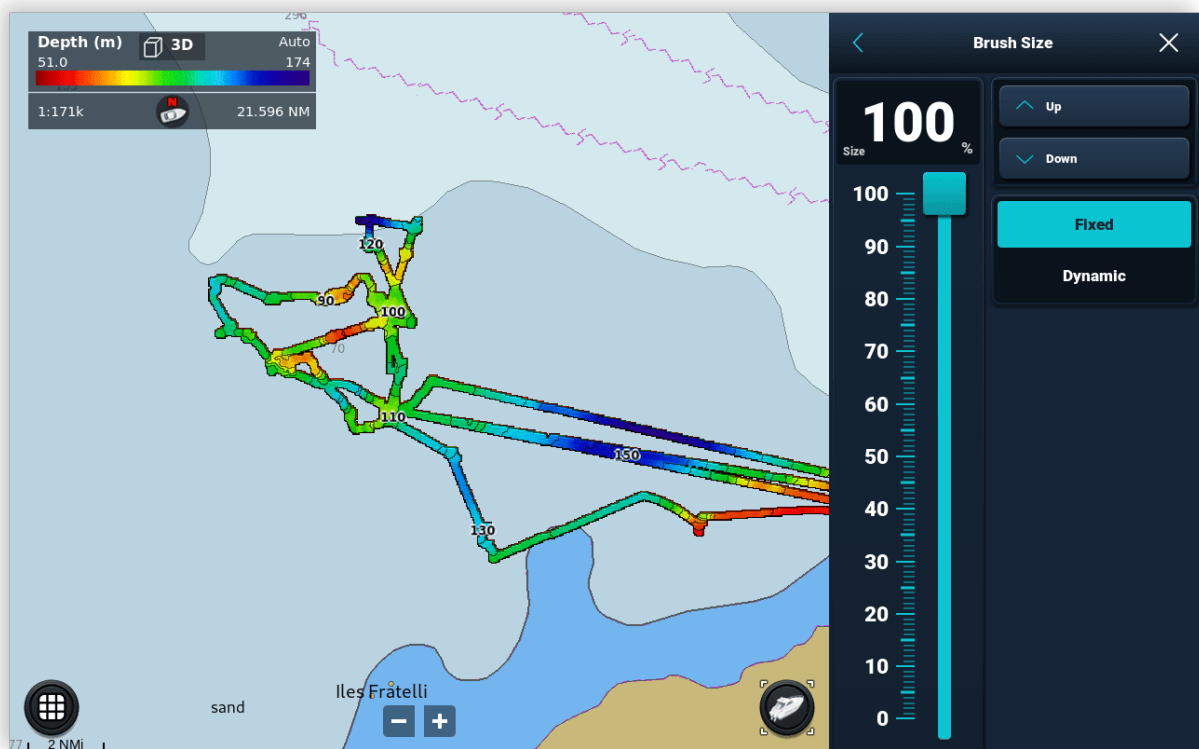
The **Brush Size** panel controls how large each recorded point is drawn on the chart. Bigger brushes fill gaps between sparsely-surveyed points and give a smoother image; smaller brushes show each individual reading but leave holes if coverage is thin. A single slider (**0--100%**, default **50%**) sets the brush intensity; the mode underneath chooses how that number is interpreted.

- **Fixed** (default) --- the brush keeps the same footprint on the seabed regardless of chart zoom. Useful when you want each point to represent a consistent area on the ground.

- **Dynamic** --- the brush adapts to chart zoom: bigger at wide views to fill gaps between tracks, smaller at close-in views for finer detail.



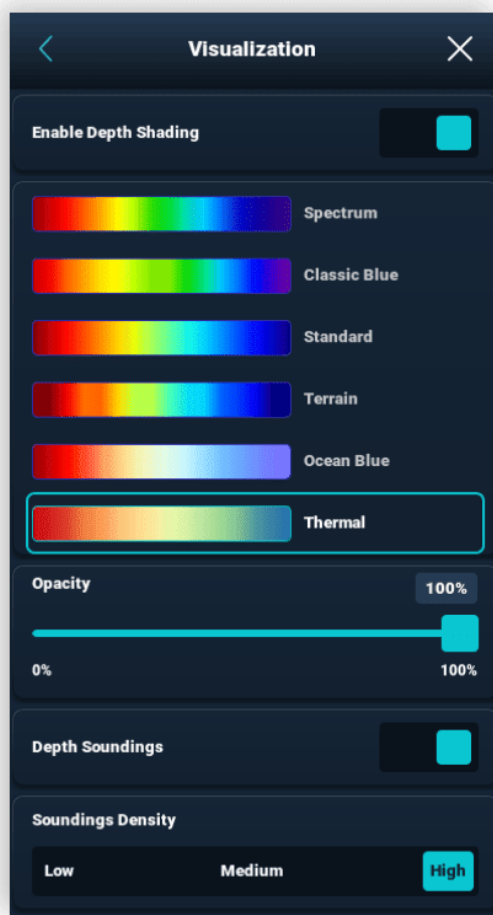
The **Brush Size** panel --- the 0--100% slider with the **Fixed** / **Dynamic** mode pill.



The same seabed at two brush settings --- a small brush leaves individual dots with visible gaps, while a large brush fills the gaps for a smoother result.

Visualization

The **Visualization** panel groups the look of the depth overlay --- the master shading toggle, the colour palette, opacity, and depth-sounding labels.



The **Visualization** panel --- shading toggle, palette buttons, opacity slider, soundings toggle, and density selector stacked from top to bottom.

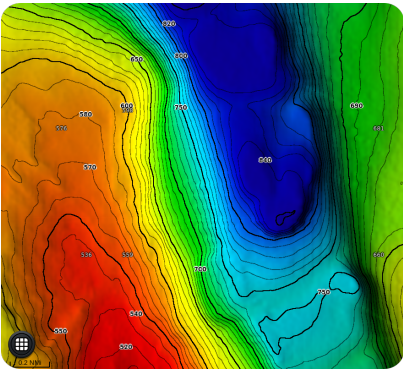
Enable Depth Shading

The first item on the panel is the **Enable Depth Shading** toggle (default **on**). When on, the survey is painted with the active palette; when off, the colour fill disappears entirely and the palette and opacity controls below grey out. Turning it off is a quick way to hide just the colour without losing your contour lines or 3D view.

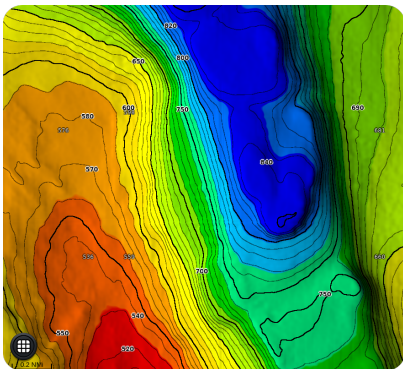
Color Palette

Below the toggle, six palettes are available:

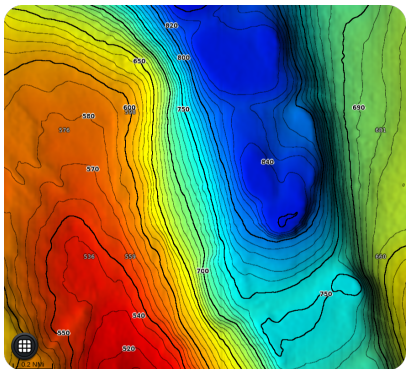
Palette	Character
Spectrum (default)	Full rainbow from deep blue to red. Maximum contrast; good for spotting small depth changes.
Classic Blue	Traditional nautical-chart style. Comfortable on the eyes; blends with standard charts.
Standard	Balanced blue-cyan scale for general use.
Terrain	Land-to-sea tones (brown shallows through green to blue). Reads like a topographic map.
Ocean Blue	Monochromatic blue scale. Minimalist look.
Thermal	Heat-map style (cool-blue to hot-red). Dramatic contrast for fine depth differences.



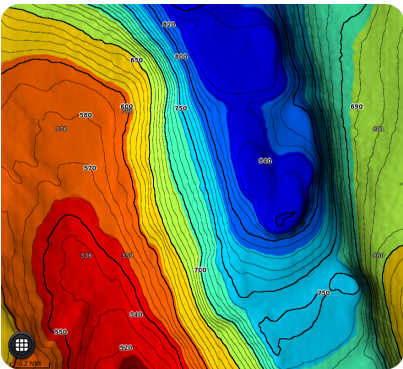
Spectrum



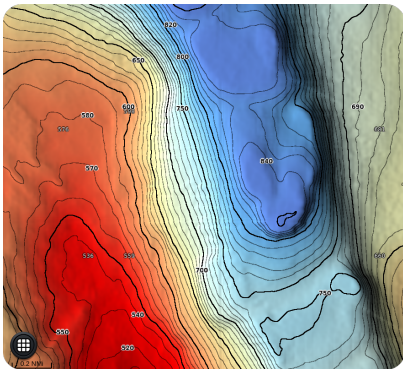
Classic Blue



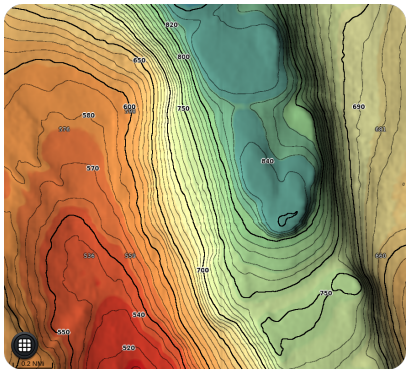
Standard



Terrain



Ocean Blue



Thermal

Opacity

The **Opacity** slider (0--100%, default **100%**) controls how much of the chart beneath shows through the bathymetry overlay. Lower opacity is useful when you want to read chart features (depth contours, hazards, navigation marks) through the survey.

Depth Sounding Labels

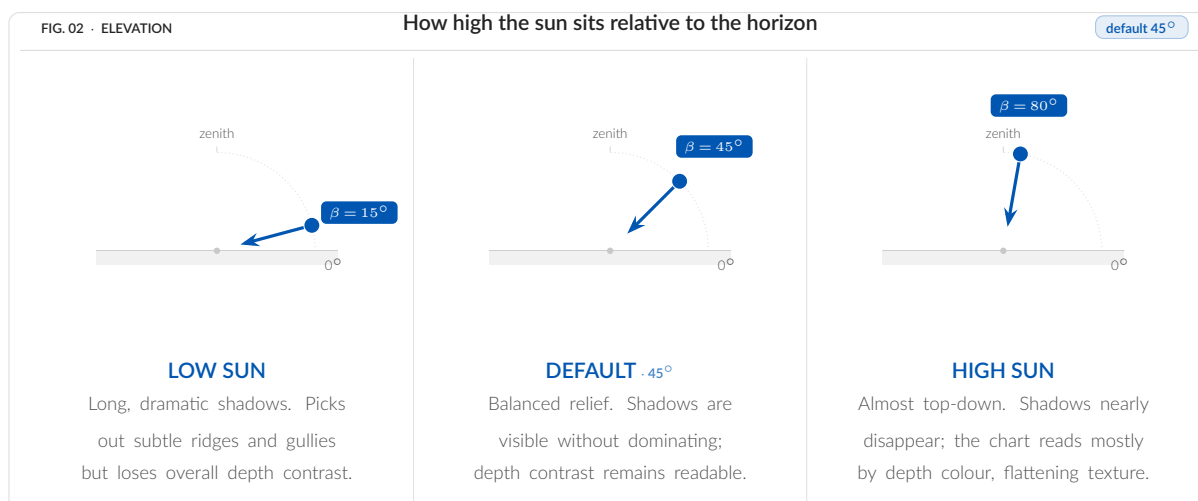
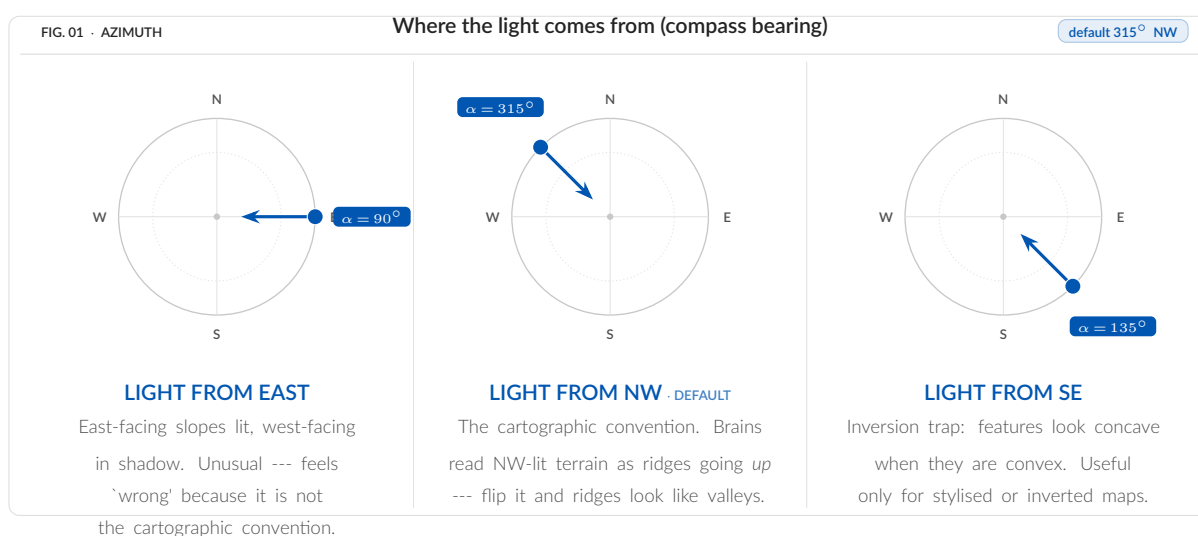
The **Depth Soundings** toggle (default **off**) scatters individual depth values across the chart as small numeric labels. A **Soundings Density** selector underneath (**Low**, **Medium** (default), **High**) controls how many are drawn

--- Low for a clean chart with just a few representative values, High when you want to read the bottom precisely. The density is zoom-adaptive, so zooming in reveals more detail without overwhelming a zoomed-out view.

Configuring Shadows

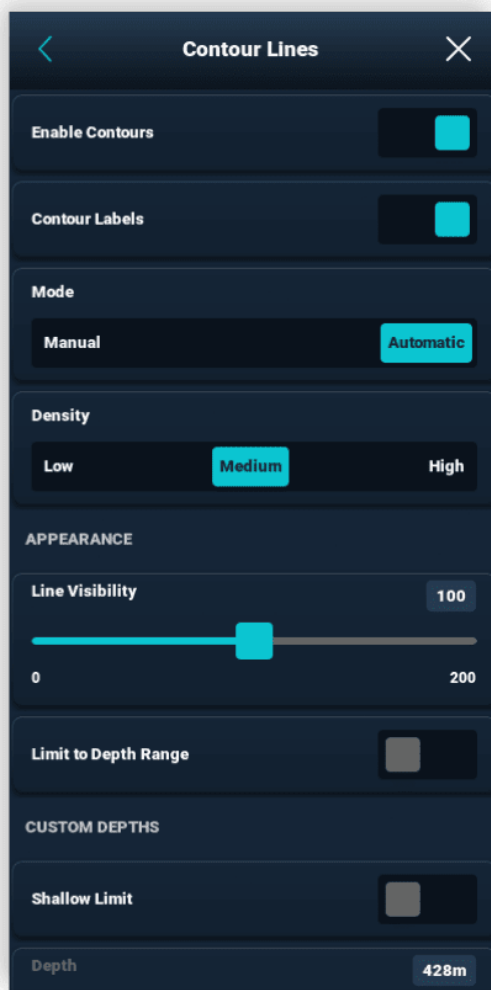
The **Terrain Shading** panel gives the bathymetry overlay a three-dimensional look by drawing the seabed as if it were lit from an imaginary sun. Ridges and valleys that are flat on a depth-coloured map become obvious as soon as shading is on.

- **Enable Shading** --- master toggle for the whole effect (default **on**).
- **Light Azimuth** --- 0--359°, default **315°** (northwest). Compass bearing the imaginary sun is in: 0° is north, 90° is east, 180° is south, 270° is west.
- **Light Elevation** --- 0--90°, default **45°**. How high the sun sits above the horizon.
- **Shading Level** --- 0--100%, default **90%**. How strongly shading is mixed into the colour. 0% shows the plain palette; 100% is full relief.



Configuring Isobath Contour Lines

An *isobath* is a line on a chart joining points of equal depth. The **Contour Lines** panel controls how Deeprey draws them over your survey.



The **Contour Lines** panel --- Enable Contours / Contour Labels / Mode at the top, the mode-specific section in the middle, then **APPEARANCE** and **CUSTOM DEPTHS** sections.

Enable, Mode, and Labels

Three controls sit at the top of the panel:

- **Enable Contours** (default **on**) --- master toggle for the contour lines.
- **Contour Labels** (default **off**) --- adds depth numbers along the lines so you can read each depth at a glance.
- **Mode** --- chooses how Deeprey picks the interval between lines.
 - **Manual** (default) --- you pick a fixed interval from a preset list: **0.5, 1, 2, 5, 10, 15, 20, 50, 100 m**. Lines are drawn exactly at those depth multiples regardless of zoom. A **Highlight Major Lines** sub-toggle (default on) makes every Nth contour thicker and more vivid; the **Highlight Every** slider (2--10 lines, default **5**) controls how often a major line appears. Highlighting is available in Manual mode only --- switch to Automatic and the toggle disappears.
 - **Automatic** --- the interval adapts to chart zoom: wide intervals (every few tens of meters) when you are zoomed out, fine intervals (every meter or so) when zoomed in close. A **Density** selector (**Low**, **Medium** (default), **High**) biases the adaptation toward coarser or finer spacing.

Appearance

Below the mode controls, an **APPEARANCE** section groups three controls that affect every line on screen:

- **Line Visibility** --- 0--200%, default **100%** (normal). Below 100% the lines fade; above 100% they are emphasised.
- **Line Color** --- pick **Palette Colors** to tint the lines with your depth palette, or **Black** (default) for maximum contrast against the fill. The selector disappears when **Enable Depth Shading** is on (§13.4.3); contours are then forced to black so they stay visible against the shaded relief.
- **Limit to Depth Range** (default **off**) --- when on, contours are only drawn within the active shallow--deep range; when off, contours cover the whole chart no matter how you have set your palette.

Custom Depths

The bottom of the panel has a **CUSTOM DEPTHS** section with two extra contours that you can place at any depth you personally care about. Each has its own toggle (default **off**) and a **Depth** slider whose range follows the active depth band (0 to the current deep limit, in your active depth unit). Their colours are fixed --- red for the shallow contour, blue for the deep one.

- **Shallow Limit** (red) --- depth defaults to **3 m**. A natural place to flag water that is too shallow to enter.
- **Deep Contour** (blue) --- depth defaults to **50 m**. Useful as a target contour for fishing a specific thermal or structural depth.

 **Note** The two custom contours stay active even when **Enable Contours** is off --- so you can hide every other isobath and keep just the shallow alarm and the deep target visible. They are also saved with presets along with everything else.

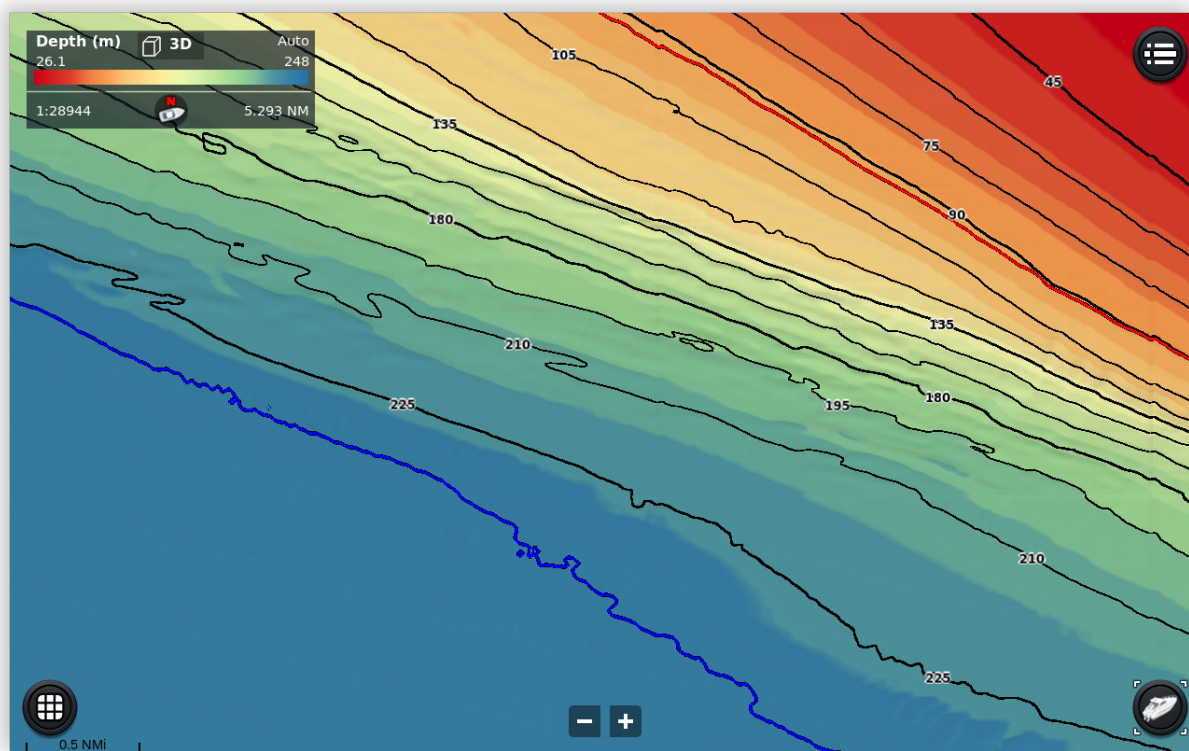
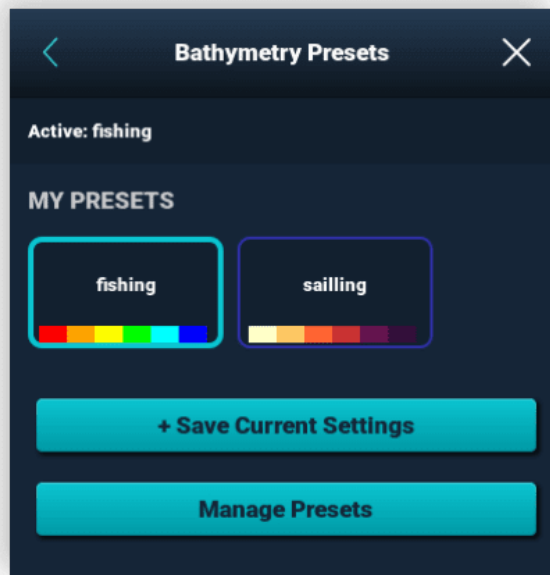


Chart overlay with contour lines, depth labels on major lines, and the red **Shallow Limit** and blue **Deep Contour** custom contours.

Using Presets

A preset captures the whole bathymetry setup --- depth range, brush, palette, opacity, shadows, contour lines (including the custom Shallow Limit and Deep Contour), depth soundings, tide correction, and every filter and threshold --- under a single name. Apply it with one tap to switch between, say, a ``Fishing" setup with tight contours and a red shallow alarm, and a ``Passage" setup with looser contours and softer colours.



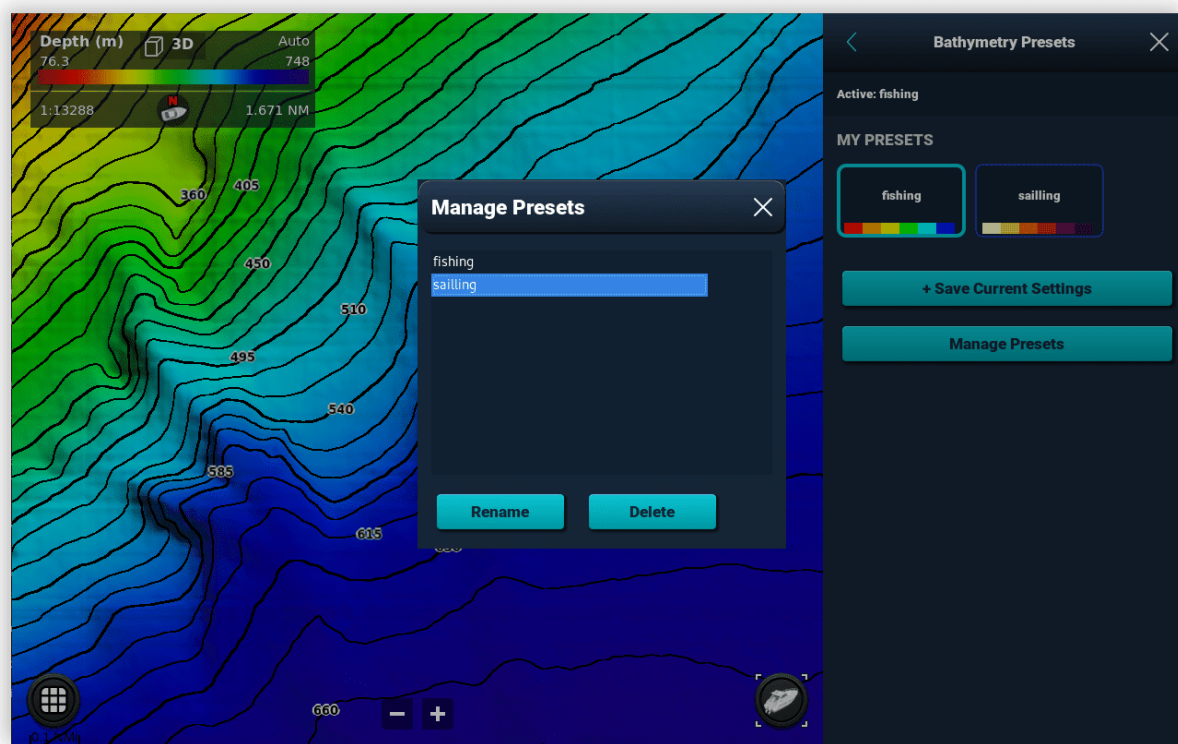
The **+ Save Current Settings** and **Manage Presets** buttons at the bottom of the preset page.

Applying, Saving, Renaming, and Deleting Presets

The preset page is split into two parts. The **header** at the top reads **Active: <name>** when a preset is loaded (or **No preset active** if none), followed by a small asterisk (*) when you have changed something since you last applied or saved. Below the header sits a **MY PRESETS** grid of tiles --- one tile per saved preset --- with the action buttons stacked underneath.

- **Apply** --- tap a tile to load that preset's settings.
- **+ Save Current Settings** --- opens a dialog where you enter a preset name (up to 50 characters, no duplicates) and save the current setup as a new preset.
- **Update** (only shown when a preset is active and modified) --- overwrites the active preset with your current settings, clearing the asterisk.

- **Manage Presets** --- opens the management dialog where you can pick a preset and **Rename** (a text box prompts for a new name --- duplicates are rejected) or **Delete** (a confirmation dialog appears first). Hidden until you have at least one saved preset.

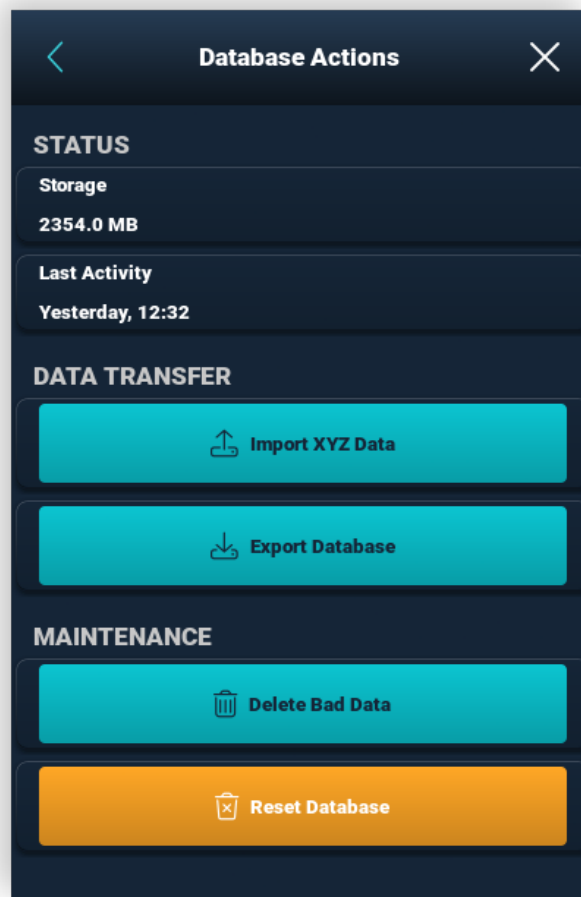


The preset page --- header at the top, the **MY PRESETS** tile grid in the middle, and action buttons underneath.

Note Until you save your first preset, the page shows an empty-state message and only **+ Save Current Settings** is available. A preset is just a saved set of display choices --- it does not contain any bathymetric data; applying one changes the *look* of your survey, never the survey itself.

Managing the Bathymetry Database

Everything your survey has recorded lives in the device's bathymetry database. Open the **Database Actions** panel from the chart menu under **DeepView Bathymetry > Database Actions**. It is split into three on-screen sections --- **STATUS**, **DATA TRANSFER**, and **MAINTENANCE**.



The **Database Actions** panel --- **STATUS**, **DATA TRANSFER**, and **MAINTENANCE** sections stacked top to bottom.

STATUS

Two read-only fields tell you where the database stands:

- **Storage** --- how much disk space the current database occupies. Shown as **KB** below 1 MB and **MB** above (for example **640 KB** or **1.5 MB**).
- **Last Activity** --- when the database was last written to (an import, an export, a clear, or live recording), shown as a date and time. **Never** appears on a brand new device.

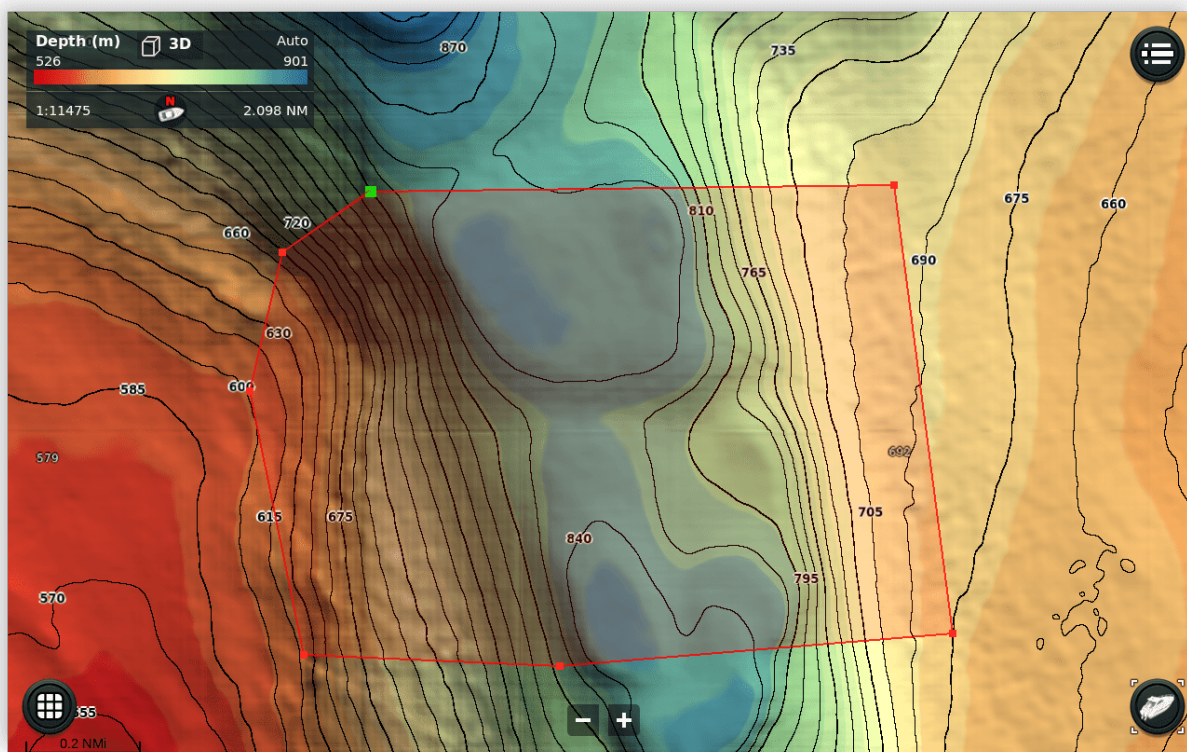
DATA TRANSFER

- **Import XYZ Data** --- opens a file chooser, reads the points, and adds them to the database. A progress bar shows how it goes. The data-quality filters in §13.3 apply to live recording only --- imported points are added as-is.
- **Export Database** --- writes the whole database to an **.xyz** file. Useful as a backup, a handover to another device, or for analysis in a GIS tool.

Note The **Import**, **Export**, and **Clear Data** buttons are disabled while an import or export is running --- you cannot stack transfers. The progress bar at the top of the panel shows that an operation is in progress.

MAINTENANCE

- **Delete Bad Data** --- closes the chart menu, shows a toast (**Delete tool active** --- **click to draw selection polygon**), and arms a polygon-selection tool. Tap on the chart to place each polygon vertex; tap near the first vertex (or double-tap anywhere) to close it. A confirmation dialog reports how many depth points fall inside the polygon (**Delete N depth points in the selected area?**); confirm and only those points are removed. Use this to cut out a bad run, an anchor drift, or data from a failed sensor without losing everything else.



The **Delete Bad Data** tool active --- tap-placed vertices outlining the patch of points to remove.

- **Clear Data** --- wipes the database entirely. A confirmation dialog prevents accidents. Everything you have recorded is lost, and the map goes back to blank.



Warning Clearing the database is irreversible. If you might want the data back, export it first and keep the .xyz file somewhere safe.

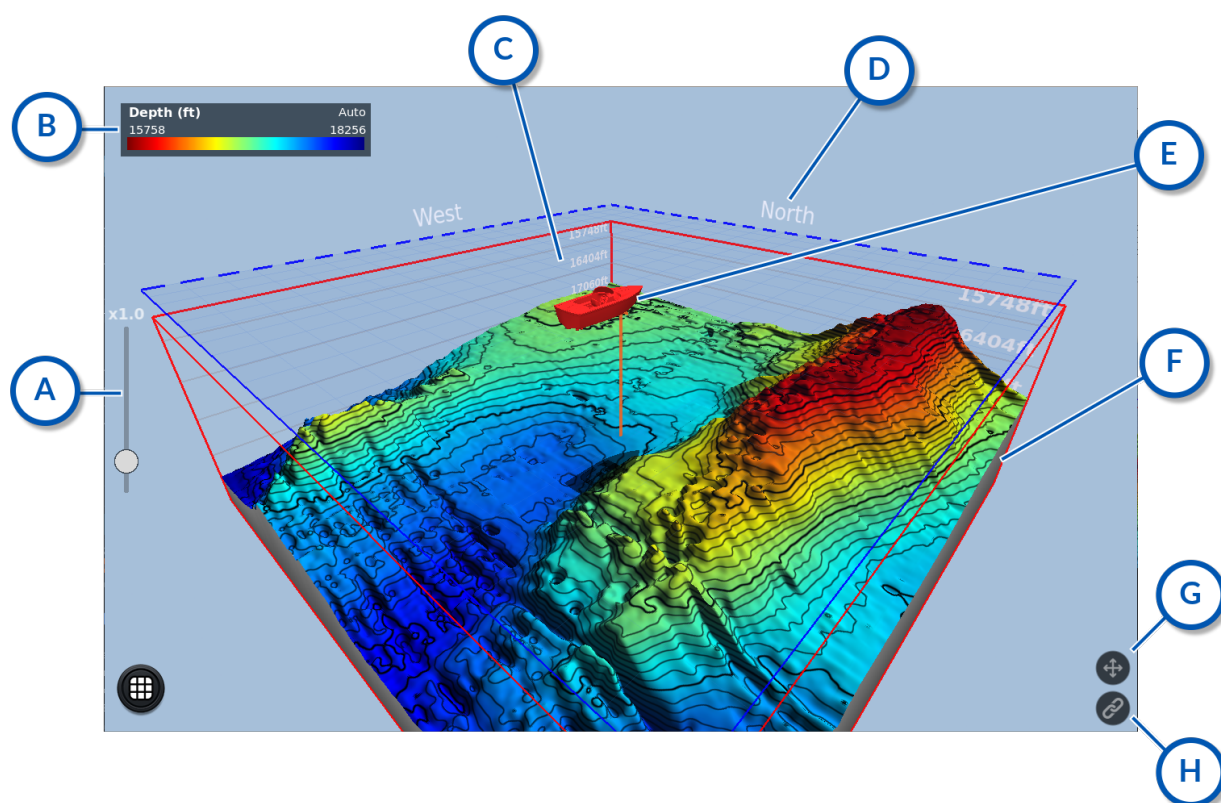
Using the 3D Terrain Cube

Deeprey can render your survey as a full three-dimensional terrain view --- useful for spotting ridges, channels, and drop-offs that a top-down chart flattens out. The cube uses the same palette, terrain shading, and contour-line settings as the 2D overlay, so any change you make in the bathymetry sidebar updates the 3D view live. Grey curtain-like wall skirts drop from the terrain edges to a cube floor, making the depth of each ridge or channel easy to read at a glance.

Opening the 3D View

There are two ways to bring the cube on screen:

- Tap the **3D** button on the chart's bathymetry info bar (top-left of the canvas, cube icon next to the ``3D" label). This opens the **Navigator | 3D Bathy** combo layout --- chart on one side, cube on the other. The button is only present when the survey overlay is showing (**View** or **Live**) on that canvas, and tapping it again closes the cube.
- From the home menu, pick the **3D Bathy** single-view layout (cube full-screen, no chart) or the **Navigator | 3D Bathy** combo layout from the workspace selector.



	Vertical exaggeration slider --- drag up or down to stretch the terrain (range 0.1×--5.0×, default 1×).
	Depth colour legend --- on-canvas gradient bar showing the depth-to-colour mapping of the active palette, with the shallow value at the top and the deep value at the bottom and an Auto or Manual label matching the depth-range mode you set in the sidebar.
	Depth ruler --- depth values (in your selected units) marked along the cube walls so you can read the depth of any feature at a glance.
	Cardinal direction labels --- <i>North, South, East, West</i> on the cube walls so you stay oriented as the camera turns.
	3D vessel marker --- a small boat model placed at your current GPS position with the correct heading. Appears whenever the vessel marker is shown on the 2D chart, and disappears when the 2D vessel is hidden.
	Box outline and sides --- the red outline marks the edges of the surveyed area, and the grey sides drop down from the seabed to the floor so you can judge at a glance how deep each ridge or hollow really is.
	Pan-mode toggle --- visible only in Independent sync mode. Tap to switch drag between rotating the view (off, default) and panning the camera centre across the terrain (on).
	Sync toggle --- switches between Synced (chain icon highlighted: cube follows the 2D chart) and Independent (cube holds its own position). See §13.9.3.

Rotating, Zooming, and Vertical Exaggeration

Two touch gestures plus a small in-cube toggle button control the camera once the panel is open:

- **Drag** --- orbits the camera around the terrain, changing azimuth and tilt. With **Pan mode** on (see below), drag instead pans the camera centre across the terrain.
- **Pinch** --- zooms the cube in or out. Available in **Independent** sync mode only (see §13.9.3); in **Synced** mode the 2D chart's zoom drives the cube.
- **Pan mode toggle** --- a small button at the bottom-right of the cube, shown only in **Independent** sync mode. Tap to switch drag between rotating (off, default) and panning the camera centre across the terrain (on).

A **Vertical Exaggeration** slider on the left edge of the panel (range 0.1×--5.0×, default 1×) stretches the terrain vertically. Low values give the terrain's true proportions --- typically flat because the sea is much wider than it is deep; high values amplify the vertical scale so even small banks and gullies stand out.

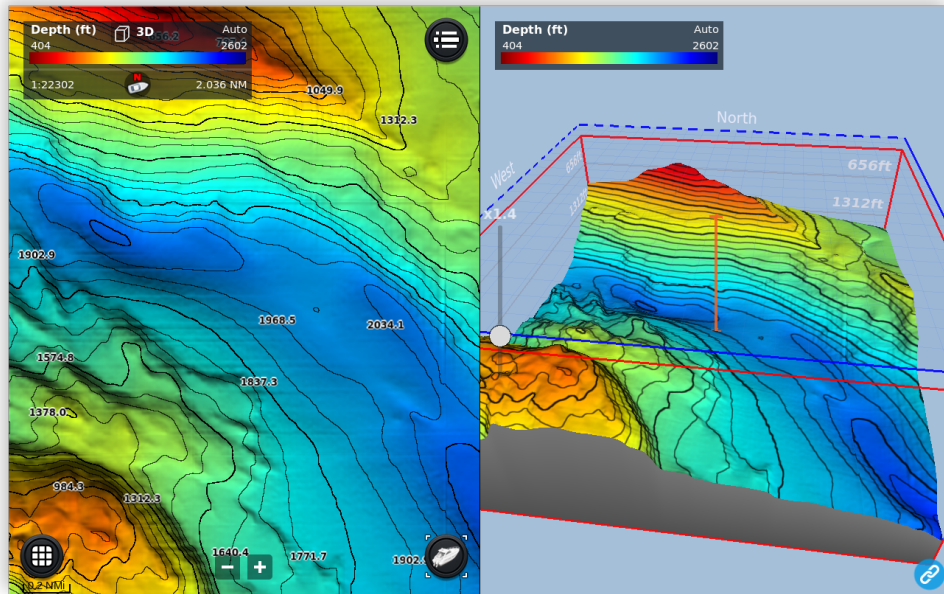
2D Sync Mode

A toggle in the 3D panel controls how the cube relates to the chart:

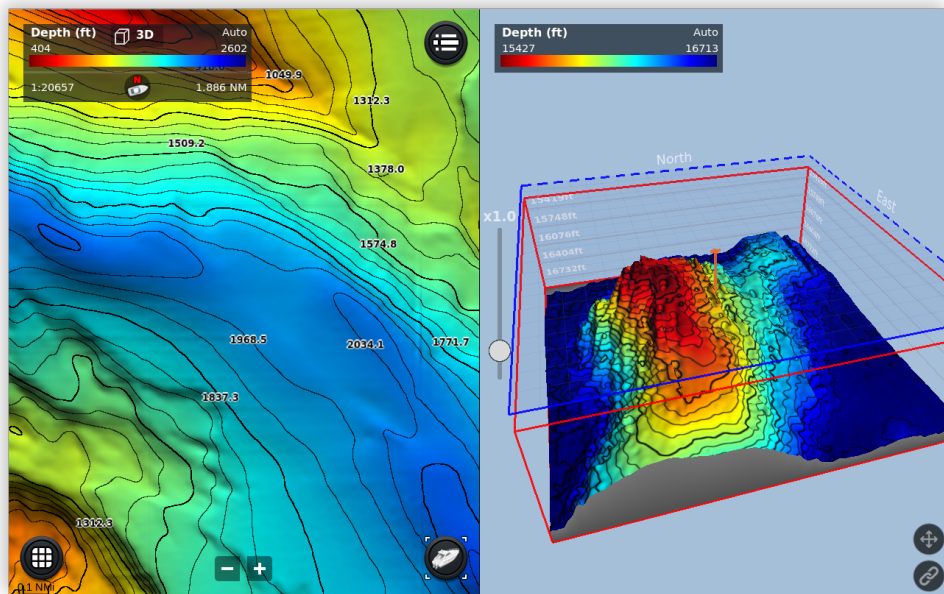
- **Synced** (default) --- the 3D camera follows whatever you do on the chart. Zoom the chart, the cube zooms. Pan the chart, the cube pans. Useful when you want the 3D view to be a live window on what the chart is showing.
- **Independent** --- the 3D camera holds its own position. Changing the chart does not move the cube. Useful when you want to study one area in 3D while continuing to work on the chart elsewhere.



Note 3D rendering is more demanding than 2D. The cube only updates while the panel is open --- closing it frees the extra processing.



Synced --- only the sync toggle is visible at the bottom-right of the cube. Zooming or panning the chart moves the cube with it.



Independent --- the pan-mode toggle appears above the sync toggle. The cube holds its own position and can be panned and zoomed separately from the chart.

Reading a Seabed Depth Profile

A depth profile is a side-on view of the seabed along a line you choose --- a vertical slice through the survey data, with distance along the path on the bottom axis and depth below the surface on the side axis. Use it to look for drop-offs, sandbars, channel slopes, and other features that flatten out when seen only from above.

Opening a Profile

Two paths produce a profile:

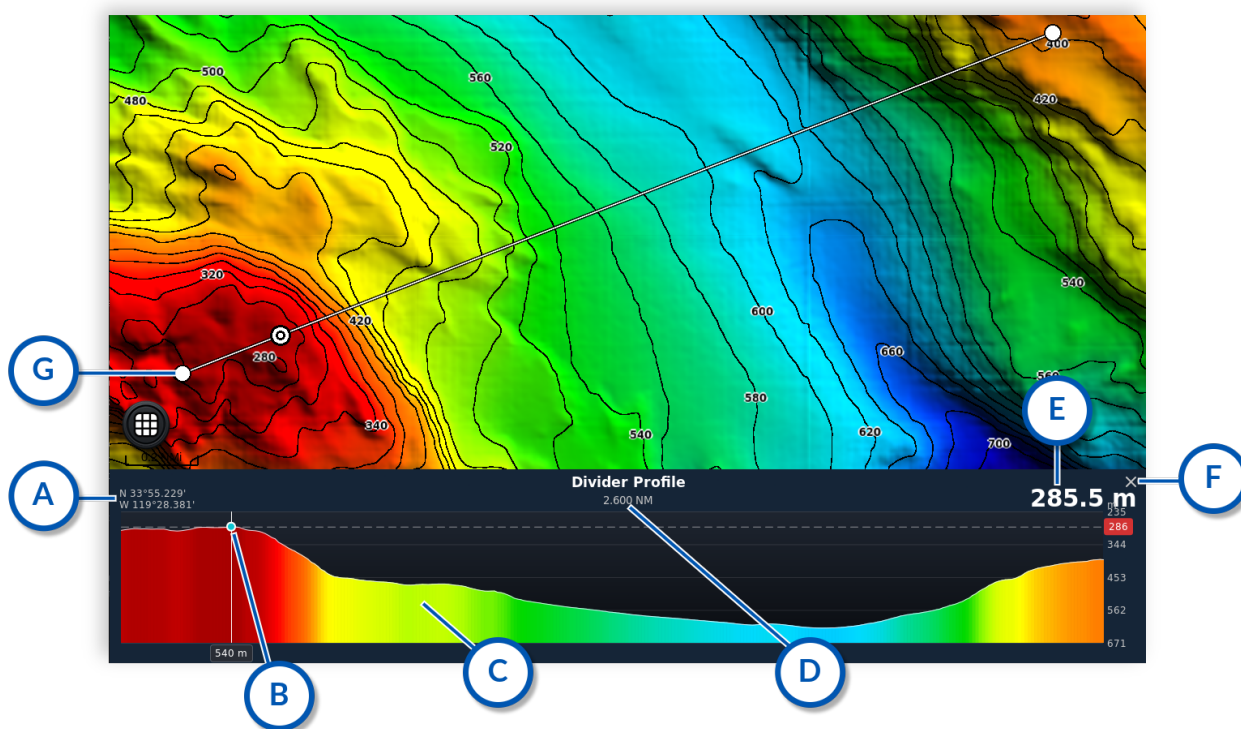
- **From the chart** --- long-press on the chart, then pick **Depth Profile** from the contextual menu. Deeprey draws a short **divider line** (white core with a black casing for legibility over any palette colour) across the chart, centred on your tap point and initially running east-west, and the profile panel slides up from the bottom of the screen showing the depth along that line. Each end of the divider carries a circular knob --- white with a thin black ring --- drag a knob to extend, shorten, or rotate the line, and the profile re-samples in real time as you drag.
- **From a saved track** --- long-press a track on the chart, then pick **Display Profile Window** from the contextual menu. Deeprey walks the track's full path and the profile shows the seabed beneath every leg, from the first point to the last.

Note Routes are not supported as profile paths. Use a divider line, or convert the route into a track first (see Chapter 7).

Note If the path crosses an area with no survey data, the profile reads "No depth data along this path" until at least part of the line falls inside the surveyed area.

Anatomy of the Profile Panel

The panel docks across the bottom of the screen and stays paired with the chart above it. Scrub a finger across the graph and the readouts in the header update live; lift your finger and the floating cursor markers fade out.



A	Cursor position --- latitude and longitude on the path under your finger, written on two lines and updated live as you scrub.
B	Cursor tracking on the plot --- a vertical white line through the cursor, a small light-blue target dot on the seabed at the cursor, a grey rounded tag riding the bottom axis with the distance from the start (e.g. 540 m), a horizontal dashed depth line, and a red rounded tag pinned to the right depth axis at the cursor's depth (e.g. 286). All five appear together so you can read at a glance where you are along the path and how deep the seabed is below you.
C	Seabed --- a column-by-column colour wash matching the chart's active depth palette so any feature you see on the chart shows up in the same colours on the profile, with a thin white crest line tracing the top for clarity. The crest line breaks at any point where there is no survey data.
D	Title and total distance --- Divider Profile for a free-drawn line, or the track name for a track, with the total length of the path right below in your selected distance units.
E	Cursor depth --- the depth at the cursor position in the depth units you set under Settings > Units. The largest text on the panel.
F	Close button --- hides the panel, removes the divider line and bullseye from the chart, and redraws the chart clean.
G	Chart-side overlay --- the divider line (white core with black casing for legibility over any palette colour) with a white circular knob at each end (drag a knob to extend, shorten, or rotate the line), plus a four-ringed black-and-white bullseye marker showing where the panel cursor is on the chart.

Dropping a Mark on a Feature

To save a point you find interesting on the profile:

1. Drag your finger along the profile to the depth feature you want to mark.
2. Double-tap on the profile at that point.
3. A navigational mark is dropped on the chart at the matching latitude and longitude. It behaves like any waypoint --- you can rename it, move it, or delete it from the Waypoints list (see [Chapter 7](#)).

Closing the Profile

Tap the **X** in the top-right corner of the panel. The panel hides, the divider line and bullseye are removed from the chart, and the chart redraws clean.

i Note In dual-chart mode, the profile belongs to the canvas you opened it from. The divider line, bullseye marker, and panel all stay on that canvas; the other canvas is unaffected. Each canvas can keep its own profile open at the same time.

14 Weather and Meteogram



Warning

Weather forecasts are predictions, not facts. Treat them as planning aids only --- always carry an independent weather source (VHF, satcom, broadcast radio, or an offshore forecast service), watch the sky and the sea, and be prepared for the forecast to be wrong.

Weather Forecasts in Deeprey



Deeprey downloads weather forecasts from two global models and draws them on the chart as wind, pressure, waves, and other layers you can turn on or off. You can scrub through time to see how conditions are expected to evolve.

- **ECMWF** --- European model (default).
- **GFS** --- US model.

Downloading a Forecast

Weather controls live in the Chart Menu under **Weather Overlay**. The top of that panel holds a **Download Forecast** group; below it, a master **Weather Data Overlay** toggle hides or shows the currently-loaded data without discarding it. Downloading a new forecast replaces the previous one.

Model, Duration, and Coverage Area

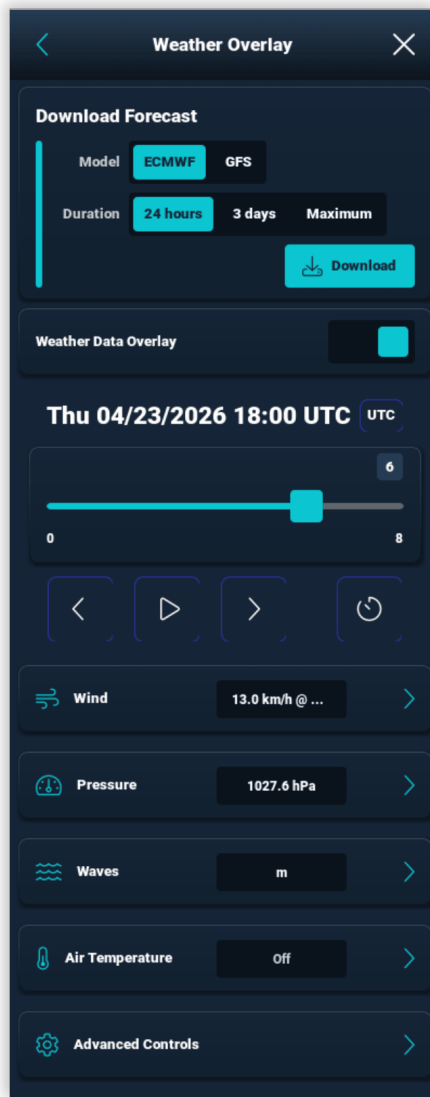
The Download Forecast group has just three controls:

- **Model** --- ECMWF (default) or GFS.
- **Duration** --- 24 hours, 3 days, or Maximum (roughly ten days of forecast).
- **Download** button --- starts the download and shows an inline progress bar.

The download always covers the *chart area currently on screen*. Pan and zoom the chart to frame the waters you need before tapping Download --- a tighter view makes for a smaller, faster download. If the master **Weather Data Overlay** toggle is off when you tap Download, Deeprey turns it on for you so the new forecast is visible as soon as it arrives.



Note Larger regions and longer durations take longer to transfer over slow connections. For a quick planning update on a marine data link, pick Duration 24 hours and frame just the area you care about.



Navigating the Weather Timeline

Timeline controls live in the Weather Overlay sidebar, between the master toggle and the layer list. Every control you need to move through time is grouped here.

Timestamp, Slider, Step, and Play Controls

- **Timestamp display** --- shows the current forecast time. A small **UTC / Local** badge beside it flips between the two time zones with one tap.
- **Timeline slider** --- drag to jump to any forecast hour.
- **Previous / Next step** --- move one forecast interval back or forward (usually one, three, or six hours, depending on the file).
- **Play / Pause** --- animates the forecast forward from the current time. Tap again to pause.
- **Show Now** --- snaps the slider to the forecast time closest to the real-world clock, so you start from the conditions happening right now. Disabled until a forecast is loaded.

Playback speed and loop behaviour are set in Advanced Controls (see §14.4.5).

Configuring Weather Layers

Every weather parameter is its own row in the Weather Overlay sidebar. Tap a row to reveal its display toggles. A layer becomes active the moment you turn *any* toggle on; turning every toggle off removes the layer from the chart. There is no separate on/off switch for the layer itself. Only layers present in the loaded forecast appear --- parameters the file does not carry are simply not shown.

Layers and Display Toggles

Layer	Shows	Toggles
Wind	Surface wind speed and direction.	Wind Barbs, Contours, Heatmap, Labels, Particles
Wind Gust	Peak gust speed --- often the more useful number in squally conditions.	Contours, Heatmap, Labels
Pressure	Surface atmospheric pressure. Tight isobars mean strong wind.	Contours, Isobar Visibility, Compact Labels, Labels
Waves	Significant wave height, with direction shown as arrows.	Arrows, Heatmap, Labels, Particles
Current	Sea-surface current velocity and direction.	Arrows, Heatmap, Labels, Particles
Precipitation	Expected rainfall rate.	Heatmap, Labels
Cloud	Total cloud cover as a percentage.	Heatmap, Labels
Air Temperature	2-metre air temperature.	Contours, Heatmap, Labels
Sea Temperature	Sea-surface temperature, where available.	Contours, Heatmap, Labels
CAPE	Convective instability --- high values mean the air is primed for thunderstorms.	Contours, Heatmap, Labels
Reflectivity	Simulated radar reflectivity --- flags where intense precipitation is expected.	Heatmap, Labels

What each toggle does:

- **Heatmap** --- continuous colour wash mapping the value to a gradient (see §14.4.4).
- **Contours** --- isolines joining equal values (isobars on pressure, isotherms on temperature).
- **Isobar Visibility** --- switches pressure contours between full and short-dashed lines.
- **Labels** --- the raw numeric value at each grid point.
- **Compact Labels** --- abbreviated pressure (**13** instead of **1013**) for a less-cluttered chart.
- **Wind Barbs** --- meteorological barbs showing wind speed and direction (see §14.4.3).
- **Arrows** --- direction arrows on Waves and Current.

- **Particles** --- animated dots that drift along the wind, wave, or current field. Magnitude by colour, direction by motion.

Note Particle animations are computationally heavy. If the chart starts feeling sluggish, turn them off or drop the Map Detail slider (see §14.4.5).

Switching a format between layers

Only one layer can use a given display format at a time. If you turn on, say, **Heatmap** for Sea Temperature while it is already active on Wind, Deeprey opens a short **Switch Heatmap?** dialog:

“The Heatmap is currently showing Wind. Switching it to Sea Temperature will turn it off for Wind.”

Tap **Switch** to move the Heatmap to the new layer, or **Cancel** to keep the original layer. The same dialog appears for Contours, Arrows, Particles and Labels --- each format belongs to exactly one layer at a time to keep the chart readable.

Recommended Starting Combinations

Not sure where to start? These pairings cover the most common situations.

Situation	Turn on
Coastal day sail	Wind → Wind Barbs + Pressure → Contours
Offshore passage	Add Waves → Arrows + Wind Gust → Heatmap
Storm watching	Add CAPE → Heatmap + Reflectivity → Heatmap
Fishing	Sea Temperature → Heatmap + Wind → Wind Barbs

Reading Wind Barbs

When the **Wind Barbs** toggle is on, the Wind layer draws a small staff at each grid point. The tail of the staff points *towards where the wind is coming from*. Speed is read from the marks at the end of the tail:

Symbol	Meaning
	Zero knots / indeterminate wind direction
	Small barb = 5 knots
	Large barb = 10 knots
	Arrow barb = 50 knots

If a combination of barbs is shown on a tail, add them together for the total wind speed. The example below on the left shows three large barbs + one small barb = **35 knots**; the example on the right shows one arrow barb + one large barb = **60 knots**.



Wind speed: 35 knots



Wind speed: 60 knots

Heatmap Color Legends

The **Heatmap** toggle washes the chart with a colour gradient. Each layer has its own palette --- cool colours mean low values, warm colours mean high.

Layer	Palette (low → high)
Wind / Gust	
Waves	
Current	
Air Temp.	
Sea Temp.	
Precipitation	
Cloud	
CAPE	
Reflectivity	



Note The exact value mapped to each colour shifts with the range of the loaded forecast. When in doubt, read the inline cursor value on the layer row (\$14.5) --- the number is always authoritative.

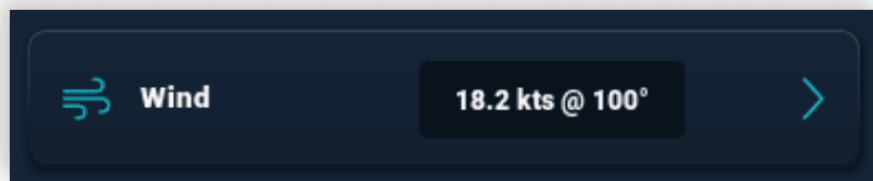
Advanced Controls

Tap the **Advanced Controls** row at the bottom of the Weather Overlay sidebar (with the gear icon) to open a panel with four global settings that affect how every layer is drawn and how the timeline animates:

- **Heatmap Transparency** --- 0 to 100%. Lower the slider to let the chart show through the colour wash.
- **Loop Playback** --- toggle. When on, the animation restarts from the beginning once it reaches the end instead of stopping.
- **Playback Speed** --- 1 to 10, default 4. Sets how quickly the animation advances.
- **Map Detail** --- 0 to 100%, default 50%. Controls how densely symbols (barbs, arrows, labels, particles) are placed. Lower values declutter low-zoom views.

Reading Weather Data at Cursor

When a forecast is loaded, every layer row in the Weather Overlay sidebar shows the value at the cursor *inline*, to the right of the layer name. Below, the Wind row reads **18.2 kts @ 100°** --- a wind of 18.2 knots blowing from bearing 100°:



Move the cursor across the chart and the readouts update in real time --- no extra panel needed. Pressure appears in your chosen unit (hPa, mmHg, inHg), temperatures in Celsius, Fahrenheit or Kelvin. A row reads **Off** when all its display toggles are off, and -- when no data is available at the cursor location.

Using the Meteogram Panel

A **meteogram** is a time-series chart of weather at a single point --- the forecast plotted as curves against time instead of painted over a map. It complements the chart overlay: the overlay shows *where* conditions are at one instant, the meteogram shows *how* they change at one place.

Opening and Selecting a Forecast Location

To open the meteogram for a specific location:

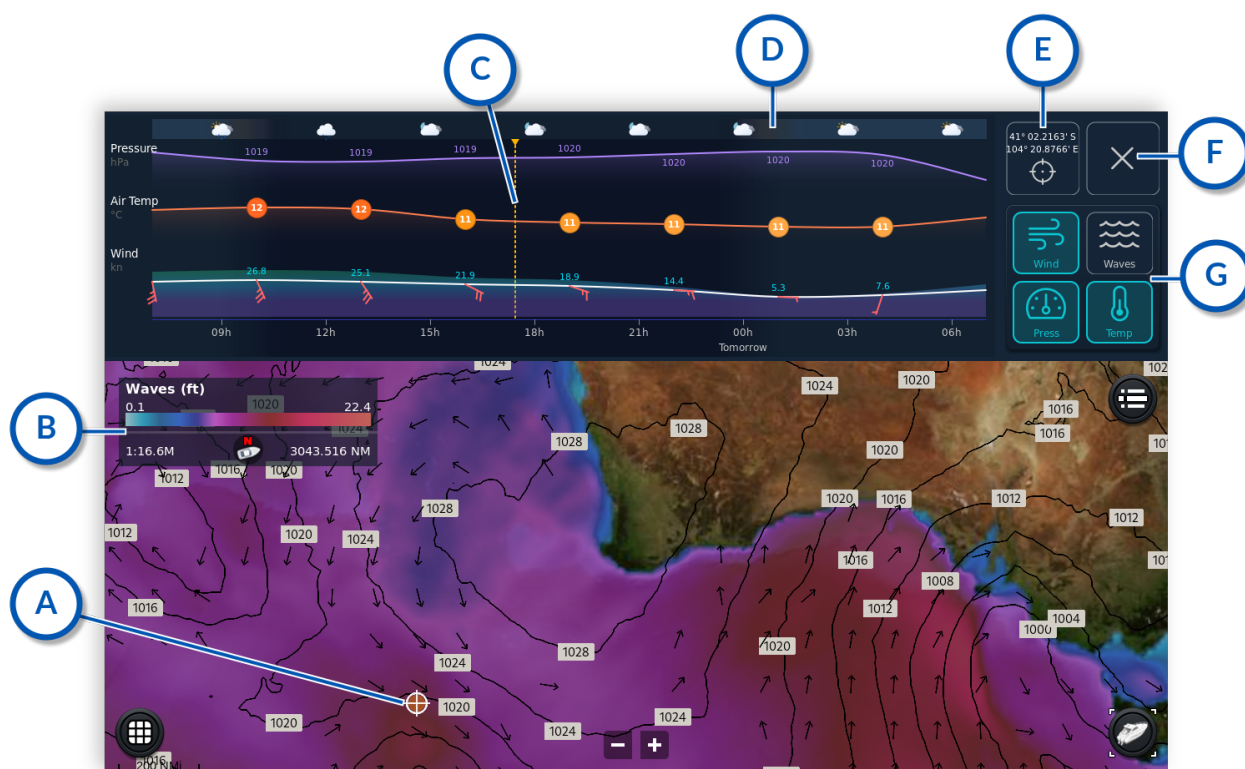
1. Long-press any location on the chart that has GRIB coverage.
2. Tap **Meteogram** from the context menu.
3. The meteogram panel docks at the top of the screen, and an orange crosshair target appears on the chart to mark the queried location.

To check the forecast at a different location, you do not need to close the panel:

1. Tap and hold the **orange crosshair target** on the chart.
2. Drag it to a new location. The meteogram updates in real time as you move.
3. Release to lock in the new position.



Note If you download a new weather forecast while the meteogram panel is open, the graphs will automatically update to reflect the new data.



A	Target Location. The orange crosshair on the chart marks exactly where the forecast is being queried. Drag it to change locations.
B	Heatmap Color Legend. An on-canvas key for the active heatmap layer --- title with the layer name and unit (here Waves (ft)), a colour gradient running low to high, and the actual min/max range of the loaded forecast. The information row beneath shows the chart scale, the orientation icon (tap to cycle north-up / course-up / head-up), and the view width.
C	Current-time Marker. The dashed orange vertical line shows the forecast time closest to right now --- past is to the left, forecast to the right.
D	Sky Strip. Day/night shading across the top, plus a summary weather icon at each mark along the timeline.
E	Coordinate Readout. Latitude and longitude of the target, updated live as you drag it across the chart.
F	Close Button. Dismisses the meteogram panel.
G	Lane Toggles. Tap to show or hide a graph. A maximum of three lanes can be active at once.

Available Lanes

Tap the **Wind**, **Waves**, **Press**, or **Temp** button in the sidebar to add or remove its lane from the graph. Wind is on by default.

Button	Shows
Wind	Mean wind speed with wind barbs and a gust-gradient fill (see §14.6.3).
Waves	Significant wave height, with wave-direction arrows along the curve.
Press	Surface atmospheric pressure as a curve.
Temp	Air temperature as a curve.

Note At least one lane must remain active --- tapping the last visible lane's toggle has no effect. A maximum of three lanes can be shown at once; when a fourth is enabled, the oldest active lane is turned off automatically.

Units follow the global settings --- changing wind-speed units in Settings updates the meteogram instantly.

Wind Gradient Visualisation and Direction Arrows

Three elements are stacked on the Wind lane:

- **Gust-gradient background** --- the coloured fill behind the curve encodes the forecast gust at each time, using Beaufort categories:
- **Mean-wind curve** --- a white line on top of the gradient.
- **Wind barbs** --- coral-red WMO barbs along the curve (half = 5 kn, full = 10 kn, pennant = 50 kn; see §14.4.3 for full details).

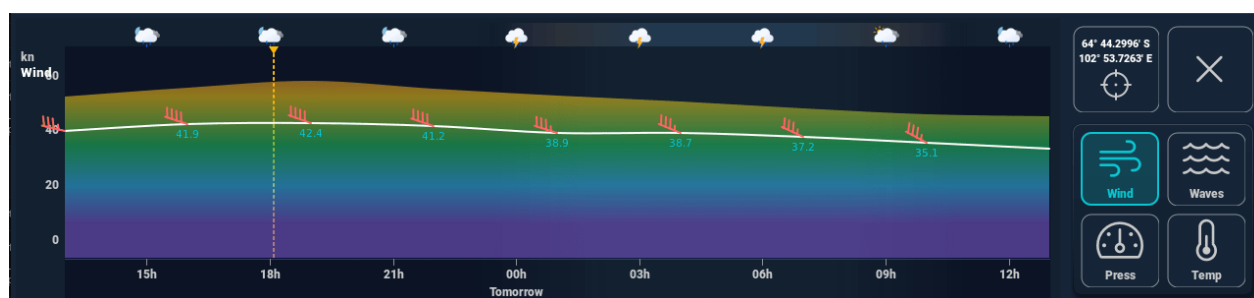
Colour	Beaufort	Category	Range (kn)
	F0--2	Light	0--10
	F3--4	Moderate	11--21
	F5--6	Fresh	22--33
	F7--8	Strong	34--47
	F9--10	Gale	48--63
	F11--12	Storm	64+

Note Wind Gust has no separate button --- it is loaded together with the Wind lane and painted as the gradient behind the curve.

Other lane symbols

- **Waves lane** --- cyan arrows below the curve point in the direction the waves are travelling. A small number below each arrow shows the wave period in seconds.

- **Temp lane** --- coloured dots along the curve; the value is printed inside each dot. Warm temperatures are deep orange/red, cooler ones are soft orange.



The Wind lane combines mean wind (white line), direction (barbs), and gust strength (Beaufort-coloured background).

Day / Night Timeline Overlay

A slim ``sky strip'' runs across the top of the meteogram and shows:

- **Day and night shading** --- a bright-to-dark gradient that tracks sunrise, daylight, sunset, and night, calculated from the sun's altitude at the meteogram location.
- **Weather icons** --- glyphs along the timeline representing the combined cloud / precipitation / CAPE conditions at each mark. The set covers clear sky, partly cloudy, overcast, drizzle, rain, heavy rain, thunderstorm, and severe thunderstorm, each with day and night variants (sun, moon, moon-and-cloud, and so on).

A subtle darker overlay also extends down through the whole graph during night hours, so you can tell at a glance whether a forecast minimum or maximum falls in the dark.



Note A dotted vertical line is drawn at every local midnight on the time axis. Use it to separate one forecast day from the next on a multi-day meteogram at a glance.

Weather Icon Reference

Sky-strip icons summarise conditions at each mark along the timeline. Most conditions have a **day** and **night** variant (sun-based vs moon-based glyph); see §14.6.4 for how day and night are determined.

Day	Night	Condition	Shown when
		Clear	Cloud cover at or below 20%.
		Partly cloudy	Cloud cover between 20 and 70%.
		Overcast	Cloud cover above 70%.
		Drizzle	Precipitation above 0.1 mm/h (light cloud).
		Rain	Precipitation above 0.2 mm/h (light cloud).
		Overcast with rain	Precipitation above 0.2 mm/h and cloud cover above 70%.
		Heavy rain	Precipitation above 2.0 mm/h.
		Thunderstorm	CAPE above 1000 J/kg <i>and</i> precipitation above 0.5 mm/h.
		Severe storm thunder-storm	CAPE above 2500 J/kg <i>and</i> precipitation above 1.0 mm/h.

Note Conditions are evaluated in priority order: thunderstorm checks (CAPE + precipitation) come first, then heavy rain, then moderate rain, then drizzle, then cloud cover alone. The most severe matching condition wins. If the forecast does not include CAPE, thunderstorm icons simply don't appear --- rain icons are still shown from precipitation alone.

Reading Exact Values (Tap-and-drag)

To read the exact forecast values at any point on the timeline, **tap and drag** across the graph area. A floating info panel follows your finger and lists the values at the time under the cursor.

The panel shows:

- **Date and time** in the header (e.g. ``April 24, 18:15").
- **Values for each active lane** --- wind (speed + barb + compass bearing), waves (height + arrow + period with a ``Short / Medium / Long" label), pressure, temperature, etc.
- **Cloud cover** at the bottom --- a percentage with a teal progress bar and a text label (``Clear", ``Partly cloudy", ``Overcast").

Release the drag to dismiss the panel.



The floating info panel appears while dragging. The header shows date and time; each row lists the value for an active lane; the cloud-cover bar sits at the bottom.

Weather Along a Route

The standard meteogram answers ``how does the weather change at this one place?" A planned passage usually needs the other question instead --- ``what weather will I actually meet, given that I'll be in a different place at each hour?" Route-bound mode answers the second question: each forecast time on the meteogram samples the wind, waves, pressure and temperature at the position your vessel is expected to reach *at that time*, not at a fixed point.

Opening the meteogram on a route

1. On the chart, long-press the route you want to study.
2. Tap **Weather along route** from the contextual menu.
3. The meteogram panel opens at the route's first waypoint and rebuilds itself for the passage. From this moment, every reading along the X-axis belongs to the position you are expected to occupy at that forecast time.



Note The departure time comes from the route's **Planned Departure** field (Route Properties). If no departure has been set on the route, Deeprey uses the current clock time as the departure, so the meteogram still animates the passage starting ``now". Set a planned departure on the route to study a passage that begins at a specific date and time.

What changes in the meteogram

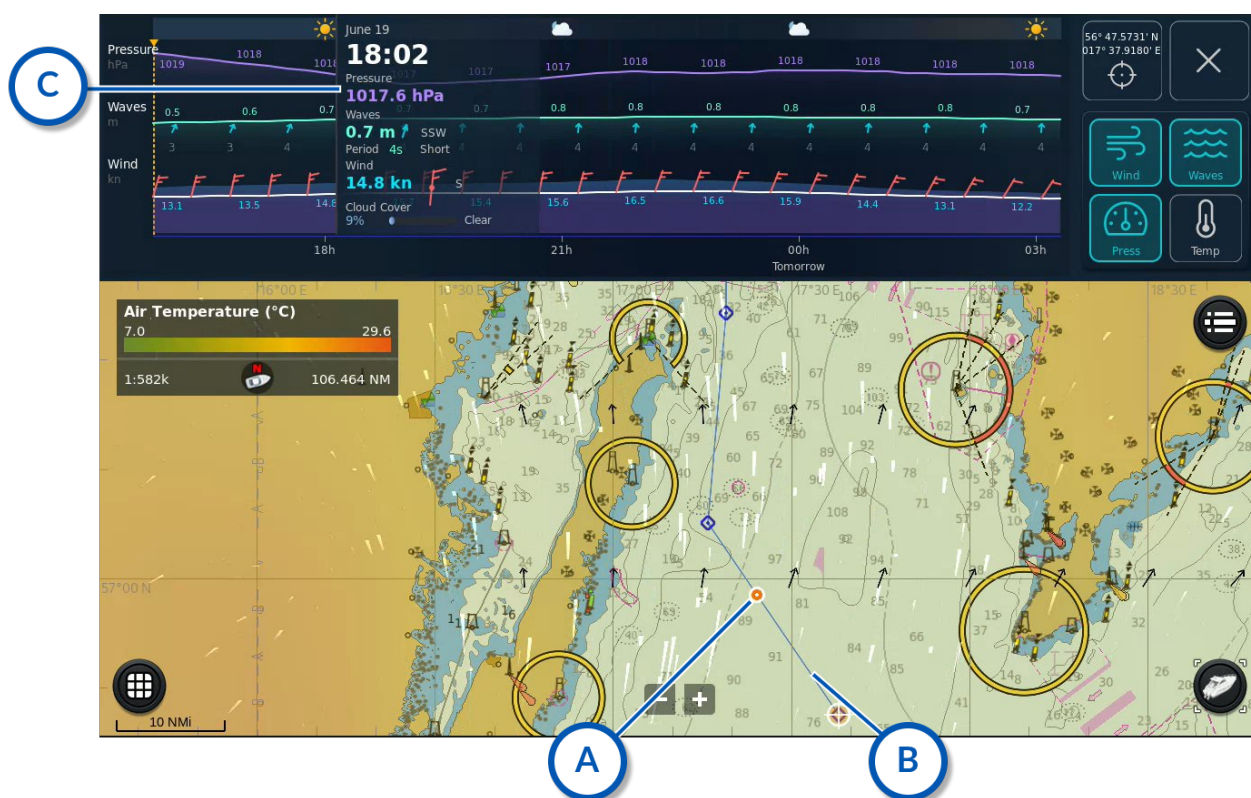
- **Every lane resamples along the passage** --- wind, waves, pressure, temperature, sky strip and weather icons all switch from ``weather at one point over time" to ``weather along the route over time". The shapes you see on screen are the conditions you'll actually steer through.
- **The X-axis is the passage window** --- the time covered runs from your departure to your arrival (computed from the route's total distance at its planned speed), clamped to the forecast's coverage. 48 evenly-spaced sample times are spread across that window.
- **If the passage falls outside the forecast** --- e.g. you set a departure two weeks ahead and the loaded forecast only covers the next ten days --- Deeprey falls back to the full forecast window so you still see something useful, but the route-position estimates will reflect where you'd be on a passage starting at the forecast's start time instead.

The route cursor on the chart

While you scrub the meteogram with your finger, an **orange dot with a white halo ring** appears on the chart and slides along the route to mark the position your vessel is expected to occupy at the forecast time under the cursor. This dot is distinct from the draggable orange crosshair (the meteogram's anchor) --- the crosshair stays put at the route's first waypoint, while the route cursor moves with the meteogram time.

- Lift your finger off the meteogram and the route cursor disappears; touch the graph again and it reappears at the matching position.
- The dot is read-only --- you cannot drag it. Movement is driven entirely by the cursor on the meteogram.

- In dual-chart mode the dot only renders on the canvas the meteogram was opened on; the other canvas is left clean.



(A)	Route cursor on the chart --- the orange dot with the white halo ring marking your projected position at the forecast time under your finger. Slides along the route in real time as you scrub the meteogram.
(B)	The active route on the chart --- the path the route cursor is following. Re-open the meteogram from a different route's contextual menu to bind it to another route.
(C)	Meteogram time cursor and floating values --- the dashed vertical line marks the forecast time under your finger, and the floating panel beside it lists the conditions at that instant (date and time, then a row per active lane). Move your finger left or right and the panel updates live while the route cursor in (A) slides along the route to match.

Leaving route mode

The meteogram drops back to fixed-point mode in either of two ways:

- Long-press anywhere else on the chart and tap **Meteogram** --- the panel re-anchors at the new point, the route cursor disappears, and the lanes resample at that fixed location.
- Close the meteogram panel --- the route cursor disappears with it.

Note You don't need to deactivate the route to leave route-bound mode --- the route stays active for navigation, the meteogram simply stops using it. Re-open the meteogram from the route's contextual menu any time you want it back.

Glossary of Weather Terms

A short reference to terms used throughout this chapter.

Term	Definition
Beaufort scale	A 0--12 scale mapping wind speed to observed sea-surface effect. Light (0--10 kn) through Storm (64 kn and above).
CAPE	Convective Available Potential Energy. A measure of atmospheric instability that drives thunderstorm potential. Measured in J/kg.
Front	The boundary between two air masses of different temperatures. Often marks a rapid change in wind and weather.
Gust	A brief spike in wind speed above the mean. Deeprey draws gusts as a separate layer and as the coloured background of the meteogram Wind lane.
High pressure	A mass of cool, dense air pressing on the surface. Usually brings dry, settled weather.
Isobar	A line joining points of equal atmospheric pressure. Tight isobars mean strong wind.
Isotherm	A line joining points of equal temperature. Used on air and sea-temperature layers.
Knot (kn)	One nautical mile per hour. $1 \text{ kn} \approx 1.852 \text{ km/h} \approx 0.514 \text{ m/s}$.
Low pressure	A mass of warm, less-dense air. Usually brings wet, unsettled weather.
Millibar (hPa)	A unit of atmospheric pressure. $1 \text{ mb} = 1 \text{ hPa}$. Standard sea-level pressure is around 1013 hPa.
Reflectivity	Simulated radar echo from the forecast model. Higher values indicate heavier expected precipitation.
Wave period	The time between successive wave crests. Longer periods mean rolling swells; shorter periods mean a choppier sea.

15

Tide and Current

Tide and Current in Deeprey

Deeprey displays tide and current predictions from the built-in station database. Tap a tide or current station icon on the chart to open a detailed dialog showing a 25-hour graph, today's high/low events, moon phase, and a live now-indicator that refreshes every minute.



The Tide and Current dialog --- opened by tapping a station icon on the chart.

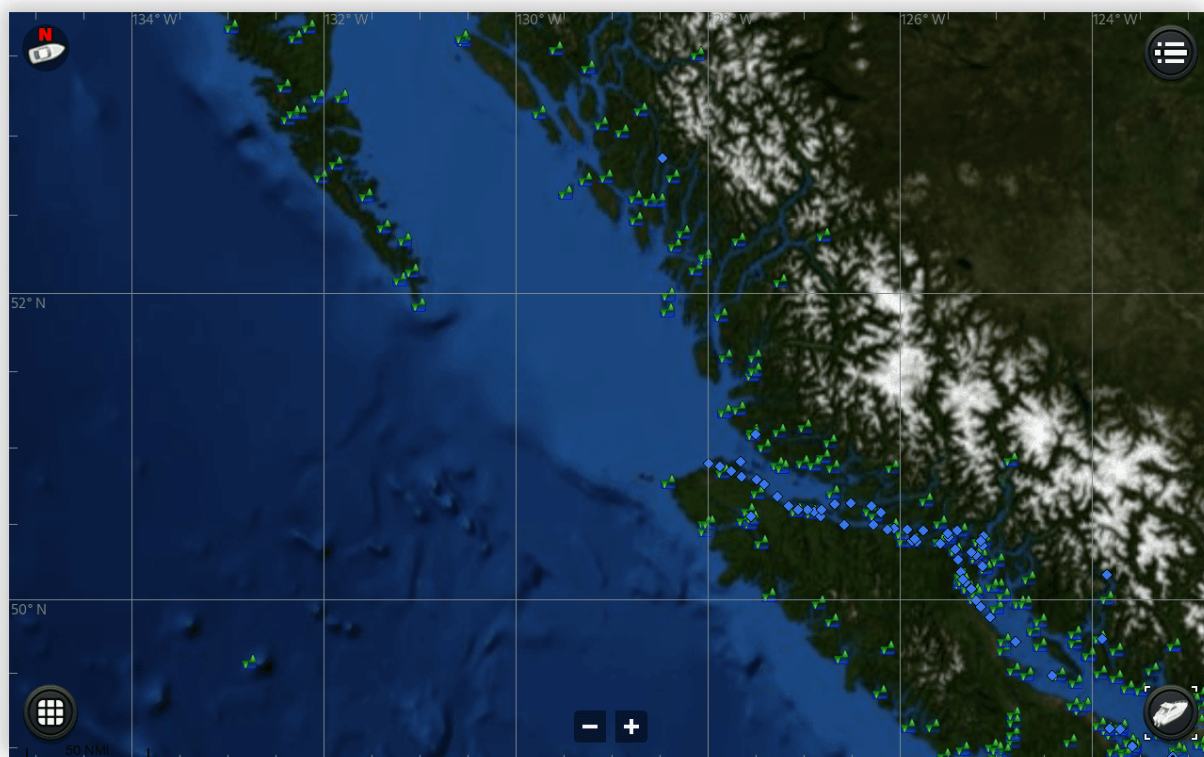
Showing Tide and Current Stations on the Chart

Tide and current stations are hidden by default. To display them, open the **Chart menu** and toggle on either or both of:

- Show Tidal stations
- Show Tidal currents

The two toggles are independent --- tide stations and current stations are separate datasets, and you can show either, both, or neither.

Once enabled, station icons appear on the chart at their recorded positions. **Tap** a station icon to open the Tide and Current dialog for that station.



Note If a region has no nearby station, no icon appears. Coverage depends on the station database shipped with the product --- see §15.6.

The Tide and Current Dialog

The dialog opens on top of the chart when you tap a station icon. If the dialog is already open, tapping a different station updates it in place rather than opening a second window.

Anatomy

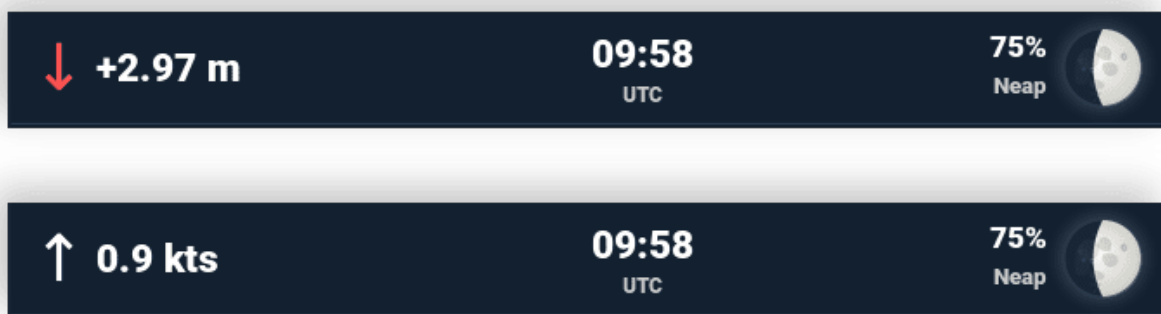


A	HUD panel. Current state arrow and value on the left, local time in the centre, and moon phase on the right. Drag the HUD header to move the dialog around the screen.
B	Now indicator. A red vertical line with a triangle at the top marks the current time on the graph. It refreshes every minute, and the value where it crosses the curve is shown in a small red label.
C	Station data card. Station name, date, station type (Tide or Current), and a timezone toggle to switch all displayed times between Local Station Time and UTC.
D	Today's events. Scrollable list of high/low water or flood/ebb/slack events for the displayed day, colour-coded by direction.
E	Date navigation. Prev / Now / Next --- step through yesterday, today, and tomorrow.

HUD Panel

The HUD across the top of the dialog is split into three columns. **Drag** the HUD anywhere to reposition the dialog on the screen.

Column	Shows
State --- tide	A coloured trend arrow (↑ rising, ↓ falling, --- slack) paired with the signed tide height in the active depth unit, e.g. +10.28 m or -0.50 ft .
State --- current	A white compass arrow pointing in the direction the current is flowing (one of ↑N, ↗NE, →E, ↘SE, ↓S, ↙SW, ←W, ↖NW), paired with the current speed in the active speed unit, e.g. 0.2 kts .
Time (centre)	Large HH:MM , with a small label below: UTC when the timezone toggle is set to UTC, UTC±H (e.g. UTC-10) for the station's local offset, or Local Time if the station's offset is unknown.
Moon (right)	Moon disc with illumination percentage, plus a Spring (cyan) or Neap (grey) tag below it.



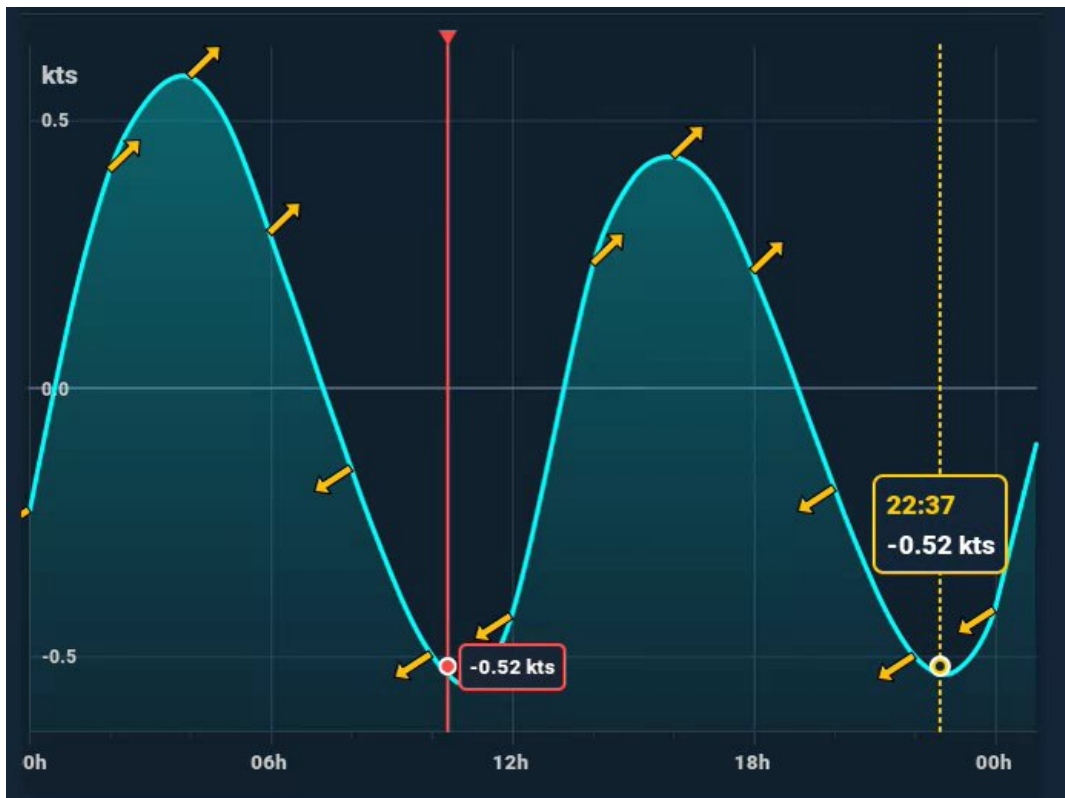
Top: tide HUD --- red ↓ with signed height. Bottom: current HUD --- white ↑ with unsigned speed.

Graph Panel

The graph covers a 25-hour window for the displayed day. The Y-axis unit (**m**, **ft**, **fa**, or **kts**) is printed in the top-left corner; the X-axis is labelled every six hours (**00h**, **06h**, **12h**, **18h**, **00h**).

- **Cyan curve** --- tide height or current speed over time, with a gradient fill beneath.
- **Grey reference lines** (tide stations only) --- labelled **Avg High** and **Avg Low**, marking the station's mean high and low water levels.
- **Red ``now" indicator** --- a vertical line at the current time, capped with a small red triangle at the top of the graph and a red-bordered value tag where it crosses the curve. The line refreshes every minute.
- **Amber direction arrows** (current stations only) --- plotted along the curve every 1.5 hours, pointing in the direction the current is flowing. Arrows are skipped when the speed falls below 0.15 kn (near slack).

To read the exact value at any moment, **tap and drag** across the graph. A dotted amber line follows your finger, an amber spot highlights the curve, and a tooltip box shows the time and value at that point.



Current-station graph: cyan curve with amber direction arrows, the red ``now'' line with its triangle and -0.52 kts value tag, and the amber dotted tap-and-drag line with its 22:37 / -0.52 kts tooltip.

Station Data Card

The top card in the right column. From top to bottom:

- **STATION DATA** --- card header.
- **Station name** --- the station's full designation in white, wrapped over as many lines as needed (e.g. **Wilson Point, 3.90 nmi NNW of (depth 4 ft), San Pablo Bay, California Current**).
- **Date** --- the day being displayed (e.g. **Apr 27, 2026**); changes with **Prev / Now / Next**.
- **Type** row --- label on the left, value on the right (**Tide Station** or **Current Station**).
- **Timezone** row --- label on the left and a small button on the right showing the station's offset (**UTC**, **UTC-10**, **UTC+1**, etc.) with a $\vee$ chevron. Tap the button to switch all displayed times (HUD, graph labels, events list) between station local time and UTC.



Today's Events

The middle card is headed **TODAYS EVENTS**. Each row lists one event with a coloured left-edge strip (in the event's category colour), the event time, the value, the event label, and a small chevron / circle icon on the right.

The label and colour depend on the station type:

Colour	Label	Meaning
	High Tide	Tide-station event marking a daily peak.
	Low Tide	Tide-station event marking a daily trough.
	Flood	Current-station event: peak incoming current.
	Ebb	Current-station event: peak outgoing current.
	Slack	Current-station event: near-zero current at the turn between Flood and Ebb.

Drag vertically inside the list to scroll when more events fit than can be shown at once. If the day has no recorded events, the card shows ``No events for today".

Date Navigation

Below the events list, a three-segment button steps through days:

- **Prev** --- show yesterday.
- **Now** --- return to today, re-centre the graph on the current time.
- **Next** --- show tomorrow.

The graph, the HUD, and the events list all update together when you tap one of these buttons.

Units and Tide-Datum Correction for Sonar

- Tide heights follow the global depth unit set in **Settings > General > Units**: metres, feet, or fathoms.
- Current speeds follow the global speed unit (commonly **kts**).
- Changing units in Settings updates the Tide and Current dialog instantly; no reload is needed.

 **Note** The Sonar settings page has a **Tide Correction** toggle described as ``Normalize depths to chart datum using nearest tide station". See [Chapter 12](#) for details.

16

Video Camera

What the Video Camera Pane Is

The Video Camera pane plays a live video feed from an IP camera reachable on the boat's network --- typically an engine-room camera, a fixed-mount deck camera, or a forward-looking thermal camera. The stream is decoded on the unit and shown live on the tile, with an optional AI object-detection overlay drawn on top.

What you need to use the pane:

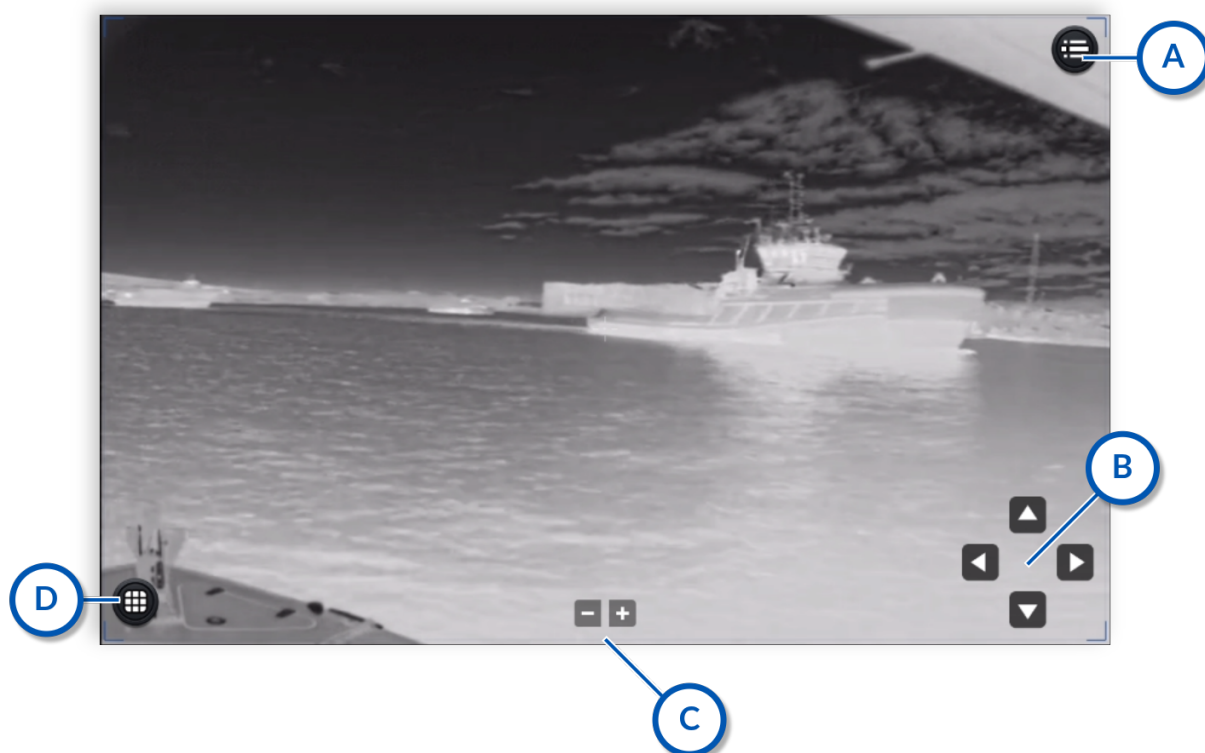
- A camera on the same network as the unit. Wi-Fi or wired both work.
- The camera's username and password if it requires authentication.
- An RTSP stream URL if the camera does not advertise itself over ONVIF; otherwise Deeprey can discover the URL for you.

Opening the Pane

The Video Camera pane can be opened two ways from the home menu:

- Tap **Views** and pick **IP Camera** --- the video tile fills the whole screen.

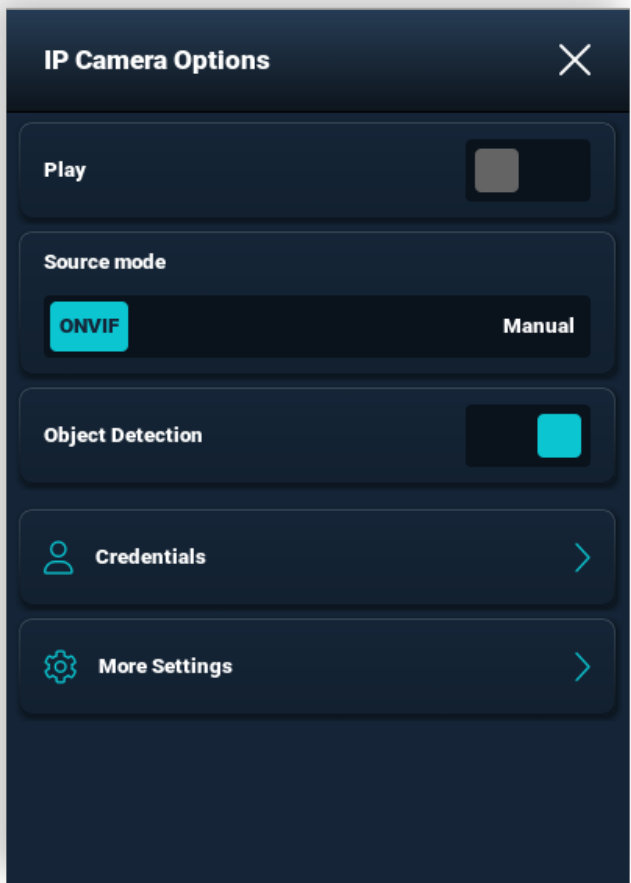
- Tap **Combo Views** and pick (or build) a layout that places a Video Camera tile next to your other content. See [Chapter 4](#) for the combo-view workflow.



(A)	Pane button --- opens the IP Camera Options sidebar.
(B)	Pan / tilt arrows --- steer the lens horizontally and vertically. See §16.5.1.
(C)	Zoom buttons --- zoom the lens in (tighter) or out (wider). See §16.5.1.
(D)	Home button --- opens the home menu.

i Note If the canvas shows an **IP Camera Not Found** message, the Video Camera service on your unit is not available. Re-open the layout from the home menu or restart the device.

Anatomy of the Sidebar



Tap the pane button (top-right of the tile) to open the **IP Camera Options** sidebar. The working controls are summarised below.

Control	What it does
Demo mode	Plays a built-in demo clip instead of a live feed. Useful for confirming the canvas is rendering correctly before you commit to a camera.
Play	The master switch. When off, the canvas is blank. When on, Deeprey connects to whatever source Source mode points at and starts streaming.
Source mode	Two choices: ONVIF (let Deeprey discover the camera on the network --- recommended) or Manual (you paste the RTSP URL yourself).
Object Detection	Turns the AI overlay on or off. See §16.6.
Credentials	A collapsible block hiding three text fields: Username , Password , and Source (the RTSP URL when in Manual mode). Tap the Credentials header to open or close it.

Note **Source mode** and the **Credentials** fields become read-only the moment you tap **Play**. To change them, tap **Play** off, edit, then tap **Play** back on. This avoids confusing partial reconnects.

Connecting to a Camera

ONVIF Auto-Discovery

The recommended path. **ONVIF** is an industry standard that most modern marine and security IP cameras follow --- it lets the unit find a camera on the network and fetch its stream automatically, with no IP-address hunting or URL typing on your part.

1. Set **Source mode** to **ONVIF**.
2. Tap the **Credentials** header to reveal the text fields, then enter the camera's **Username** and **Password**. Leave them blank if the camera is unauthenticated.
3. Tap **Play**.

Deeprey scans every network the unit is connected to, probes each ONVIF camera it finds with your credentials, and connects to the first one that answers.

Note ONVIF discovery only works on the boat's local network. A camera reached over the public internet (DDNS, port-forward, or VPN) cannot be discovered automatically --- use Manual entry below.

Manual RTSP

Use this path when ONVIF discovery fails, when the camera is on a different subnet, or when you have the RTSP URL handy from the camera's documentation.

1. Set **Source mode** to **Manual**.
2. Tap the **Credentials** header to reveal the text fields.
3. Paste the camera's RTSP URL into the **Source** field. The basic format is `rtsp://host:port/path`; if the camera requires authentication, embed the credentials inline: `rtsp://user:password@host:port/path`. For example, `rtsp://admin:1234@192.168.1.42:554/stream1`.
4. Tap **Play**.

Note The **Username** and **Password** fields apply to ONVIF auto-discovery only. In Manual mode, embed credentials directly in the RTSP URL as shown above.

Note The Source URL and the Username / Password fields are held in memory only --- none of them are saved across reboots. Expect to re-enter your camera details at the start of each session.

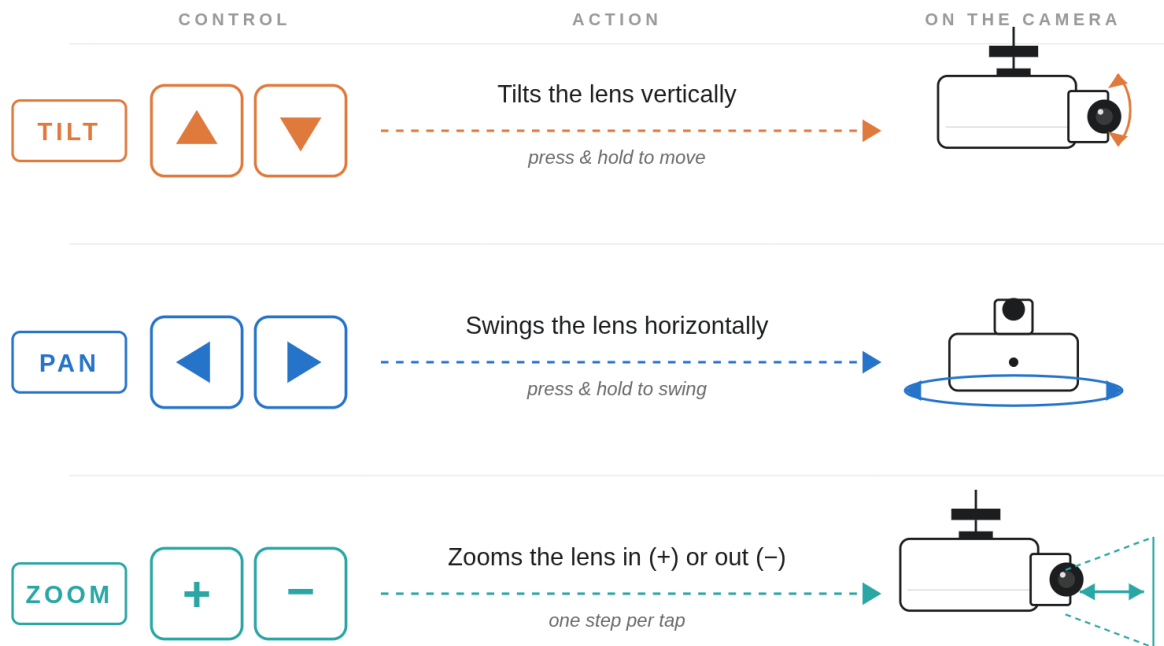
Playback

Once the stream is up, two controls govern playback.

- **Play** on the sidebar --- the master connect/disconnect toggle. Tapping it off frees the stream and blanks the canvas.
- **Centre-click the canvas** --- pauses or resumes playback *locally* without disconnecting from the camera. Useful if you want to study the current frame. Tap the centre of the canvas again to resume.

Steering a Camera (Pan-Tilt-Zoom)

Many marine IP cameras are mounted on a motorised head that lets the lens swing horizontally, tilt vertically, and zoom optically --- often shortened to **PTZ** (pan-tilt-zoom). When the connected camera supports it, a cluster of arrow buttons and a pair of zoom buttons sits in the bottom-right corner of the tile.



Note The PTZ controls appear on every Video Camera tile in the current shipping build, but their on-screen handlers are reserved for a future update --- tapping them has no effect today, even when the connected camera is PTZ-capable. Full steering will arrive in a subsequent release.

AI Object Detection

The **Object Detection** toggle in the sidebar turns the AI overlay on or off. Switch it on and Deeprey analyses the live feed on-device, drawing a coloured chip over each subject it tracks. The chip carries an icon and a confidence percentage and follows the moving subject from frame to frame.



The detector is tuned for marine scenes and is designed to highlight four kinds of subject:

Category	What it covers
Person	People on deck or in the water.
Boat	Vessels of any size --- leisure boats, RIBs, ships.
Buoy	Channel markers, mooring buoys, and navigation marks.
Hazard	Floating debris and semi-submerged obstacles.

Chips are colour-coded by what is happening, not just by what Deeprey sees:

Chip colour	What it means
Cobalt blue	A boat in the scene.
Amber	A person standing on or close to a boat.
Red	A person not on any boat --- the man-overboard treatment.

When a person is seen in the water with high confidence, a flashing red **DANGER AHEAD** banner appears at the top of the tile for a few seconds. Treat it as a man-overboard alert and act immediately.

While Object Detection is on but nothing is in view, a thin blue frame with corner ticks is drawn around the canvas --- a quiet confirmation that the AI is armed and looking.



Warning Object Detection is an aid, not a substitute for a lookout. It can miss small or distant targets, can be fooled by glare or spray, and is not certified for collision avoidance. Always keep watch.



Note Deeprey currently recognises people and boats reliably. Buoys are grouped with boats today, so they appear as cobalt-blue boat chips; dedicated buoy and hazard chips are planned for a future update.



Note The **Object Detection** toggle is the one Video Camera setting that persists across reboots --- the unit remembers whether you had it on the last time you used it. Credentials, source mode, and the manual RTSP URL all reset to defaults at every boot.

17

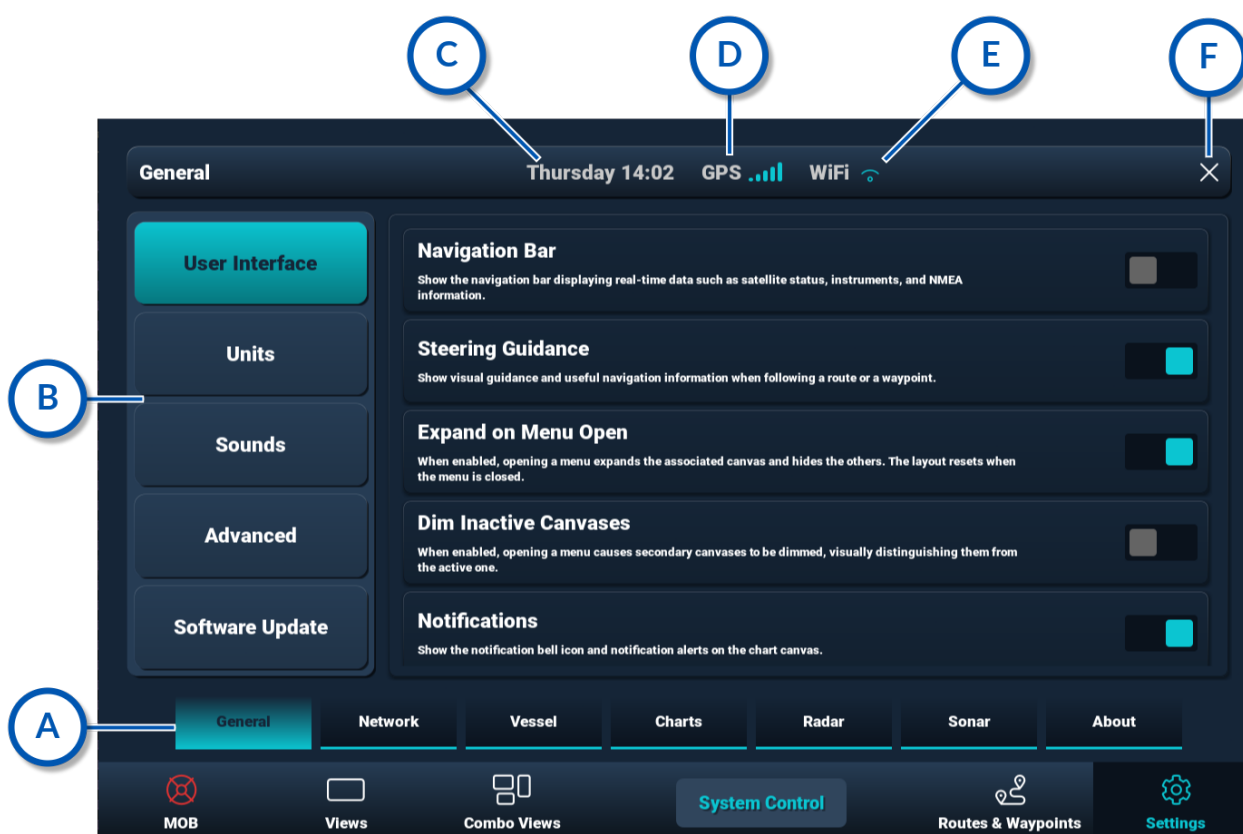
Global Settings

Opening Settings

Settings is reached from the home menu --- tap the **Settings** icon and the screen switches to a full-screen settings view. Tap the **X** in the header bar to return to where you came from.

Note Every setting saves automatically. There is no **Apply** or **Save** button; the moment you flip a toggle, change a number, or pick a different option, the change is stored and applied to the rest of Deeprey.

Anatomy of the Settings Screen



A	Top-level category strip --- six categories along the bottom of the settings area. The active category is highlighted.
B	Subpage sidebar --- the subpages of the active category. The active subpage is highlighted.
C	Day of the week and local time. Refreshes every 30 seconds.
D	GPS label and signal-bar indicator. More bars means more satellites locked; an empty indicator means no fix.
E	WiFi label and four-state connection icon: full, fair, weak, or disconnected.
F	Close X --- closes Settings and returns to the previous screen.

The Seven Top-Level Categories

The category strip along the bottom lists seven categories in fixed order. Tap one to switch to it; the subpage sidebar updates to show that category's subpages.

Category	Covers
General	User interface, units, sounds, advanced behaviour, software updates.
Network	Data sources, priorities, the live data feed, advanced output options.
Vessel	Your boat's appearance and dimensions, route and waypoint defaults, AIS target rules.
Charts	Chart manager, o-charts, vector chart appearance.
Radar	Guard zones, overlay, colours.
Sonar	Sounder device parameters and the Deepview data-quality filters.
About	Device identity, live diagnostics, support contacts, legal documents.

How the Controls Work

Most pages mix five kinds of control. Their behaviour is identical everywhere they appear:

- **Toggle** --- a switch with two states. Tap to flip.
- **Number** --- a stepper with a minus and a plus. Some numbers also have a leading toggle that turns the whole feature on or off.
- **Slider** --- a draggable handle on a track with a value readout.
- **Radio** --- a row of mutually exclusive options; tap to pick one.
- **Dropdown** --- a single line that opens a list when tapped.

General

The **General** category groups everything that is not specific to a sensor or chart. Its sidebar has five subpages: **User Interface**, **Units**, **Sounds**, **Advanced**, and **Software Update**.

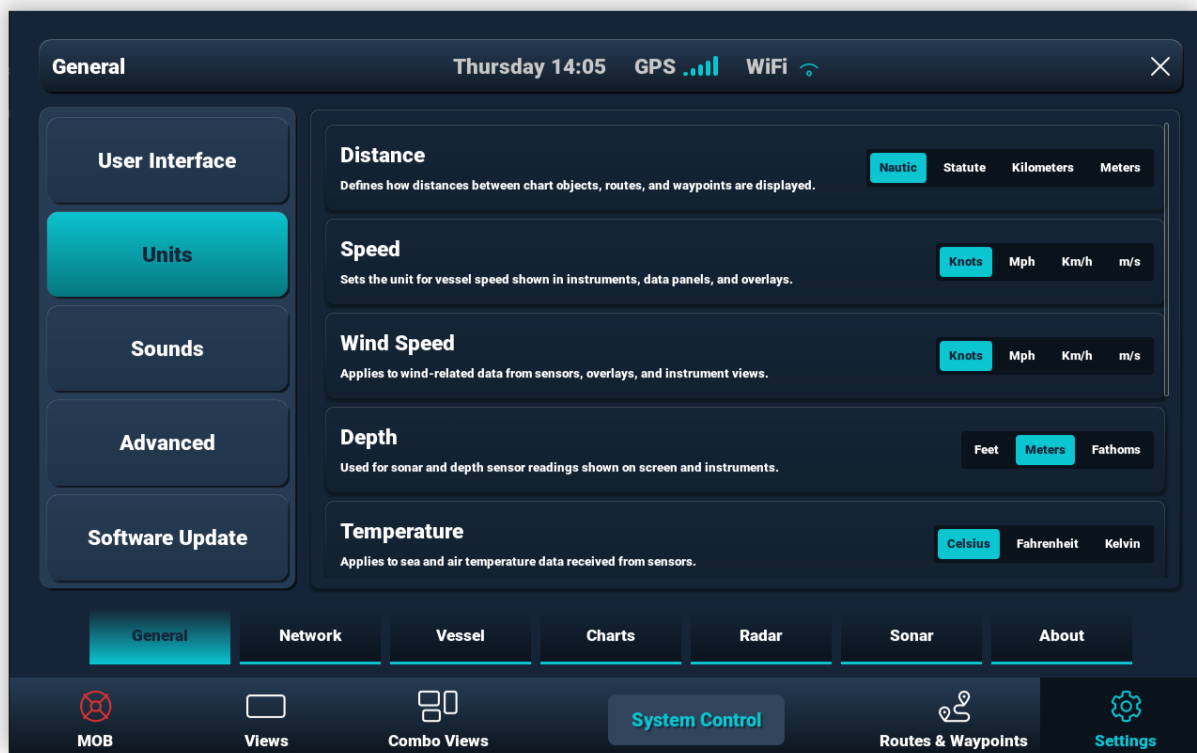
User Interface

Theme, language, and how the on-screen widgets behave. The hero shot in §17.2 shows this page.

Setting	What it does
Navigation Bar	Shows or hides the navigation bar --- a panel of real-time data (satellite status, instruments, NMEA values).
Steering Guidance	Shows the steering guidance panel at the top of the chart while a route is active.
Expand on Menu Open	When on, opening a menu expands the active canvas and hides the others; the layout resets when the menu closes.
Dim Inactive Canvases	When on, opening a menu causes secondary canvases to be dimmed so the active one stands out.
Notifications	Shows the notification bell and pop-up alerts. Off by default.
Auto hide delay	A toggle (Enable Auto Hide) plus a number 3--30 s (default 10 s). After the chosen number of seconds without input, on-canvas overlays (home button, zoom buttons, etc.) fade away.
Theme	Picks the colour palette used everywhere in the application.
Language	Selects the application language. Menus, labels, and dialogs follow the chosen locale.

Units

Eight independent unit groups. Pick the unit you want for each measurement and every screen in Deeprey will display in that unit.



Group	Choices
Distance	Nautic, Statute, Kilometers, Meters
Speed	Knots, Mph, Km/h, m/s
Wind Speed	Knots, Mph, Km/h, m/s
Depth	Feet, Meters, Fathoms
Temperature	Celsius, Fahrenheit, Kelvin
Pressure	MilliBars (hPa), mmHG, inHG
Rainfall / Precipitation	Millimeters, Inches
Latitude/Longitude	Deg Dec Min, Dec Deg, Deg Min Sec

Sounds

Audio cues for alarms and target events. Each is an independent toggle.

- **Play a sound on anchor alarm** --- audio when the anchor-watch alarm trips.
- **Play Sound on AIS Alert** --- audio for AIS collision and CPA alerts.
- **Play sound on AIS SART alert** --- audio for AIS Search-and-Rescue Transponder distress signals.
- **Play sound on DSC notification** --- audio for Digital Selective Calling events received over a connected VHF radio.

Advanced

Less-used switches that shape map interaction and tracking. Most users can leave the defaults alone.

Setting	What it does
Smooth Panning / Zooming	Animates pans and zooms instead of snapping.
Zoom to Cursor	When zooming, keeps the point under your finger fixed. With this off, zoom centres the screen instead.
Mouse wheel Zoom Sensitivity	A slider 0.1--3.0 that controls how aggressively a pinch-zoom (or external mouse wheel, when one is attached) changes the chart scale.
Automatic Daily track	Splits the track log at midnight every day so each calendar day becomes its own track.
Highlight Tracks	Adds a coloured outline to vessel tracks on the chart.
Tracking Precision	Low, Medium, High. Higher precision records denser track points and uses more storage.
Calculate SOG and COG from position changes	A toggle plus a Minimum seconds between updates number (1--10 s). When on, Deeprey derives speed and course from successive GPS positions instead of using the values reported directly by the GPS. Useful with sensors that do not output SOG/COG natively.

Software Update

Keeps the device's modules current --- an **Automatic Updates** toggle, a table of installed modules, a manual **Check for Updates / Install Updates** pair, and a **System Upgrade** that re-images the unit from a USB drive.

This subpage is documented in detail under [Chapter 18](#).

Network

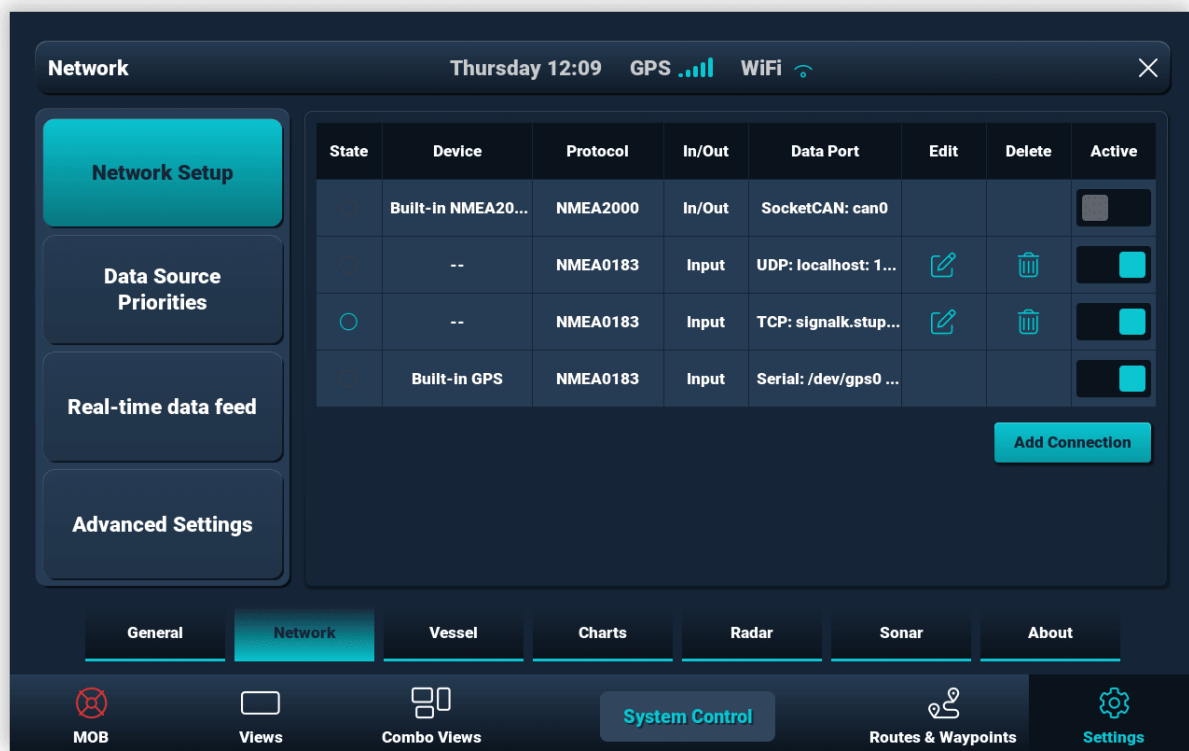
The **Network** category configures every external data source the device talks to. Its sidebar has four subpages: **Network Setup**, **Data Source Priorities**, **Real-time data feed**, and **Advanced Settings**.

Network Setup

A table of every NMEA 0183 and NMEA 2000 connection you have configured, plus an **Add Connection** button beneath it for creating a new one. Each row has the following columns:

- **State** --- a coloured indicator: green when data is flowing, amber when the connection is configured but quiet, red when the port is unavailable.
- **Device** --- the system port the connection uses (e.g. `/dev/ttyUSB0` for serial, an IP address for network).
- **Protocol** --- NMEA 0183, NMEA 2000, or SignaK, depending on what the connection speaks.
- **In/Out** --- whether the connection only listens (**In**), only sends (**Out**), or does both.
- **Data Port** --- the data-bearing port number (relevant for network connections).
- **Edit** --- tap to open the edit panel for that row.
- **Delete** --- tap to remove the connection.

- **Active** --- a per-row toggle that disables the connection without deleting it.



Note The two **Built-in** rows (built-in NMEA 2000 bus and built-in GPS) are factory-fixed --- they have no **Edit** or **Delete** cells in their rows. You can still toggle them **Active** on or off.

Adding a Connection

Adding a new sensor follows the same four steps regardless of the transport:

1. Tap **Add Connection**. The edit panel slides in beside the table.
2. At the top of the panel, pick a **transport** --- how the device reaches Deeprey. The fields below the menu update to match.
3. Fill the fields --- which fields appear depends on the transport (see below).
4. Tap **Apply** to save (the connection appears as a new row, set Active by default) or **Cancel** to discard.

Step 2 --- Pick a transport.

Transport	Use it for
Serial	A USB or serial-port instrument wired directly into the unit. The most common choice for GPS, autopilots, and depth sounders.
TCP	A networked instrument or gateway that exposes a TCP server (multiplexers, on-board mini-PCs).
UDP	A device broadcasting NMEA over UDP on the local network (common for WiFi GPS and AIS receivers).
GPSD	A networked Linux box running the gpsd daemon.
Signal K	A Signal K server. Supports an authentication token for protected servers.

The fields you fill at step 3 depend on the transport you picked.

Serial, **TCP**, and **UDP** share the same large set of fields and only differ on a few transport-specific extras. **GPSD** and **Signal K** are simpler --- the server handles protocol details on its end, so Deeprey only needs to know how to reach it.

Step 3 --- Fields for Serial, TCP, and UDP.

Field	What it does
Data Protocol	Nmea 0183 or Nmea 2000 . NMEA 2000 is faster and self-describing --- pick it when the device speaks it.
Device name	A free-form label, up to 20 characters. Appears in the Device column of the table; useful for telling two sensors of the same kind apart (<i>Bow GPS</i> , <i>Stern GPS</i> , etc.).
IO Type	Whether the connection only reads (Input), only writes (Output), or does both (Input/Output). UDP supports only Input or Output , never both.
Control Checksum	When on, sentences arriving with a bad checksum are dropped. Recommended.
APB bearing precision	Number of decimals used in outgoing autopilot sentences: x , x.x , x.xx , x.xxx , or x.xxxx . Match this to whatever your autopilot accepts.
Input filtering	Accept or Ignore . Combined with the field below, this either keeps only the listed sentences or drops them.
Input filter sentences	The list of sentence types the rule above acts on. Tap to open the sentence picker; the chosen sentences are stored as a comma-separated list. Leave empty to apply the rule to everything.
Output filtering	Mirror behaviour for outgoing sentences: Transmit or Drop .
Output filter sentences	The list the output rule acts on. Same picker as above.



Note The four **filtering** rows are only shown when **Data Protocol** is **Nmea 0183** and the matching IO direction is selected. NMEA 2000 has no per-sentence filtering --- the rows hide automatically when you switch to it.

On top of those nine fields, each transport adds its own:

- **Serial** adds **Port name** (a dropdown of detected serial ports), **Baudrate** (4800, 9600, 38400, and other standard rates), and a **GRMN** toggle for Garmin host-mode sentences.
- **TCP** adds **Address** (IP address or hostname) and **Port** (network port number).
- **UDP** adds the same **Address** and **Port** as TCP.

Step 3 --- Fields for GPSD.

GPSD is GPS-only, so the panel reduces to three fields:

- **Address** --- IP address or hostname of the GPSD server.
- **Port** --- the GPSD network port (**2947** by default on most installations).
- **Device name** --- free-form label, up to 20 characters.

Step 3 --- Fields for Signal K.

Signal K is similarly stripped down:

- **Address** --- IP address or hostname of the Signal K server.
- **Port** --- the Signal K network port.
- **Device name** --- free-form label, up to 20 characters.

- **Auth Token** --- authentication token, only required by protected servers.

Note For most users adding their first sensor, the recipe is: **Add Connection** → **Serial** → pick the **Port name** that matches the cable → set **Baudrate** to whatever the sensor expects (usually **4800** for NMEA 0183 GPS) → leave the rest at defaults → **Apply**.

Data Source Priorities

When two connections supply the same kind of data --- two GPS feeds, for example --- this page decides which one wins. The page is laid out as five side-by-side columns, one per priority category:

- **Position** --- where the boat is (latitude / longitude).
- **Speed** --- speed over ground.
- **Heading** --- the direction the bow is pointing.
- **Magnetic Var** --- magnetic variation, used to convert between true and magnetic bearings.
- **Satellite** --- GPS satellite status (number of satellites locked, signal strength).

Each column lists every sentence currently available for that category. A row shows the sentence type (GPRMC, HCHDG, GPGGA, etc.), the bus it arrived on (Nmea0183), and the connection it came from (port and transport).



Reordering. Drag a row up or down within its column to change the priority. The top row in each column is the active source; if it goes quiet, the next row down takes over automatically.

Note Reordering the **Position** list also reorders **Speed** and **Satellite** to match. The three categories almost always come from the same GPS, so coupling them avoids the surprise of one device suddenly providing position while another provides speed.

Two buttons sit at the bottom of the page:

- **Refresh** --- reloads the priority lists from the live network state. Useful after adding, editing, or deleting a connection elsewhere.
- **Clear all** --- empties every column. The page goes blank until you reorder, refresh, or change a source elsewhere.

Real-time Data Feed

A live diagnostic for confirming a sensor is wired correctly and producing the expected sentences. The console fills the bulk of the page; two buttons sit at the bottom right.

- **Start Capture / Stop Capture** --- the same button. Tap to start streaming sentences into the console; tap again to pause. The label flips between the two states.
- **Clear** --- empties the console. If you are still capturing, new sentences continue to arrive afterwards.

When you first open the page the console shows a ``ready" prompt and nothing else --- you must tap **Start Capture** before any traffic appears. Each line that arrives is timestamped and tagged with its talker category, so the console is easy to skim when several sensors are active at once:

```
[14:32:07] GPS: $GPRMC,143207,A,...
[14:32:07] DEPTH: $SDDBT,12.3,0.5*7A
[14:32:07] AIS: !AIVDM,1,1,,A,15M67FC...
```

The console keeps the most recent 200 lines; older lines drop off the top automatically.

**Note** Capture stops on its own when you leave the page (switch to another settings subpage, close Settings, etc.). It does not keep running in the background --- come back and tap **Start Capture** again to resume.

Advanced Settings

Output and smoothing options that affect how Deeprey talks back to other devices on the boat.

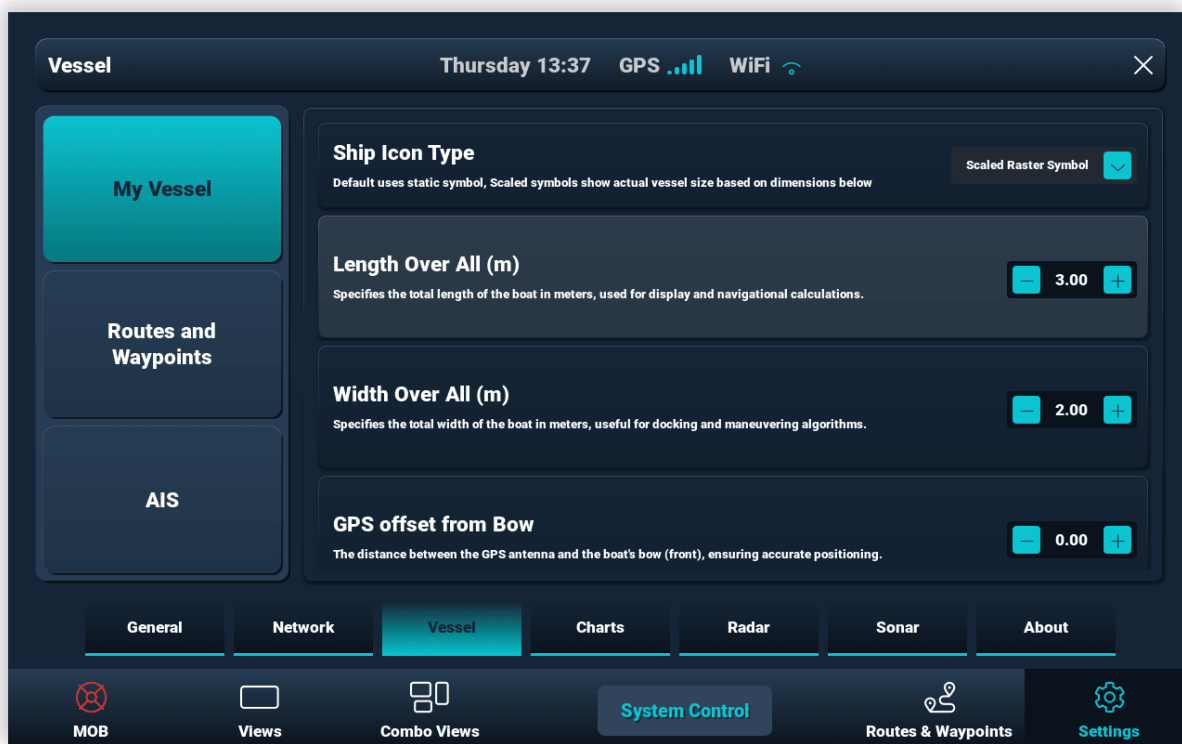
Setting	What it does
Upload format	The output sentence dialect when sending routes and waypoints to a connected GPS: Generic (standard NMEA, suitable for most devices), Garmin (GRMN Host mode, for Garmin devices in Host mode), or Furuno (GP4X exports).
Use magnetic bearing in output sentence APB	Outputs the autopilot bearing as a magnetic value rather than true. Match this to whatever your autopilot expects.
Filter NMEA course and speed data	A toggle plus a number 1--10s. When on, COG and SOG are smoothed by averaging incoming samples over the chosen window. Off by default.
Nmea 0183 Talker id	Picks the two-letter prefix Deeprey uses on its outgoing sentences (default EC ; other choices include GP , GN , HC , HE , IN , TI , VD , VW , WI). Match this to whatever the rest of your network expects to see.

Vessel

The **Vessel** category configures the boat itself --- how it is drawn, how routes behave, and how AIS targets are filtered. Its sidebar has three subpages: **My Vessel**, **Routes and Waypoints**, and **AIS**.

My Vessel

How the boat icon is drawn and the predictor / range-ring overlays that travel with it.



Ship icon

The **Ship Icon Type** dropdown has three choices:

- **Default** --- a simple stylised arrow scaled to a fixed screen size.
- **Scaled Raster Symbol** --- a raster boat outline drawn at the boat's true length and width on the chart. Reveals the dimension fields below.
- **Scaled Vector Symbol** --- a clean vector outline drawn at the boat's true length and width on the chart. Reveals the dimension fields below.

When either scaled option is picked, five dimension and GPS-offset fields appear:

Field	What it does
Length Over All (m)	Total boat length in metres. 3--300 m.
Width Over All (m)	Total boat width (beam) in metres. 2--100 m.
GPS offset from Bow	Distance from the GPS antenna to the bow, in metres. Bounded by the boat length above.
GPS offset from Midship	Distance from the GPS antenna to the centreline, positive to starboard. Bounded by half the beam either way.
Minimum Screen size (mm)	The smallest the icon is allowed to shrink to on screen. Below this, Deeprey falls back to the simple arrow. 1--100 mm.



Note The two GPS-offset ranges follow your boat dimensions automatically. If you raise **Length Over All**, the **GPS offset from Bow** maximum tracks it; if you change **Width Over All**, the **GPS offset from Midship** range adjusts to $\pm \frac{1}{2}$ beam. Set the dimensions first, then position the antenna.

Predictors and Range Rings

The lower half of the page hosts the COG/heading predictor lengths, the range rings around the boat, and the show-direction-to-active-waypoint toggle. These are documented in detail under Navigation settings in [Chapter 8](#).

Routes and Waypoints

Defaults for every route and for mark visibility on the chart --- waypoint arrival circle, advance-on-arrival behaviour, automatic route reactivation on boot, chart-scale-based mark hiding, and per-mark range rings.

This subpage is documented in detail under [Chapter 7](#).

AIS

Filters and alerts for AIS targets --- CPA / TCPA thresholds, target-lifecycle timers, predictor arrows, target-tracks length, anchored-target suppression, and target attenuation when traffic is dense.

This subpage is documented in detail under [Chapter 11](#).

Charts

The **Charts** category has three subpages:

- **Chart Manager** --- the list of installed chart sets, plus install / remove / activate controls.
- **O-Charts** --- license management for o-charts encrypted chart subscriptions.
- **Vector Chart Options** --- how ENC (vector) charts are drawn: display category, boundaries, quilting, text rules, sector lights, and the shallow / safety / deep depth thresholds.

All three are documented in detail under [Chapter 6](#).

Radar

The **Radar** category has three subpages:

- **Installation** --- physical-mount calibration: bearing alignment, range adjustment, antenna offsets, blanking sectors, side-lobe and interference rejection. The fields shown depend on the connected radar model.

- **Display Colors** --- the radar palette: theme preset plus individual colour pickers for trails, returns, ARPA edges, AIS text, and the background.
- **Parameters** --- cross-cutting behaviour: range units, guard-zone styling and alarm cadence, heading-source rules, overlay transparency, and overlay-content toggles.

Per-antenna live controls (gain, sea/rain clutter, etc.) live on the radar canvas itself, not in Settings. All of the above is documented in detail under [Chapter 10](#).

Sonar

The **Sonar** category has three subpages:

- **Display Options** --- the **Horizontal slider** toggle that adds a timeline scrubber under the waterfall when you scroll back in history.
- **Parameters** --- the connected transducer's board / sensor / firmware / IP read-out, plus the editable Sensor Name, IP Address, and Subnet Mask.
- **Deepview** --- tide correction and the four data-quality filters (depth range, speed, spike, frozen) used by the bathymetric survey.

Display Options and **Parameters** are documented in detail under [Chapter 12](#). The **Deepview** filters are documented in [Chapter 13](#).

About

The **About** category gathers device identity, live system diagnostics, support contacts, and the on-device legal documents. Its sidebar has three subpages:

- **About** --- the identity card: product model, serial number, and the software and OpenCPN versions.
- **Diagnostics & Support** --- live uptime, memory, storage, and CPU-temperature read-outs, the **Export to USB** support-bundle tool, and the Deeprey support contacts.
- **Legal** --- the End-User License Agreement, regulatory declarations, and open-source license notices.

About and **Diagnostics & Support** are documented in detail under [Chapter 18](#). The full text of every legal notice on the **Legal** subpage is reproduced in [Chapter 19](#).

18 Maintenance and Troubleshooting

This chapter covers keeping the software current, reading the unit's identity and diagnostics when you need to contact support, resolving the problems you are most likely to meet, and the physical care of the display.

Keeping the Software Up to Date

Deeprey software is modular: the chart manager, radar, sonar, dashboard, and the other components are separate packages that update independently of one another. Everything to do with updates lives on one page --- **Settings > General > Software Update**. The page has a status read-out at the top, a table of installed modules in the middle, and a row of action buttons at the bottom.

Control	What it does
Automatic Updates	When on, any available updates are installed in the background while the unit shuts down. Leave it on to stay current without thinking about it.
Modules table	Lists every Deeprey module with its installed version and a status of Up to date , Update available , or Not installed .
Check for Updates	Queries the Deeprey update server and refreshes the table. The status line reports how many updates are available, or shows an Offline notice if the unit has no internet connection.
Install Updates	Installs every pending update, then shuts the unit down to apply them. Greyed out until a check has found updates.
System Upgrade	Runs a full system-image upgrade from a prepared USB drive. Use this for major version jumps that cannot be applied as in-place module updates.



Note Checking for and downloading updates needs an internet connection --- either a wired network or WiFi joined from the System Control Panel (see [Chapter 3](#)). With no connection, the table still shows what is installed but cannot tell you whether anything newer exists.



Warning **System Upgrade** replaces the entire operating-system image on the unit. Make sure you have a correctly prepared USB image and stable power before starting --- an interrupted system upgrade can leave the unit unable to boot.

Device Information and Diagnostics

When you contact support, file a warranty claim, or simply want to confirm what the unit is running, everything you need is under **Settings > About**. Its sidebar has three subpages: **About**, **Diagnostics & Support**, and **Legal**.

About --- the Identity Card

A read-only block of key/value rows under a **Product** heading. These are the values support will ask for first.

Field	What it shows
Model	The product model.
Serial	Factory serial number.
Software	Deeprey software version.
OpenCPN	The version of the OpenCPN engine Deeprey is built on, with its plugin API version.

Below the Product block sit a **Powered by OpenCPN** credit acknowledging the open-source navigation engine and an **Acknowledgements** list naming the third-party libraries Deeprey draws on.

Diagnostics & Support

A live read-out of the unit's runtime state, a tool for packaging up its logs, and the contact details for Deeprey support.

The **Diagnostics** block at the top shows four metrics; tap **Refresh** to update them on demand:

- **Uptime** --- how long the unit has been running since the last boot.
- **Memory** --- memory in use versus total.
- **Storage (/)** --- disk usage of the root partition.
- **CPU temp** --- main processor temperature.

Exporting a support bundle

When you raise a fault with Deeprey, the support team will usually ask for a log bundle. The **Export to USB** button saves the OpenCPN log, the unit's configuration, and the o-charts fingerprints into a single compressed file on a USB drive --- everything Deeprey or o-charts support needs to diagnose installation, licensing, or hardware issues, with no hunting through the filesystem.

1. Insert a USB drive into the unit.
2. On **Diagnostics & Support**, tap **Export to USB**.
3. Choose the USB drive when prompted. A timestamped **.zip** file is written to it.
4. Remove the drive and attach the file to your support email.

The **Support** block at the bottom of the page lists the email, customer-service link, and website you can reach the Deeprey team at.



Note If you would rather send a photo than a file, the single most useful screen to capture is this one: **About** for the identity and **Diagnostics & Support** for the runtime state. Together they tell support almost everything they need to start.

Legal

The **Legal** subpage opens the documents shipped with the unit --- the End-User License Agreement, the regulatory and compliance declarations, and the open-source license notices. The full text of every legal notice is reproduced in [Chapter 19](#).

Remote Support

When a problem is hard to pin down, Deeprey can connect to your unit over the internet and diagnose it in place --- no need to ship it back or wait for a visit. All the support team needs is your serial number.

1. Make sure the unit is powered on and connected to the internet --- either plugged into a wired network or joined to WiFi (see [Chapter 3](#)).
2. Read your serial number from the **About** page (§18.2.1) and give it to Deeprey support.
3. The support team connects over a secure, encrypted link and works through the problem with you.



Note Remote support needs no setup on your side --- there are no ports to open and no firewall or router changes to make. It works over the same internet connection you already use for chart downloads and software updates.

Troubleshooting

Most transient faults clear with a clean restart. Before working through the table below, try a power cycle: open the System Control Panel, tap **Power Off**, wait for the unit to shut down fully, then power it back on. Always use the software shutdown --- see [Chapter 3](#).



Danger Never pull power to "reset" a unit that will not respond. Cutting power while the system is running can corrupt the configuration. Always shut down through the software, and only remove power once the unit is fully off.

Symptom	What to check
No GPS fix / position	Give the antenna a clear view of the sky and a minute to acquire. Confirm a GPS source is present and prioritised under Settings > Network (see Chapter 17). The GPS indicator in the Settings header and Navigation Bar shows lock status.
An instrument reads --	The sensor for that value is not reporting. Check the wiring and that the device is powered; readouts repopulate automatically once data returns.
Radar will not transmit	The correct radar model must be selected under Settings > Radar > Installation before the scanner will transmit (see Chapter 10). Confirm the scanner is powered and reachable over Ethernet.
Radar targets missing from the overlay	The target overlay only draws with a valid heading source. Connect a compass, or enable COG as heading in the radar settings.
No sonar image	Confirm the transducer is connected over Ethernet and detected under Settings > Sonar (see Chapter 12). The device block reads ``Unknown" when no transducer is found.
``IP Camera Not Found"	The Video Camera service is unavailable. Re-open the layout from the home menu, or restart the unit (see Chapter 16).
No sound on an alarm	Audio cues are per-event. Confirm the relevant toggle is on under Settings > General > Sounds .
No chart on screen	Confirm a chart set covering the area is installed and active in the Chart Manager (see Chapter 6), and that you are zoomed to a scale the chart covers.
Updates show ``Offline"	The unit has no internet connection. Connect it to the internet --- a wired network, or WiFi from the System Control Panel --- then tap Check for Updates again.
Touch unresponsive / app frozen	Power-cycle the unit using the procedure above. If it persists, export a support bundle and contact Deeprey.



Note If a problem survives a clean restart, export a support bundle from **Diagnostics & Support** (§18.2.2) and send it to Deeprey with the serial from the **About** page --- or, with the unit online, give support your serial and let them connect remotely (§18.3). Logs and a live look almost always pinpoint the cause faster than a description can.

Caring for the Display

The unit needs little routine maintenance. A few habits keep it working and looking its best:

- **Cleaning the screen.** Wipe with a soft, lint-free cloth lightly dampened with fresh water. For stubborn salt or grime, use a cloth moistened with a mild soap solution, then wipe dry.
- **Avoid harsh products.** Do not use solvents, ammonia, abrasive cleaners, or scouring pads on the glass --- they can permanently haze the anti-glare coating.
- **Rinse off salt.** After exposure to spray, rinse the bezel and surrounding surfaces with fresh water and dry them. Dried salt is abrasive and holds moisture against the housing.
- **Protect when idle.** Fit the sun cover, where supplied, when the unit is not in use. Prolonged direct sunlight ages the display and front panel.

- **Keep connectors clean and dry.** Check that the connectors at the back are seated, clean, and corrosion-free. A light smear of dielectric grease helps in exposed installations.



Note Environmental ratings, operating-temperature limits, and mounting and connector details are covered in the Deeprey MFD Installation Manual.

19

Regulatory & Legal Notices

This chapter contains legal, licensing, regulatory, and warranty information for the Deeprey MFD. A brief copyright and trademark notice also appears in the front matter of this manual.

Disclaimer and limitation of liability

The Deeprey MFD is intended as an aid to navigation only. It is not a substitute for official nautical charts, publications, or qualified watchkeeping. See Chapter 2 --- Safety Information --- for the full list of navigation warnings.

To the maximum extent permitted by applicable law, Deeprey Research Ltd disclaims all warranties, express or implied, including the implied warranties of merchantability and fitness for a particular purpose. In no event shall Deeprey Research Ltd be liable for any indirect, incidental, special, or consequential damages arising from the use of, or inability to use, this product.

End-User License Agreement (EULA)

Use of the Deeprey MFD software and firmware is subject to the Deeprey End-User License Agreement, which sets out the terms under which the Software is licensed to you, including permitted use, restrictions, warranties, limitation of liability, and governing law (England and Wales). By using the Deeprey MFD, you agree to be bound by the EULA.

The Deeprey EULA governs the Deeprey plugins and Deeprey-authored software only. OpenCPN is used in its unmodified upstream form and remains licensed to you under the GNU General Public License; see Section 3 below.

The current version of the EULA is available at:

- On the device: *Settings* → *About* → *Legal* → *End-User License Agreement*
- Online: <https://deeprey.com/legal/eula>



Note The EULA is not reproduced in this manual. The full text is available in the locations listed above.

Open-source software licenses

The Deeprey MFD incorporates software developed by the open-source community. Deeprey gratefully acknowledges these projects. Principal components include:

OpenCPN

The Deeprey navigation software is built on **OpenCPN**, the open-source marine chartplotter and navigation platform, licensed under the GNU General Public License v2 or later (GPLv2+). Deeprey ships the current live upstream release (v5.14) of OpenCPN **unmodified**; the complete corresponding source code is freely available at:

- <https://opencpn.org>



- <https://github.com/OpenCPN/OpenCPN>

The Deeprey plugins are separate works, developed independently by Deeprey Research Ltd, and are loaded at run time through OpenCPN's documented plugin Application Binary Interface (ABI). The Deeprey plugins are proprietary and are not derivative works of OpenCPN for the purposes of the GPL.

OpenCPN remains an independent open-source project. It continues to be freely available to download and use on desktop and other platforms under the GPL, independently of Deeprey; this does not change OpenCPN's availability, licensing, or governance for any other user.

The Deeprey software was developed in close and ongoing collaboration with the OpenCPN project. See the Acknowledgements in the front matter of this manual.

Other open-source components

- **Debian GNU/Linux** --- operating system; individual packages are distributed under their respective licenses, including GPL, LGPL, MIT, BSD, Apache, and others.
- **wxWidgets** --- cross-platform GUI library, used under the wxWindows Library Licence (a modified LGPL).
- **OpenSSL** --- cryptographic library, used under the Apache License 2.0.
- **FFmpeg** --- multimedia framework, used under the GNU Lesser General Public License (LGPL) v2.1 or later.

A complete inventory of open-source components installed on the device, together with their full license texts, is provided at:

- On the device: `/usr/share/doc/`
- On the device: *Settings* → *About* → *Legal* → *Open-source licenses*
- Online: <https://deeprey.com/legal/oss>

Where required by the applicable license (e.g., GPL, LGPL), the corresponding source code is made available to recipients of the device on request for a period of at least three years from the date of supply. Written requests should be addressed to Deeprey Research Ltd, 124 City Road, London EC1V 2NX, United Kingdom, or emailed to legal@deeprey.com.

Electronic chart data and cartography licenses

Electronic charts supplied with or installed on the Deeprey MFD are licensed from third-party cartography providers and are subject to their respective end-user license agreements.

- **o-charts** encrypted charts are licensed from o-charts.org for OpenCPN under the o-charts End-User License Agreement. The chart sets are licensed for a specific device or fingerprint and linked to it. They may not be transferred, copied, or redistributed.
- **Basemap imagery** is derived from the NASA Blue Marble Next Generation dataset, produced by the NASA Earth Observatory and the NASA Goddard Space Flight Center. NASA imagery is in the public domain; attribution: "Images courtesy of NASA Earth Observatory."



Warning

Electronic chart data may contain errors or omissions and must not be used as the sole means of navigation. Always cross-reference with official government charts and notices to mariners.

Regulatory approvals

This section applies to the Deeprey MFD models **DP121M** (sold as the MFD12, 12.1-inch) and **DP156M** (sold as the MFD16, 15.6-inch). DP121M and DP156M are the model numbers printed on the rating label on the rear of the unit.

European Union --- CE marking

Deeprey Research Ltd declares, under its sole responsibility, that the Deeprey MFD models DP121M and DP156M are in conformity with the applicable European Union harmonisation legislation, including the Electromagnetic Compatibility Directive (2014/30/EU), the Low Voltage Directive (2014/35/EU), and the RoHS Directive (2011/65/EU as amended by 2015/863/EU).

The full EU Declaration of Conformity is available on the device under *Settings* → *About* → *Legal* → *Regulatory & Declarations*, and online at <https://deeprey.com/legal/doc>.

United Kingdom --- UKCA marking

Deeprey Research Ltd declares, under its sole responsibility, that the Deeprey MFD models DP121M and DP156M are in conformity with the applicable UK statutory requirements, including the Electromagnetic Compatibility Regulations 2016, the Electrical Equipment (Safety) Regulations 2016, and the Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012.

The full UK Declaration of Conformity is available on the device under *Settings* → *About* → *Legal* → *Regulatory & Declarations*, and online at <https://deeprey.com/legal/doc>.



Note

Regulatory markings (CE, UKCA, WEEE crossed-bin) appear on the product rating label on the rear of the unit.

Environmental compliance

RoHS

The Deeprey MFD is compliant with Directive 2011/65/EU (as amended by 2015/863/EU) of the European Parliament and of the Council on the restriction of the use of certain hazardous substances in electrical and electronic equipment ("RoHS"), and with the equivalent UK Regulations of 2012. The hardware bill of materials has been audited to ensure that concentrations of lead, mercury, cadmium, hexavalent chromium, polybrominated biphenyls (PBB), polybrominated diphenyl ethers (PBDE), and the four restricted phthalates (DEHP, BBP, DBP, DIBP) are below the permitted thresholds in all homogeneous materials.

WEEE

The Deeprey MFD is classified as electrical and electronic equipment under the Waste Electrical and Electronic Equipment (WEEE) Directive (2012/19/EU) and the equivalent UK Regulations of 2013. The crossed-out wheeled bin symbol on the rating label indicates that this product must not be disposed of with unsorted municipal waste at the end of its life.

End-of-life disposal. Please return the unit to an approved collection facility, to your retailer, or to Deeprey Research Ltd for environmentally responsible recycling. Deeprey's UK producer registration number is.

REACH

Deeprey Research Ltd is committed to compliance with Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals ("REACH"), and with its UK equivalent. To the best of our knowledge, the Deeprey MFD does not contain Substances of Very High Concern (SVHC) from the current REACH Candidate List in concentrations exceeding 0.1% by weight of any article, other than as required to be communicated under Article 33 of REACH. The current SVHC declaration is available on request from legal@deeprey.com.

Packaging

Packaging materials for the Deeprey MFD are recyclable. Please dispose of packaging in accordance with local regulations.

Warranty

The Deeprey MFD is supplied with a limited hardware warranty. The current warranty terms, coverage period, and claim procedure are published by Deeprey and are available at:

- <https://deeprey.com/customer-service>

Warranty service requires proof of purchase and the device serial number (printed on the rating label on the rear of the unit). Unauthorised modification of the device, removal of seals, exposure to conditions outside the published environmental specifications, or installation contrary to the instructions in this manual may void the warranty.

This warranty is offered in addition to, and does not affect, your statutory rights as a consumer under applicable UK or EU law, including the right to a conforming product under the Consumer Rights Act 2015 (UK) or Directive (EU) 2019/771.

Technical accuracy

Deeprey Research Ltd has taken reasonable care to ensure the information in this manual is accurate at the time of publication. However, specifications, software features, and user-interface details are subject to change without notice. The latest version of this manual is available at <https://deeprey.com/manual>.

Publication copyright

© 2026 Deeprey Research Ltd. All rights reserved. This manual, including all text, diagrams, and screenshots, is the copyrighted work of Deeprey Research Ltd and may not be reproduced, distributed, or translated without prior written permission.

Deeprey Research Ltd is a company registered in England and Wales, company number 15929253, with its registered office at 124 City Road, London EC1V 2NX, United Kingdom.



Glossary

AIS	Automatic Identification System. A VHF broadcast system by which vessels and navigation aids transmit identity, position, course, and speed. Deeprey displays AIS targets; it does not transmit them --- see Section 11.10 .
ARPA	Automatic Radar Plotting Aid. Radar-derived target tracking that computes each acquired target's course, speed, and closest approach.
AtoN	Aid to Navigation. A buoy, beacon, or light. AIS-equipped AtoNs broadcast their position and are shown on the chart.
Bearing	The direction from one point to another, in degrees. Distinguished from <i>heading</i> , which is the direction the vessel is pointing.
BSB / KAP	A raster chart format. BSB is the chart set; KAP is the individual chart image file.
CM93	A vector chart format, used for worldwide small-scale coverage.
COG	Course Over Ground. The actual direction of travel over the seabed, as opposed to the direction the vessel is pointing.
Combo view	A workspace layout that divides the screen between two or more panels --- for example chart and radar side by side. See Chapter 4 .
CPA	Closest Point of Approach. The smallest distance at which a target will pass, if both vessels hold course and speed.
DSC	Digital Selective Calling. A VHF calling system that carries distress alerts, including the sender's MMSI and position.
EBL	Electronic Bearing Line. A radar bearing line drawn from a chosen origin, used with a VRM to measure a target's bearing and range.
ENC	Electronic Navigational Chart. A vector chart conforming to an IHO standard. Contrast with a raster chart, which is a scanned image of a paper chart.
GNSS	Global Navigation Satellite System. The general term covering GPS, GLONASS, Galileo, and BeiDou. The chartplotter has an internal multi-constellation receiver.
GRIB	Gridded Binary. The file format in which numerical weather forecast data is distributed. See Chapter 14 .
Guard zone	A user-defined radar area that raises an alarm when a target enters it.
Heading	The direction in which the vessel is pointing, in degrees. May be true or magnetic.
Instruments Bar	The panel of live data readouts opened by swiping in from the right edge of the screen. See Chapter 5 .
Meteogram	A time-series graph of forecast weather at a single point, read from GRIB data.

MMSI	Maritime Mobile Service Identity. The nine-digit number that uniquely identifies a vessel's AIS and DSC radio equipment.
MOB	Man Overboard. A one-touch action that marks the current position and immediately begins navigating back to it.
NMEA 0183	The serial marine data standard, in which instruments exchange ASCII sentences such as GGA or RMC over a point-to-point wired connection.
NMEA 2000	The CAN-based marine network standard, in which instruments exchange binary messages identified by PGN over a shared, powered backbone.
oeRNC	An encrypted raster chart format distributed by o-charts.
oeSENC	An encrypted vector chart format distributed by o-charts, derived from official ENC data.
PGN	Parameter Group Number. The numeric identifier of an NMEA 2000 message type --- for example PGN 128267 carries water depth.
RNC	Raster Navigational Chart. A chart supplied as a scanned image of the printed original, as opposed to the vector data of an ENC.
Route	An ordered series of waypoints defining a passage. Activating a route makes the chartplotter navigate it leg by leg.
S-57	The IHO standard defining the vector data format of official electronic navigational charts.
S-63	The IHO standard defining the encryption applied to S-57 chart data, and the permit system that unlocks it.
SART	Search and Rescue Transponder. A distress beacon whose signal appears as a distinctive target on radar and AIS. A SART indication is a live emergency.
SOG	Speed Over Ground. Speed relative to the seabed, as measured by GNSS. Distinguished from speed through water, which a paddlewheel or ultrasonic sensor measures.
TCPA	Time to Closest Point of Approach. The time remaining until a target reaches its CPA.
Track	The recorded history of where the vessel has actually been, laid down automatically as it moves. Contrast with a route, which is planned in advance.
VRM	Variable Range Marker. An adjustable radar range ring, used with an EBL to measure a target's range.
Waypoint	A single saved position, optionally named and given an icon. The building block of a route. See Chapter 7 .
Workspace	A saved arrangement of panels and their settings, recalled as a unit. See Chapter 4 .
XTE	Cross Track Error. The perpendicular distance by which the vessel has strayed from the intended track between two waypoints.

DEEPREY®

Deeprey Research Ltd
124 City Road, London EC1V 2NX, United Kingdom
Registered in England and Wales No. 15929253

© 2026 Deeprey Research Ltd. All rights reserved.