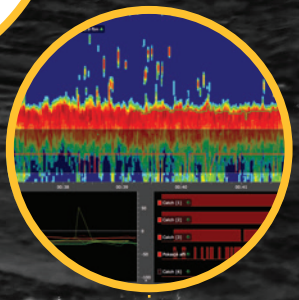
Scala
User Guide



MARPORT

Contents

Legal

History

V1	02/07/17	First release
V2	08/16/17	New topics: • Displaying Single Trawl Spread on page 98 • Displaying Twin Trawl Spread on page 100 • Displaying Bathymetric Data from GEBCO Database on page 64 • Displaying Trawl Positioning from Scala on Olex on page 44 • Displaying Trawl Positioning from Scala on MaxSea Version 12 on page 49 Improved topics: • Changing the Echogram Colors on page 87 • Checking Noise Interference on page 126 Corrected topics: • NMEA Outputs from Scala on page 140: from Scala v. 01.06.02 to 01.06.06, IITPT sentence is not output anymore. New sentences have been added.
V3	03/09/18	Documentation now also includes Scala version 01.06.14. Improved topics: • Installing Scala on page 14: now includes a procedure to fix a software issue on Mac Pro with Mavericks OS. • List of Marport Hydrophones on page 21: new hydrophones have been added (NC-1-07 and NC-1-08). • Calculations for Positioning System on page 31: new improved examples. • NMEA Outputs from Scala on page 140: new sentences have been added. • Setting an Alarm on Incoming Data on page 111: now includes a procedure to import your own alarm sounds.

V4	04/12/18	Documentation now also includes Scala version 01.06.19. Improved topics: • Displaying Trawl Positioning from Scala on SeapiX on page 60: new compatible sentence ($PTSAL for SeapiX). • Compatible Incoming NMEA Sentences on page 131: structure of compatible NMEA sentences is now explained. New sentences have been added.
V5	07/06/18	Documentation now also includes Scala version 01.06.23. Improved topics: • Opening a Page in a New Window on page 82: from Scala version 01.06.23, you need to be in Customize mode to open a page in a new window. • Advanced Troubleshooting Tools on page 123: more detailed information about **Message** and **Spectrum** pages.
V6	11/30/18	Documentation now also includes Scala version 01.06.25. Improved topics: • Compatible Incoming NMEA Sentences on page 131: New compatible NMEA sentence Karmoy Winch. • Troubleshooting on page 119: New troubleshooting case if black window with failed and login messages blocks the screen.
V7	02/11/20	Documentation now also includes Scala version 01.06.34. Improved topic: • Outputting NMEA Data to Other Systems on page 43: you can now specify which Ethernet network adaptor is used when selecting UDP NMEA output.

V8	07/05/21	• Configuring Trawl Positioning System on page 29 and Calculations for Positioning System on page 31: included guidelines to complete the positioning setting page with the receiver firmware 08.01.01. • Receiving Warp Lengths from Scantrol on page 42 and Outputting Scala Symmetry Data to Scantrol on page 62: added details about the computer IP address. • Removed details about Extracting Data from SDS Files on page 118, as sds2txt is now available on demand as a stand-alone application. • Added contact details for the sales offices in South Africa and Norway in Support Contact on page 130.

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Disclaimer

Marport endeavors to ensure that all information in this document is correct and fairly stated, but does not accept liability for any errors or omissions.

The present user guide is applicable for the following versions of Scala: v. 01.06.06 - v.01.06.34

Compatible macOS versions:

- OS X Mavericks
- OS X El Capitan
- macOS Sierra
- macOS High Sierra
- macOS Mojave
- macOS Catalina
- macOS Big Sur

Introduction and Presentation

Read this section to get a basic knowledge of Scala.

Tip: Click Marport logo at the bottom of pages to come back to the table of contents.

Introduction

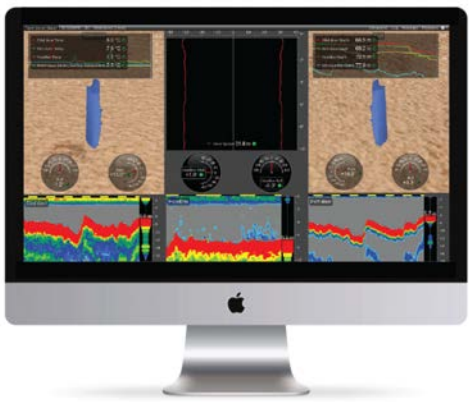
Scala is Marport's advanced trawl monitoring system that collects, processes, stores and displays data sent from multiple sensors, sounders and other connected devices. It gives the user full control over its fishing operations.

In order to suit the working conditions, gear and sensor data type available, this monitoring system offers unparalleled flexibility. It is easily configurable:

- Display several simultaneous echogram presentations on a single page.
- Use drag and drop possibilities to customize your page layout.
- Choose from existing gauges, histograms or 3D views or create your own layout with any number of sensors displayable on screen.
- Adjust windows and graphs according to your needs.
- Compare data from equivalent sensors using multiple history plots.
- Easily play back historical data

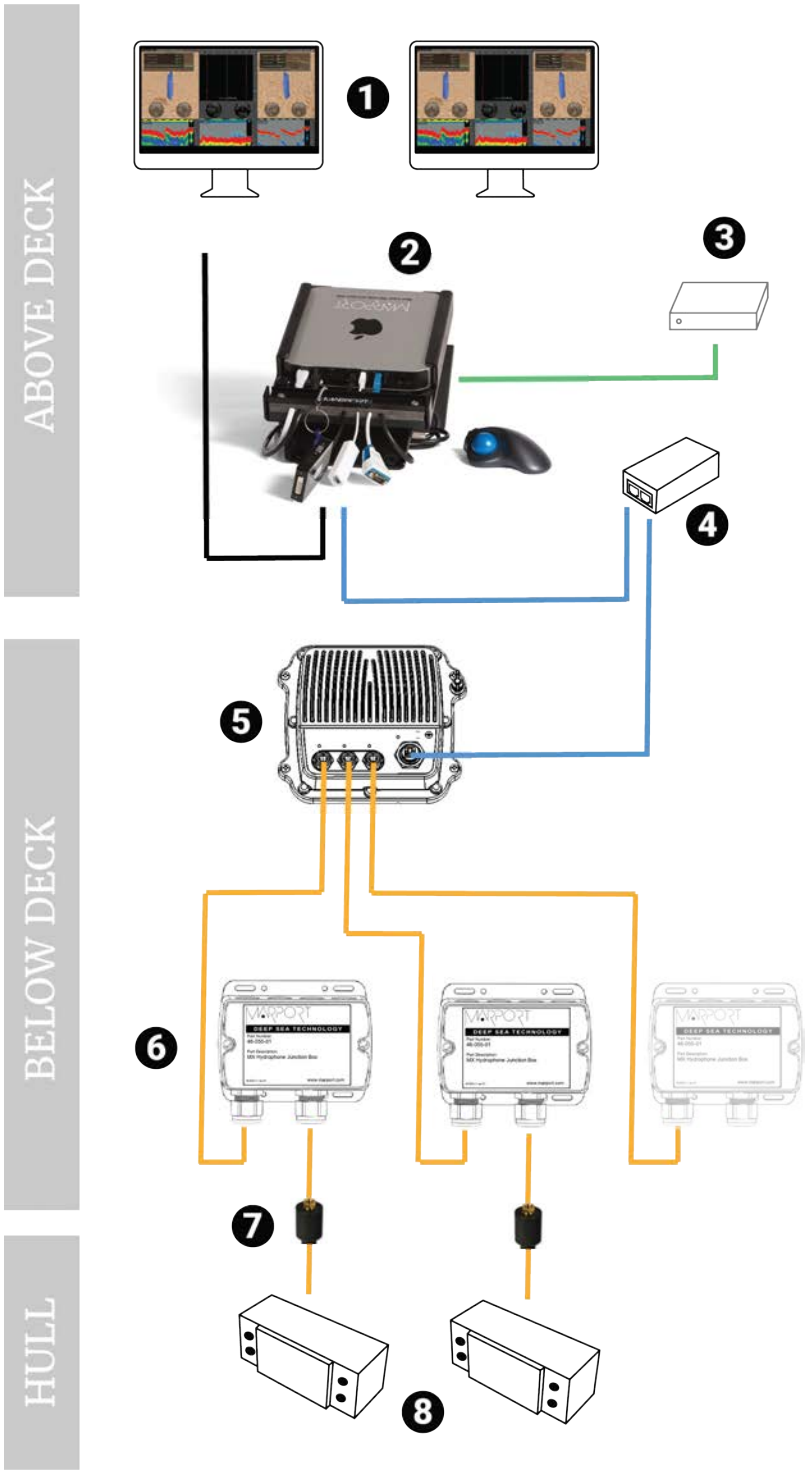
Moreover, a key feature of Scala is that it is designed to meet tomorrow's requirements:

- It incorporates 3D simulation with bathymetry using a simple GPS data connection.
- It has a range of standard data inputs and outputs.



Overview of the System

This schema is an example of a system with M3 receiver.



1. Monitors
2. Mac Mini
3. Internet access (optional)
4. PoE
5. M3 receiver (M3REC)
6. Junction boxes (2) + One optional junction box
7. Thru-hull penetration (TH-1-01)
8. Hydrophones (NC-1-XX)

Manufacturer standard cable

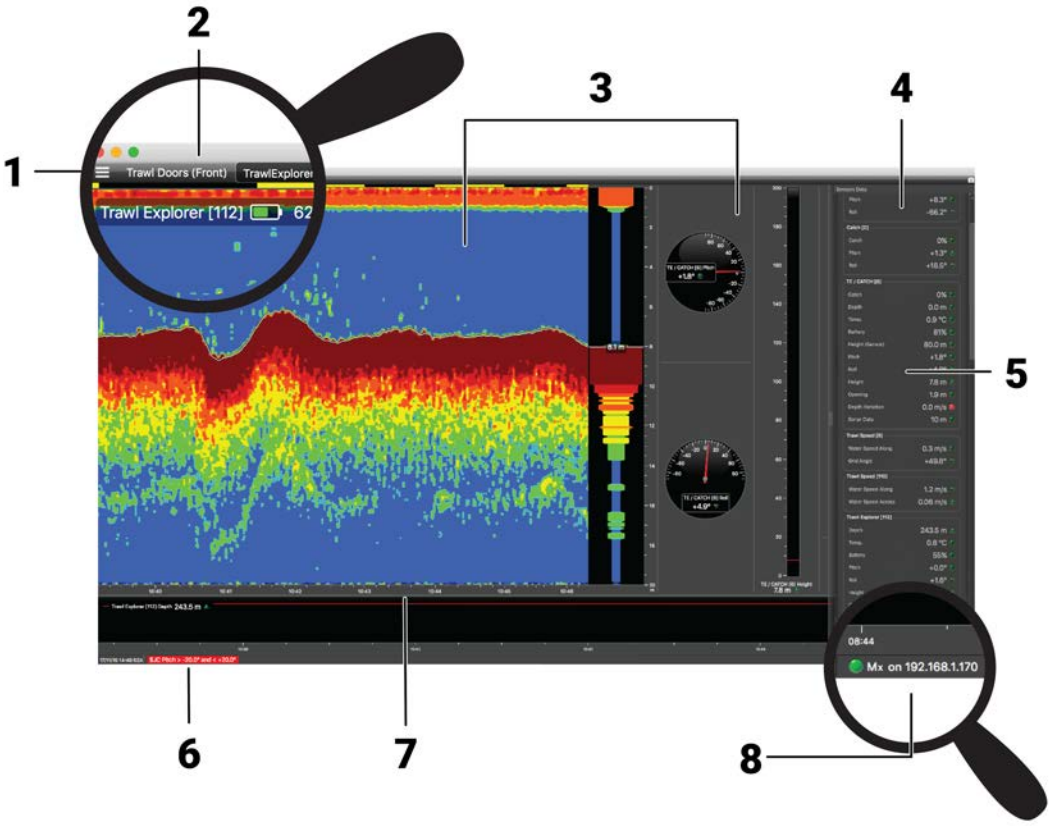
CAT5e Ethernet cable (receiver private network)

Ethernet cable

Marport junction box extension cable & hydrophone cable

(Blurred) Optional elements

Overview of Scala



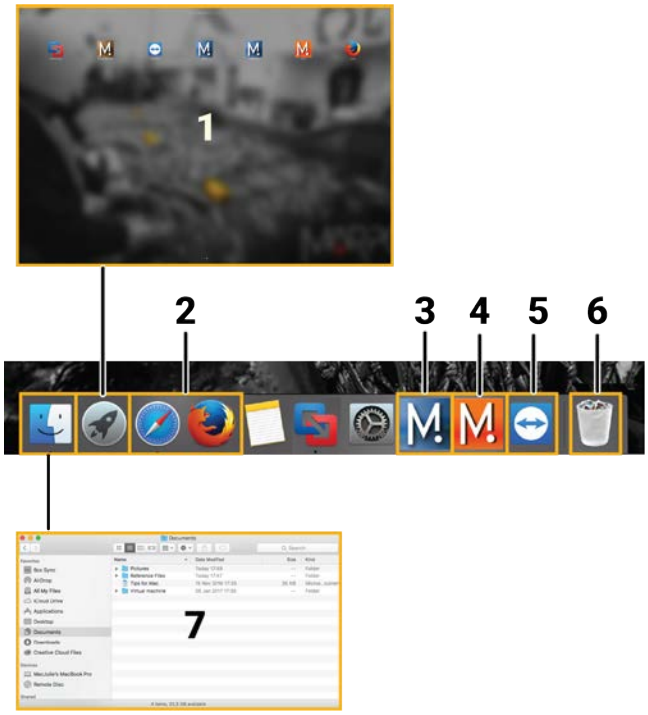
1	Menu	**5**	Incoming Data
2	Toolbar for Page Display	**6**	Alarms
3	Data Display	**7**	Echogram Time Stamp
4	Control Panels	**8**	Receiver Activity

Mac Basics

Switching On the Computer

Opening Applications and Files

You can use the bar of icons at the bottom of your screen, called the Dock, to access applications and files. Click icons to open items.

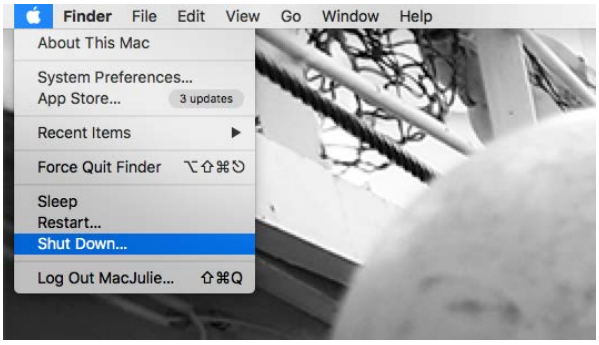


1. Launchpad: access all your applications
2. Web
3. Scala
4. Mosa2
5. TeamViewer
6. Trash: to delete items, drag them to the trash
7. Finder: access your files

If you need to search for an item, click the magnifying glass on the top right corner of the screen and type the name of the item.

Switching Off the Computer

From the top left corner of the screen, click **Apple Menu** > **Shut Down**. Also use this menu to restart or put the computer in sleep mode.



Installation

Read this section to know how to install and open Scala.

Installing Scala

You can install Scala and Scala Replay on your Mac Mini or Mac Pro computer.

Before you begin

- You have 1 to 3 monitors for a Mac Mini, 1 to 6 monitors for a Mac Pro.
- Receiver is connected to the computer via the private Ethernet network.

Procedure

1. Plug in the computer the Scala software dongle for basic or full version.
2. Double-click the installation file (*.dmg).
3. From the installation panel, double-click **Sentinel Runtime.pkg**. If a warning appears, click **Open**.

4. Follow the installation steps.
5. From the installation window that appears, drag Scala icon to the **Applications** icon.

6. Repeat the operation for Scala Replay icon.

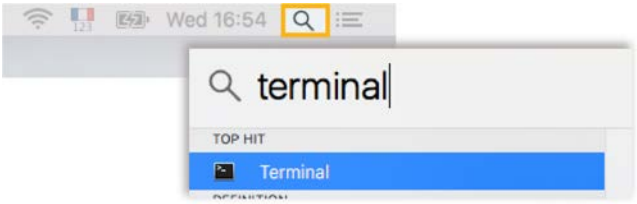
   Scala and Scala Replay are added to the **Launchpad**.
7. Open the **Launchpad** and drag Scala icon to the Dock at the bottom of your screen.

   You can now open Scala by clicking its icon on the Dock.

8. Change the **Security & Privacy** settings to be able to open Scala:
   a) From the upper left corner of the screen, click **Apple menu** > **System Preferences** > **Security & Privacy** .
   b) From the lower left corner of the **Security & Privacy** dialog box, click the lock icon and enter your computer password if you have one.
   c) From **General**, at **Allow apps downloaded from**, select **Anywhere**, then close the dialog box.

d) If the operating system is OS X Sierra and above, **Anywhere** option is not displayed by default. To display **Anywhere**:

- Click the magnifying glass from the top right corner of your screen and type `Terminal`.
- Select **Terminal** from the results.



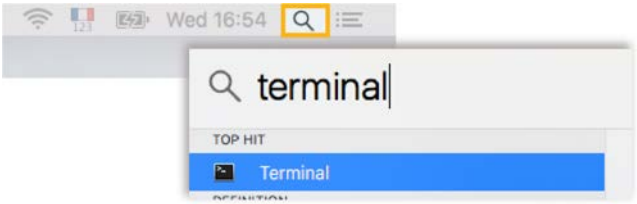
- In the terminal, enter `sudo spctl --master-disable`
- Press enter.

  Anywhere option is now displayed in your **Security & Privacy** preferences.

  Troubleshooting: If you do not add the **Anywhere** option, messages saying that Scala cannot be opened will appear.

9. Scala 01.06.14 **Systems with a Mac Pro Mavericks OS** need to launch a script that is in the installation package of Scala from version 01.06.14 and later. This operation has to be done only once.

a) Click the magnifying glass from the top right corner of your screen and type `Terminal`.
b) Select **Terminal** from the results.



c) In the terminal, enter `sh /Volumes/Marport-Scala/ScalaPatchForMavericks.sh`
d) When prompted, enter the administrator password.
e) Close the terminal.
f) Open Scala to check if the script has worked. If Scala does not open, it means the script has not worked. Repeat the procedure and make sure you enter the correct command line.

Automatically Opening Scala at Start Up

You need to configure the computer so that Scala automatically opens when the computer is switched on.

Procedure

1. From the top left corner of the screen, click **Apple Menu** > **System Preferences** > **Users & Groups**.
2. Click the tab **Login Items**.

3. Click the plus sign under the list, then go in the **Applications** folder and select Scala.

Opening Scala

Scala should open when you switch on the computer. If not, you can open Scala from the Dock at the bottom of the screen.

Before you begin

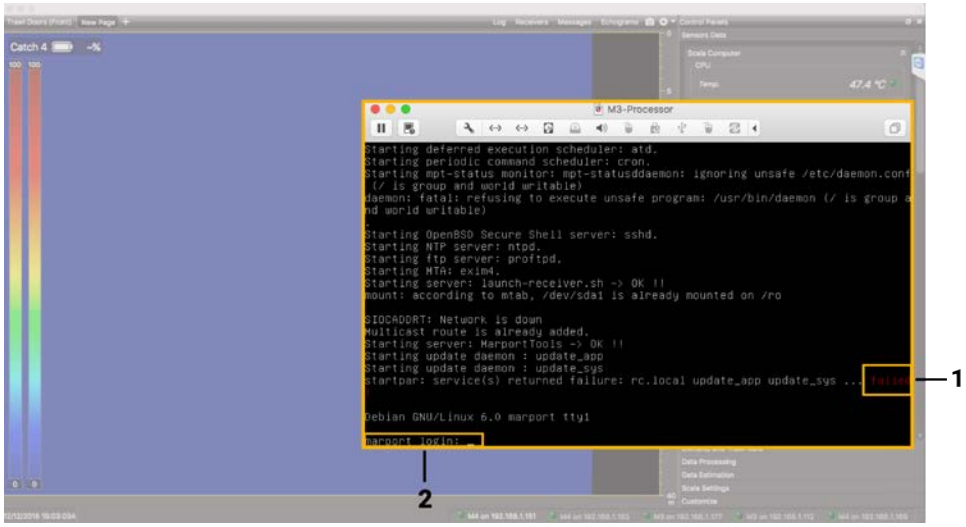
- Scala software dongle is plugged in the computer. Always have the dongle plugged in when using Scala.
- Receiver is connected to the private Ethernet network.

Procedure

From the Dock at the bottom of the screen, click Scala icon.

Important: On M3, M5, M4 and M6 systems, the following window is a software that analyzes sensors data. This program is necessary for the correct operation of the receiver. **DO NOT CLOSE this window**. If the window appears, click minimize to hide it and change the settings as indicated in Automatically Opening Scala at Start Up on page 16 to keep it hidden. This icon should always appear at the bottom of your desktop screen:

If you close the window, restart the computer.



Note: **Failed** (1) and **Login** (2) indications are **normal** and always appear. You do not need to enter anything.

Important: Do not click inside the window or you will loose the mouse. If you lost the mouse, connect a keyboard and press **ctrl + cmd** (Apple) / **ctrl + window** key (Windows).

Results

The application opens.

Changing the Language Settings of Scala

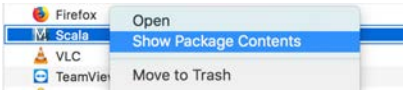
You can change Scala default language.

About this task

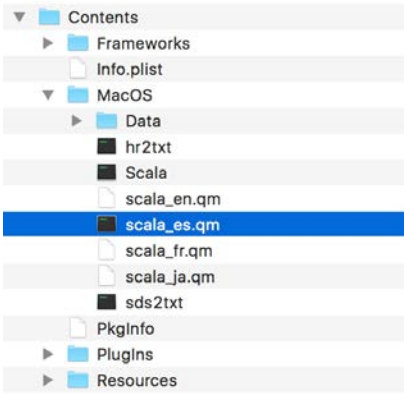
By default, Scala is in English. To change Scala default language, you need to have a QM language file, for example scala_es.qm.

Procedure

1. Download the file corresponding to the language you need from Marport support page.
2. Add this file to Scala setting files:
   a) Right-click Scala application and click **Show Package Contents**.



   b) Copy-paste the language file in **Contents/MacOS**.



3. From Scala, click **Menu** > **Expert Mode** and enter the password `copernic`.
4. Click **Menu** > **Settings** > **Advanced**.
5. In **Language File**, click ... and select the language file you added previously.
6. Restart Scala.

Results

Scala language is changed.

System Configuration

Read this section to know how to configure a receiver, sensors and other devices to be able to display their data in Scala.

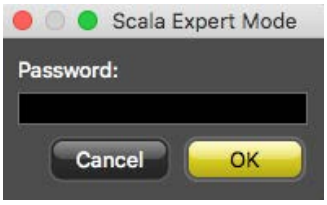
Configuring the System

You need to configure the different components of the system to display in Scala data received from the sensors.

A system web page gives access to the receiver configuration. It is accessible through Scala or Firefox web browser:

1. Click **Menu** > **Expert Mode** .

2. In the following window, enter the password `copernic`.



3. Then, click **Menu** > **Receivers**.
4. Or, enter the receiver IP address in Firefox web browser.
5. You can now configure the different components of the system.

Note: When you have finished changing settings, you need to deactivate the Expert mode: click **Menu** > **Expert Mode** again.

Defining a Hydrophone

You need to add hydrophones to the system.

About this task

The hydrophones are used to convert acoustic signals from trawl sensors to analog signals. You need to define the correct type of hydrophone in the receiver configuration based on the model of hydrophone installed on your hull.

Refer to List of Marport Hydrophones on page 21 to learn about Marport different models of hydrophones.

Procedure

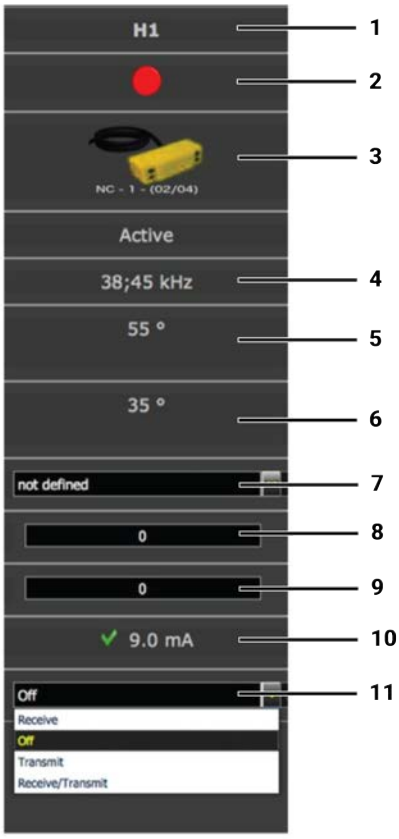
1. From the left side of the screen where the system is displayed, click **Hydrophones**.

2. To add a hydrophone to the system, click **Click to Add** on one of the hydrophones ports.
3. In the hydrophone selection page, scroll the top part to see the available hydrophones.
4. Click the picture of the correct type of hydrophone between active and passive, and the brand.

   Note: When selecting an active hydrophone, you can see the hydrophone current displayed.

5. Click **Ok**.

   The panel closes and the hydrophone is added to the **Hydrophones** page.
6. From the **Hydrophones** page, select a location for the hydrophone. The location is important when using a trawl positioning system.
7. For reference, you can also indicate vertical and horizontal tilt angles of the hydrophones.
8. Define an operating status. For normal sensor reception, select the **Receive** operating status.



1. Number of hydrophone inputs
2. Red = active / Blue = passive
3. Hydrophone model
4. Frequency range
5. Horizontal beam width
6. Vertical beam width
7. Location (for positioning system)
8. Horizontal tilt angle
9. Vertical tilt angle
10. Measured hydrophone current
11. Operating status

Note: If the hydrophone current is outside normal values, it is indicated with a red cross. Refer to List of Marport Hydrophones on page 21 to know what are normal values.

Troubleshooting: If an active hydrophone shows 0.0 mA current, it might be faulty or the wiring to the hydrophone might be wrong. Check the wiring.

List of Marport Hydrophones

These are technical specifications for hydrophones currently sold by Marport. For information about obsolete hydrophones, please contact Marport support.

Product reference	Name	Use case	Bandwidth (3 dB)	Typical current consumption	Cable*
NC-1-05	Passive wideband hydrophone (no preamplifier)	• Vessel with very low level of noise (below -110 dBV). • Sensors close to the vessel (approx. 300 m) • For positioning systems with Slant Range/pinger (one passive hydrophone is necessary for transmission).	33-60 KHz	0.0 mA	Blue
NC-1-05 + NC-2-02	Passive hydrophone + Wideband preamplifier box	• Vessel with normal level of noise (below -100 dBV). • Large number of sensors.† • Use at great depths (> 500 m). • Gain configurable (Low or High) • Filters configurable (38 and/or 50kHz). • Low noise environment between passive hydrophone and wideband preamplifier box	33-60 KHz	25-29 mA	Blue

Product reference	Name	Use case	Bandwidth (3 dB)	Typical current consumption	Cable*
NC-1-07	Active hydrophone (integrated preamplifier)	• Vessel with normal level of noise (below -100 dBV). • Limited number of sensors.† • No filtering options. • Not used for positioning system	41-44 KHz	4-6 mA	Green
NC-1-06	Active wideband hydrophone (integrated preamplifier)	• Vessel with normal level of noise (below -100 dBV). • Large number of sensors.† • Use at great depths (> 500 m). • Gain configurable (Low or High) • Filters configurable (38 and/or 50kHz)	30-60 KHz	25-29 mA	Yellow
NC-1-08	Active wideband hydrophone (integrated preamplifier)	• Vessel with normal level of noise (below -100 dBV). • Large number of sensors.† • Use at great depths (> 500 m). • Gain configurable (Low or High) • Filters configurable (38 and/or 50kHz)	30-60 KHz	18-22 mA	Yellow

Product reference	Name	Use case	Bandwidth (3 dB)	Typical current consumption	Cable*
NC-1-09 ‡	Active hydrophone (integrated preamplifier)	• **For use on a paravane only** • Vessel with normal level of noise (below -100 dBV). • Limited number of sensors.† • No filtering options. • Not used for positioning system	41-44 KHz	4-6 mA	Blue, heavy-duty

*Note that cables are colored according to the type of hydrophone: blue for passive, green for active narrowband and yellow for active wideband.

† Standard active hydrophones have an available bandwidth of 6kHz. So, if: (PRP_number * 100) + (NBTE_number * 800) < 6000 you have enough place. If: (PRP_number * 100) + (NBTE_number * 800) > 6000 then you need a wideband hydrophone.

‡ Add as NC-1-07 in the system web page.

Defining a Trawl Gear Type

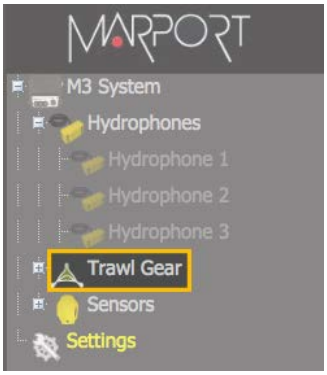
You need to define a type of trawl gear to be able to add sensors to the system.

About this task

Important: If you change the trawl gear type of an existing trawl, you will loose all settings you made for the sensors added to this trawl. You will have to add them back and create new pages.

Procedure

1. From the left side of the screen where the system is displayed, click **Trawl Gear**.



2. Select your type of trawl in the **Trawl Gear List**.

   A picture of the selected trawl gear is displayed, with the nodes (sensor locations) where sensors can be placed.

What to do next

Now you have chosen a type of trawl gear, you can define sensor locations on it.

Adding a Sensor

You need to add new sensors to the system.

Before you begin

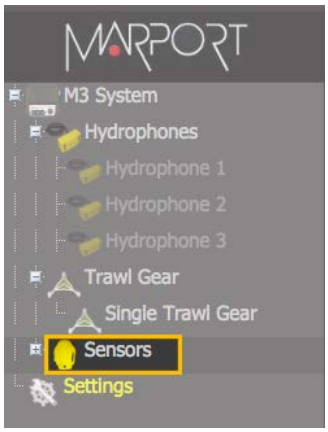
A trawl gear type is defined.

About this task

All sensors added to the system must be given a location, called nodes, on the selected trawl gear type. Nodes have numerical value between 1 and 999. See Trawl Gears and Sensor Locations on page 24 for illustration.

Procedure

1. From the left side of the screen where the system is displayed, click **Sensors**.



2. In the sensor selection page that appears, in **Product Category** select the main function of the sensor.
3. In **Product Name**, select the additional options that the sensor has.

   A picture with the nodes where sensors can be placed on the selected trawl gear is displayed.
4. In **Trawl Gear Location**, select a node location for the sensor. The list only displays nodes that have no sensor assigned. Refer to the picture to know to which node the number corresponds.
5. Click **Add Sensor**.

What to do next

You can now configure the settings of the sensor.

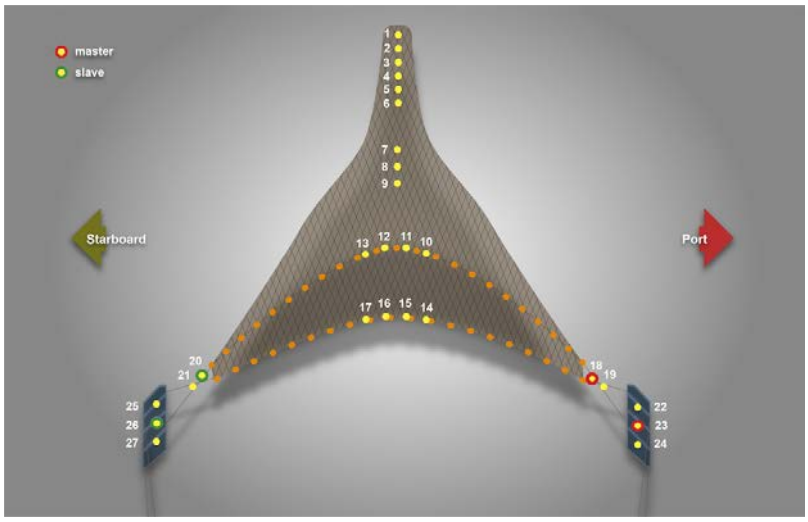
Trawl Gears and Sensor Locations

Sensor locations in the system are called nodes and have a numerical value between 1 and 999. The following pictures show the node locations on different types of trawl gear.

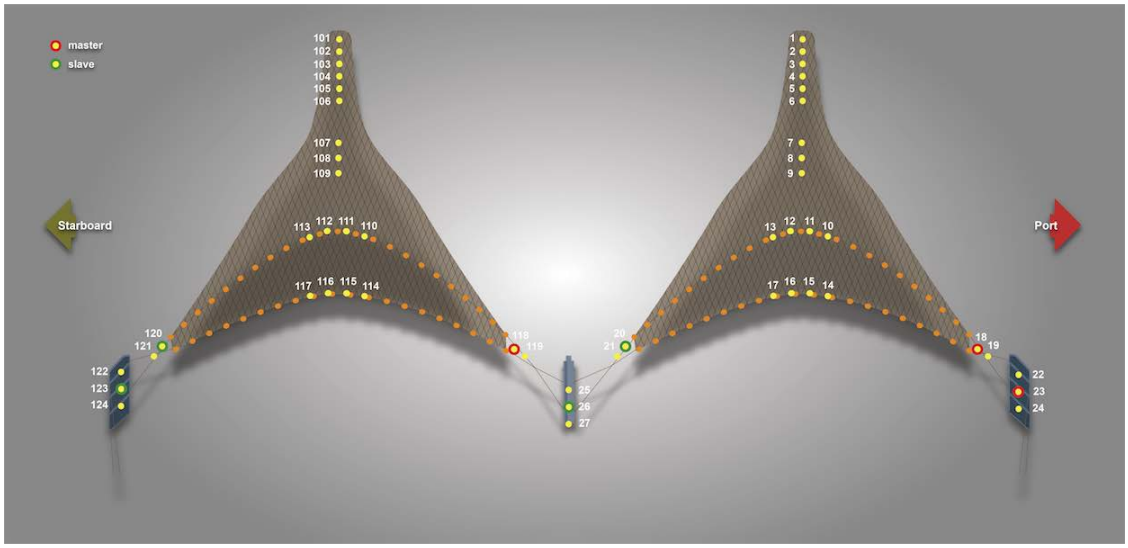
The nodes are displayed when defining sensor locations on a trawl gear in the system settings. When looking at sensors data in the control panels, each sensor will have its defined sensor location or node number shown next to its name.

You can refer to these pictures to know the location of the sensor.

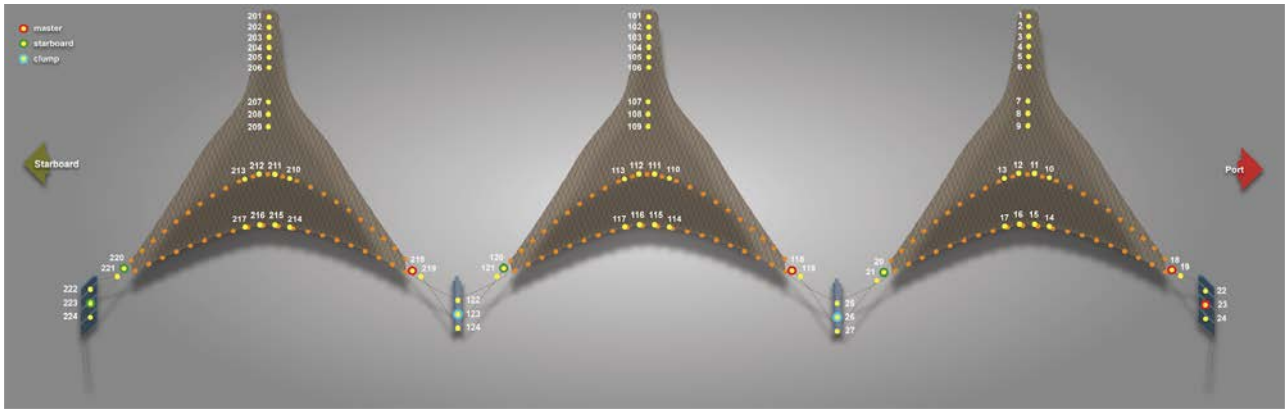
Single Trawl Gear



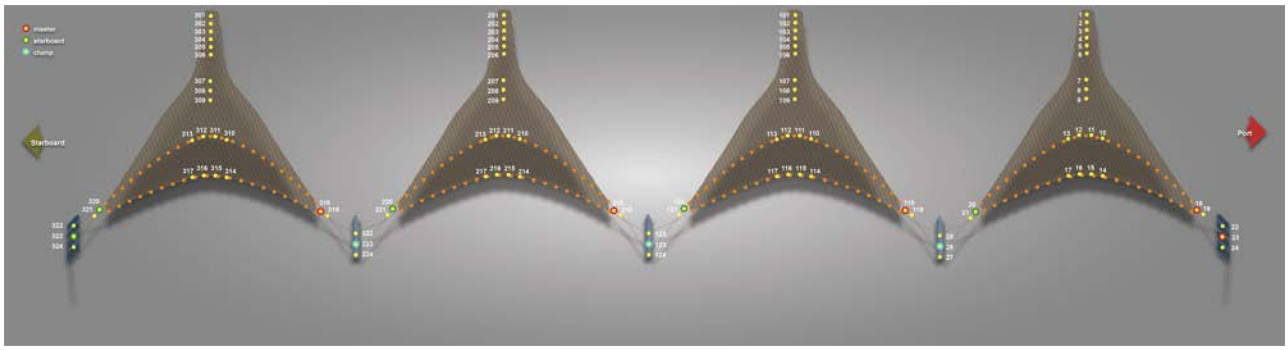
Twin Trawl Gear



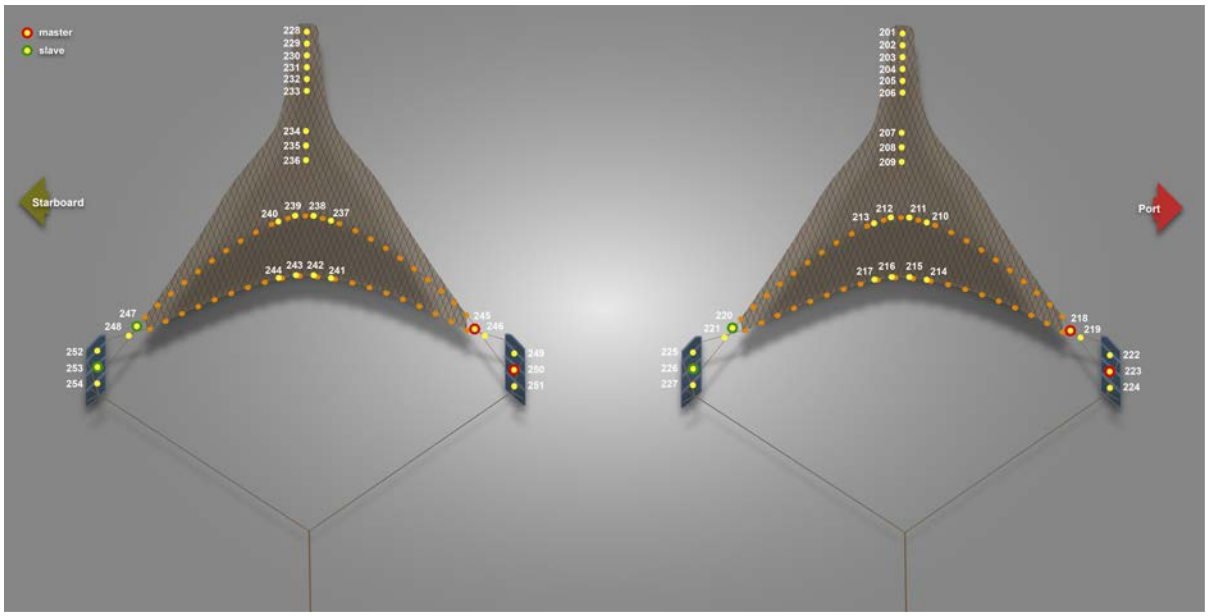
Triple Trawl Gear



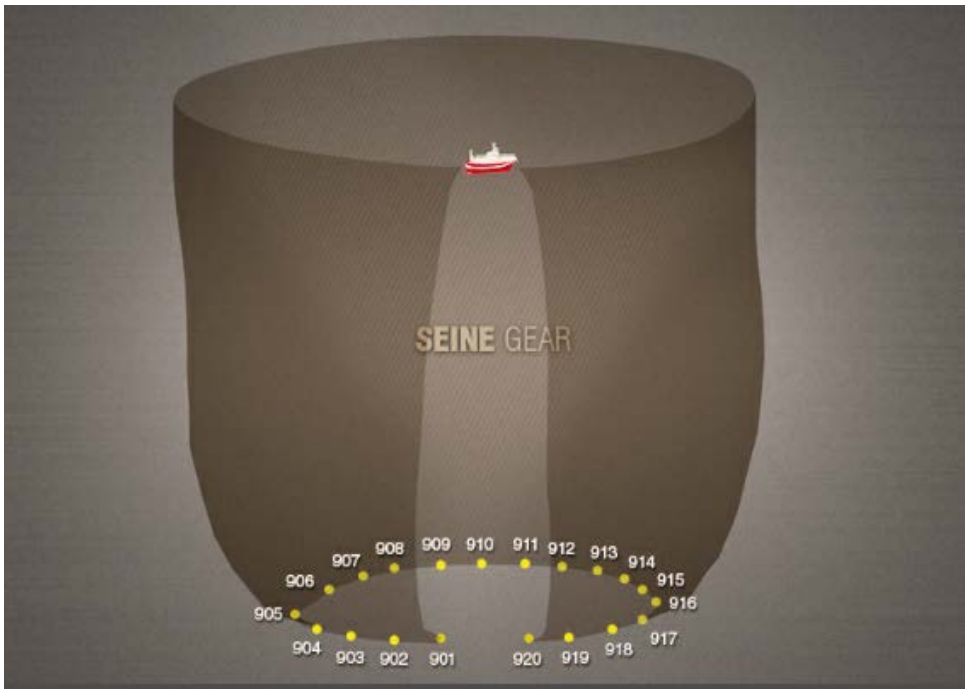
Quadruple Trawl Gear



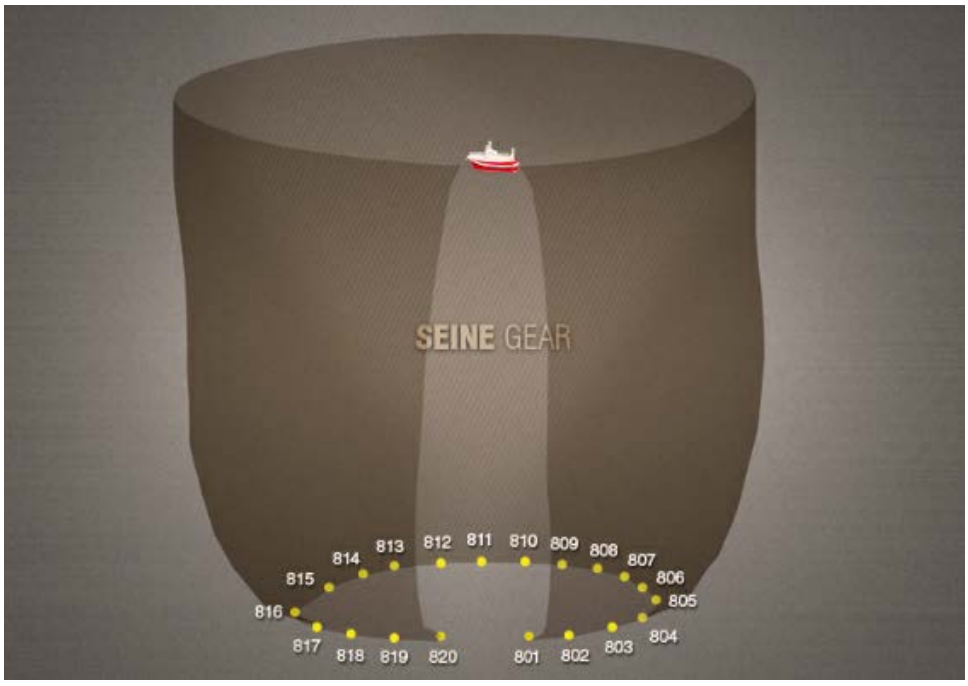
Twin Outrigger Trawl Gear



Port Seine Gear



Starboard Seine Gear



Configuring the Sensor Settings

You need to configure settings for the sensor when you add it to the system, such as its frequency or sounding range.

Before you begin

- A trawl gear type is defined
- A location is defined for the sensor

About this task

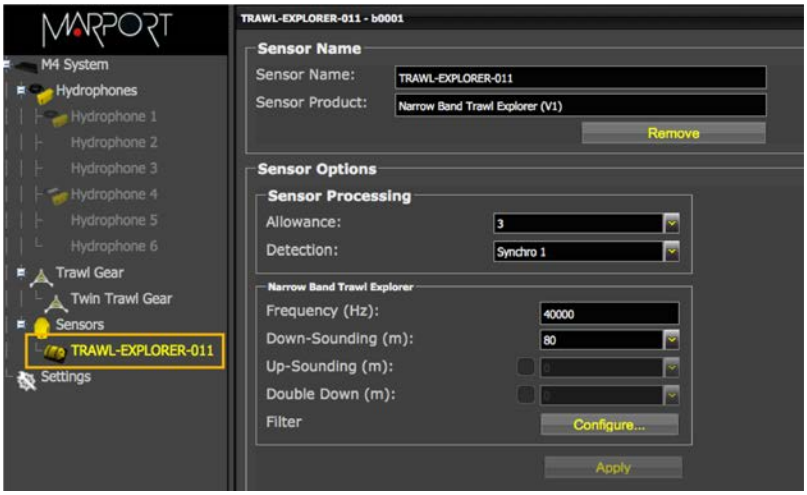
The settings you configure here depend on the type of sensor you have. Refer to your sensor's user guide to know the recommended settings.

Note: Before you add the sensor to the receiver on the system web page, using Scala or Firefox web browser, the sensor must be configured with Mosa2 application. Settings configured in Mosa2 need to be the same here (e.g. frequency, sounding range).

Procedure

1. From the left side of the screen where the system is displayed, click the name of the sensor you want to configure.

   The sensor setting page appears.



2. Fill in the settings.
3. To configure filters, see Applying Filters on Incoming Data on page 35.
4. Click **Apply** when you have finished.

Configuring Trawl Positioning System

When you have a system with door spread sensors with position data or slant ranges, you need to complete the positioning page to get accurate measurements of the door positioning.

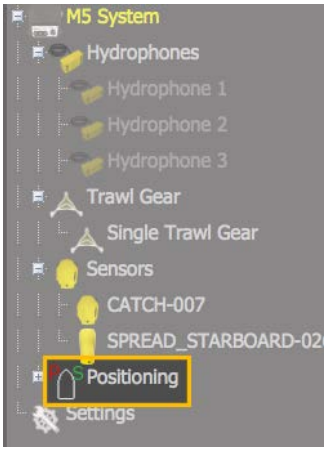
Before you begin

- Door sensors are already added and configured.

Tip: A spreadsheet is available on Marport support website to help you complete this page: go to the Useful Resources page.

Procedure

1. From the left side of the screen where the system is displayed, click **Positioning**.



The positioning configuration page appears.
The page is different depending on the receiver firmware version:

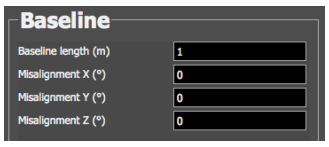
Figure 1: **Receiver firmware below version 08.01**

Figure 2: **Receiver firmware from version 08.01**

2. In **Baseline**, enter the baseline distance and the misalignment angles:

   a) Enter the distance between the two receiving hydrophones in **Baseline length**.

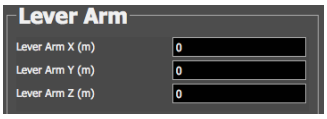
   b) **Receiver firmware below version 08.01:** You can complete the misalignment X and Z, for more accurate positioning. See Calculations for Positioning System on page 31. Otherwise, you can enter 0. Enter 0 for the misalignment Y.



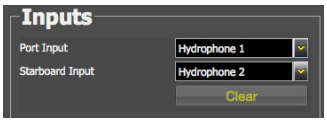
   c) **Receiver firmware from version 08.01:** Enter the misalignment angle shown on the drawing.

   Note: The baseline is very important to have accurate positions of the doors.

3. **Receiver firmware below version 08.01:** In **Lever Arm**, leave 0 in the fields.



4. In **Inputs**, enter the port and starboard hydrophones, according to the hydrophone configuration.



   Note: If you have not given a port/starboard location to hydrophones when configuring them, you need to go back to hydrophone configuration page.

5. **Receiver firmware below version 08.01:** In **Algorithm**, select **Compensate** if you entered misalignment values in **Baseline**.

6. Click **Apply**.

Calculations for Positioning System

When configuring the positioning system on the system web page (Scala receiver page), you must consider the position of the hydrophones. When they are misaligned, you can calculate their misalignment angles with the following calculations.

Tip: A spreadsheet is available on Marport support website to help you complete this page: go to the Useful Resources page.

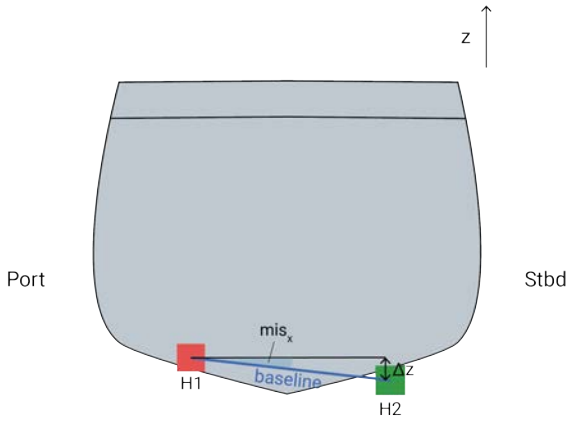
Note: Baseline length is the distance between two hydrophones. It must be in meters.

Receiver firmware below version 08.01: There are two misalignment angles that you should calculate. Misalignment Z is the more critical for correct positioning data. Make sure these calculations are correct if you enter them in Scala.

Receiver firmware from version 08.01: Calculate misalignment Z only.

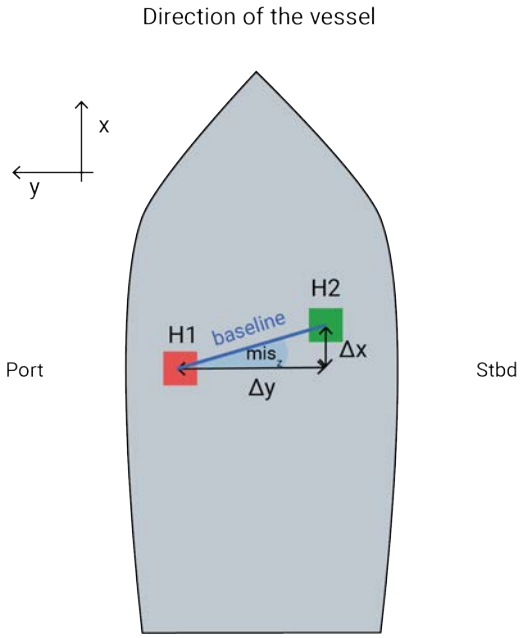
The drawings below show the misalignment angles and how to calculate them:

Misalignment X (angular offset around X axis)



$$mis_x = \arcsin\left(\frac{\Delta z}{BL}\right)$$

Misalignment Z (angular offset around Z axis)

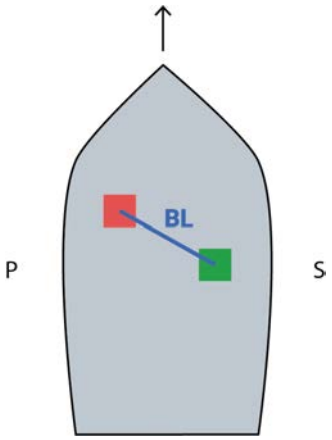


$$mis_z = \arctan\left(\frac{\Delta x}{\Delta y}\right)$$

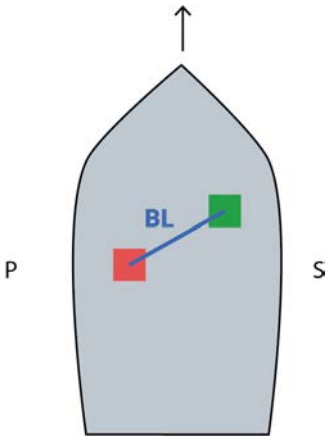
Sign of Angles

Once you have calculated X and Z misalignment angles from the above formulas, you need to add a positive or negative sign to the result. The sign depends on the offset of the hydrophones. Refer to the drawings below to know if you need to add a negative or positive sign to misalignment Z and X. The sign of the angles is important to receive correct positioning data.

Misalignment Z (view from above)

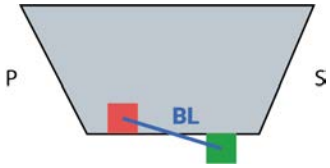


Negative sign (-)

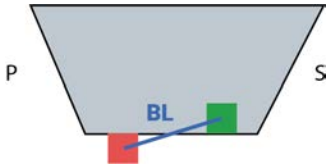


Positive sign (+)

Misalignment X (view from behind)



Negative sign (-)



Positive sign (+)

Exporting/Importing the Receiver Configuration

You can export and import a configuration you made for a receiver.

About this task

Important: You need to have **Java 7** version or lower to be able to import and export configuration settings via the system control panel on Firefox. Java version initially installed on the computer enables you to do it, but if you update Java version, you will not be able to import or export configuration settings.

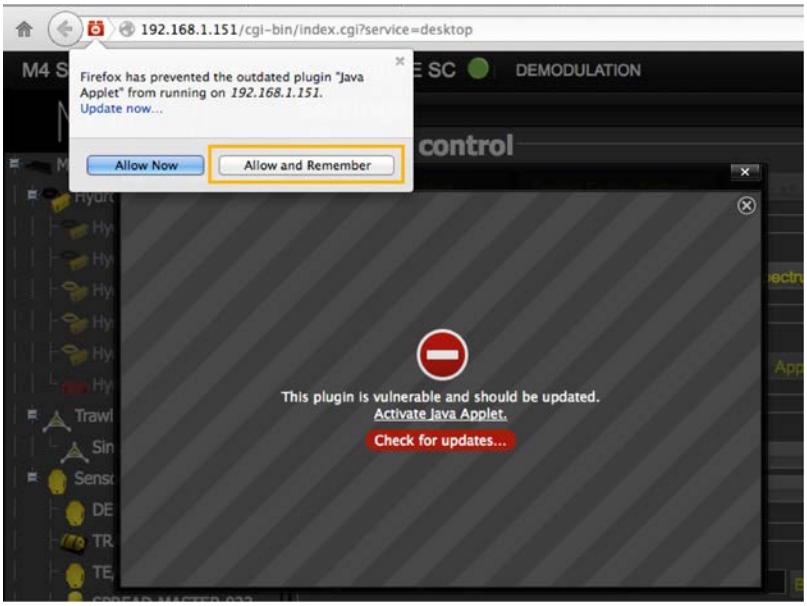
Procedure

1. Enter your receiver IP address in Firefox web browser to access the system control panel web page.
2. In the system view on the right side of the screen, click **Settings**.

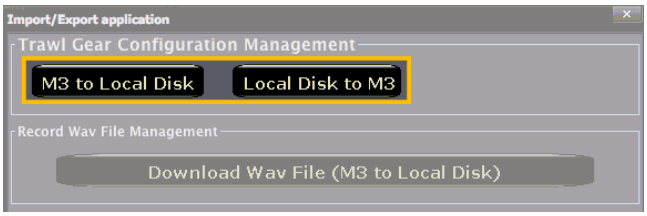
3. Click **Open Import/Export Application**.

Troubleshooting: If you cannot click on the items, it means your Java version is higher than version 7. This version is necessary for the correct functioning of the system web page. Refer to the support to downgrade Java version.

4. If you have the following message, click the red icon in the browser's address bar and click **Allow and Remember**, then **Run**. **Do not update Java**.



5. Click **Mx to Local Disk** to export a configuration file or **Local Disk to Mx** to import an existing configuration file.



When exporting your configuration, you get a *.M4F file. Use this file when importing the configuration.

Applying Filters on Incoming Data

You can apply filters on incoming data to reduce noise interferences.

In some cases acoustic signal sent by trawl sensors might be perturbed by environmental acoustic noise (on the trawl or around the boat) or interference with echo sounder systems installed on the boat hull.

Typically, these perturbations would be seen as isolated targets on echograms. In order that the user do not mix echogram targets coming from perturbations with real fish targets, it is possible to apply predefined filters.

Available filters depend on the type of sensor. You can customize filters and adjust their threshold values. The threshold will define how big a suspicious isolated target needs to be in order to be removed by the filtering.

Types of Filters

This table shows the filters available, as well as dependencies when some filters are set as active (in some cases they work in combination).

Data Filters

Filter	Definition	Filters Also Active
Min/Max	Removes data that is too high and not coherent with the maximum conditions of the vessel. This filter is particularly useful for depth or spread data.	None by default, but you can also select **Rate of Change**, **Some Smoothing** and **More Smoothing** in **Advanced** tab.
Rate of Change	Applies a limit of how fast data can change when sent and displayed on the user interface. It removes incoherent variations. It is useful on all data.	**Min/Max**
Some Smoothing	Smoothens data and prevents jumps in the display. This can add some delay to the information displayed. This filter is particularly useful on pitch/roll, spread, depth. It uses a Median filter to remove acoustic communication errors, and a Low-Pass filter to smoothen the form of the signal.	**Min/Max**, **Rate of Change**
More Smoothing	Filters at higher grade than **Some Smoothing**. Creates more delay and detail in data may be lost.	**Min/Max**, **Rate of Change**
Debounced 2/3/4	Only for catch sensors. Displays catch status as full when receiver has received 2, 3 or 4 "full" signals from catch sensor. You can also choose no filtering.	-

Echogram Filters

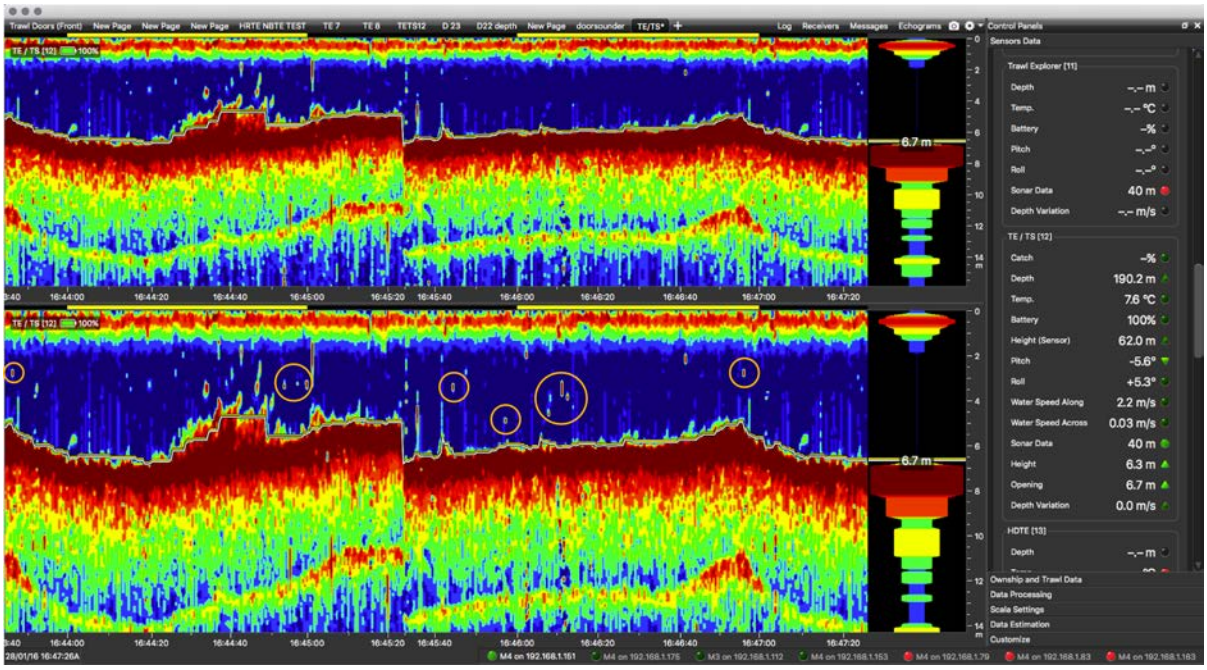
- **Signal Interference Reduction** (Low, Medium, High)
- **Echosounder Interference Reduction**
- **Echosounder and Interference Reduction** (Low, Medium, High)

Only for NBTE and HDTE echograms. They are used on the echograms of narrow band sensors and similar to **Some Smoothing** for sensors. They remove noise and interference from, for example, the vessel echo sounder.

Choose accordingly to the level of noise you have, and if you want to see more or less interferences on the echogram. For example, if you have a low level of noise you can choose **Echosounder Interference Reduction**. If you have a high level of noise, you can choose **Echosounder and Interference Reduction**. Then, adapt the level of filtering (low/medium/high).

Here are examples of the effects of filters on echograms:

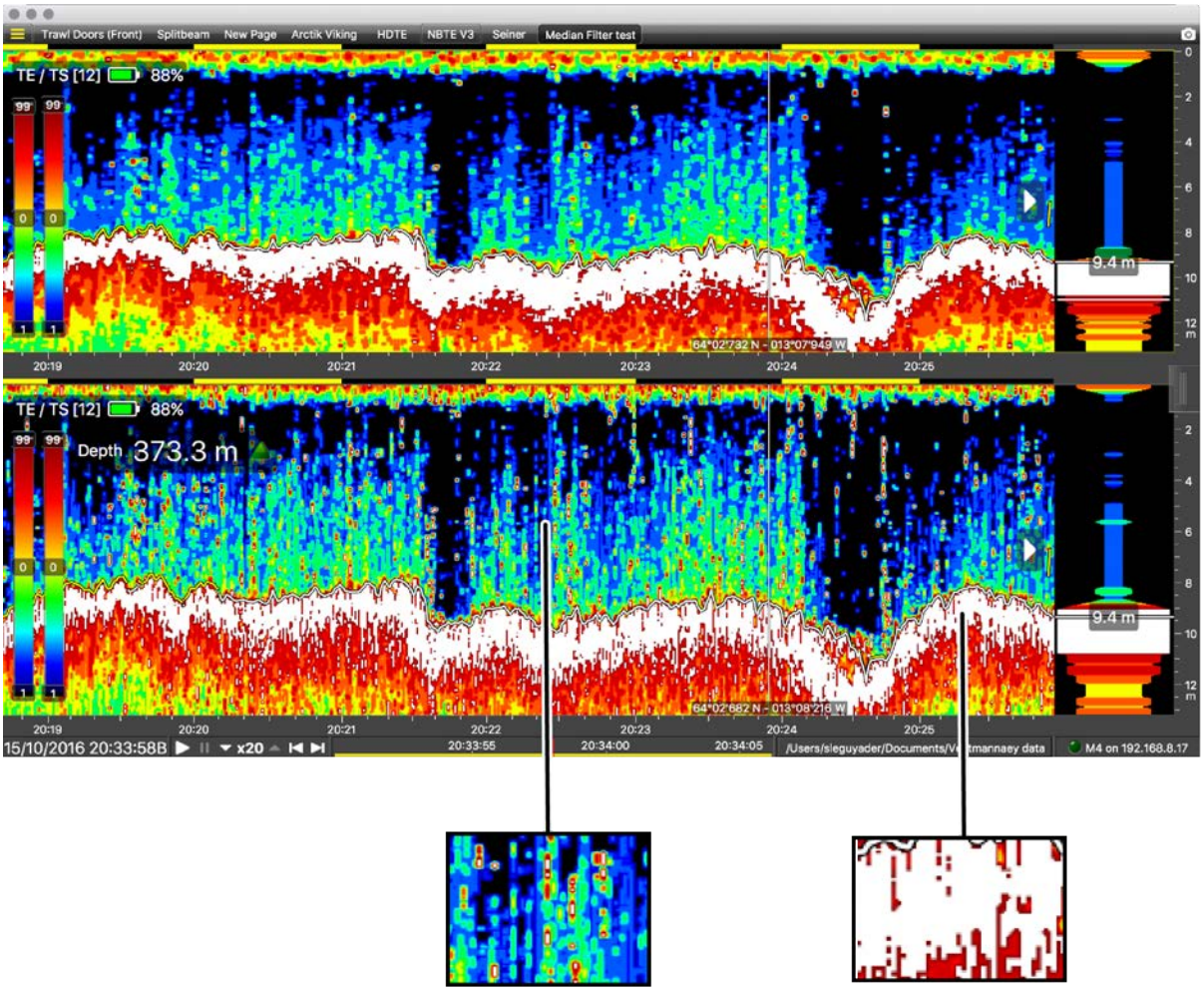
- **Echosounder Interference Reduction** Filter on a TE/TS echogram:



On the above picture, the top echogram has filtered data and the bottom echogram has raw data.

You can see on the second echogram that there are interferences due to an echosounder (circled in orange). These interferences are mostly removed when the **Echosounder Interference Reduction** filter is applied (first echogram).

- **Signal Interference Reduction Medium** Filter on a TE/TS echogram:



The echogram above has filtered data and echogram below has raw data.

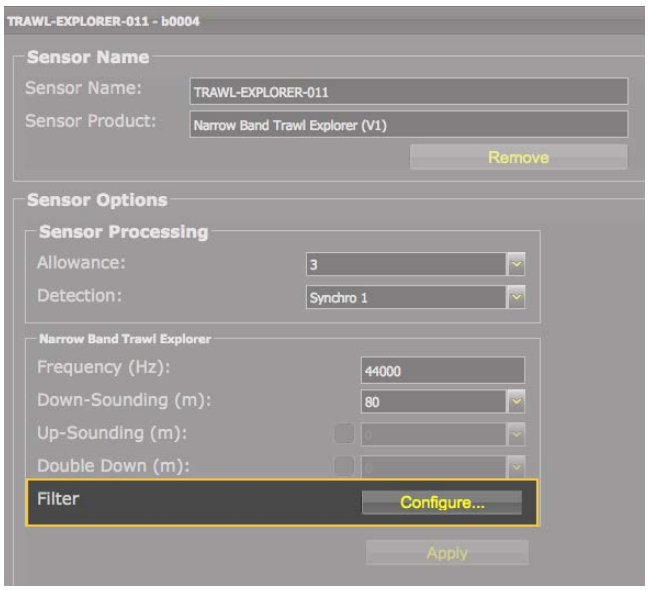
You can see on the second echogram small red points or lines in the water column and sea bottom that are interferences due to a noisy environment or to an echosounder. These interferences are mostly removed when **Signal Interference Reduction** filter is applied. The **Medium** level of the filter means data are moderately smoothed.

Applying Filters

You can apply different types of filters on sensor's incoming data.

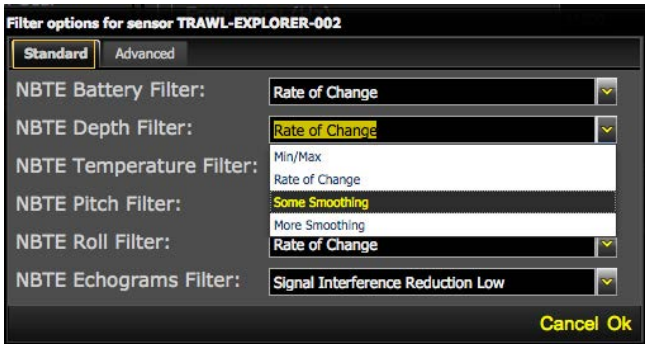
Procedure

1. Click **Menu** > **Expert Mode** .
2. Enter the password `copernic`.
3. Click **Menu** > **Receivers**.
4. Right-click the IP address of the receiver at the bottom of the page, then click **Configure Receiver**.
5. From the left side of the screen where the system is displayed, click a sensor, for example Trawl Explorer.
6. In **Sensor Options**, click **Configure** next to **Filter**.



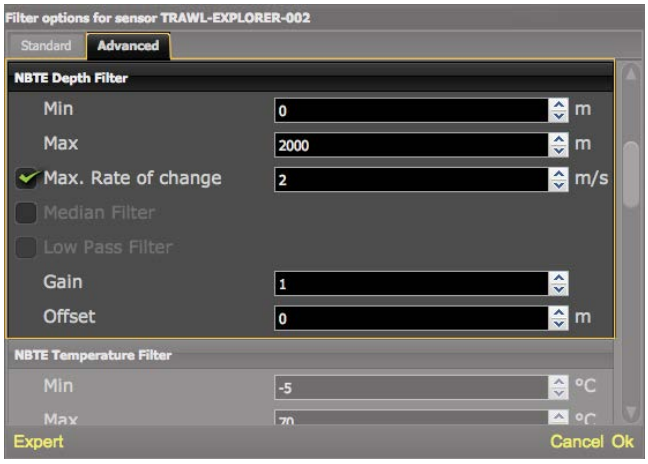
A panel listing available filters appears. The filters displayed depend on the functions of the selected sensor.

7. From the **Standard** tab, select filters for each function. See Types of Filters on page 36 for details about the filters.



8. To change the default threshold values for the filters, click **Advanced**.

   Functions are listed with their threshold values. Change them according to your need.



Adding NMEA Data from External Devices

You can display on Scala data received from external devices such as GPS, sonar, winch control system, compass or anemometer.

Before you begin

- Check the equipment from which you want to receive data to help you complete the parameters.
- Check that your version of Scala is able to read information sent by the device: see Compatible Incoming NMEA Sentences on page 131.

Procedure

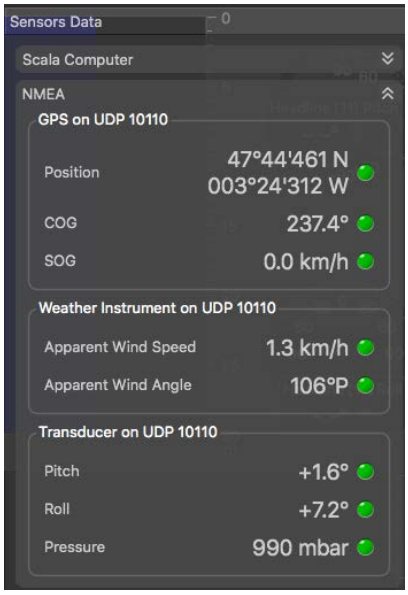
1. Click **Menu** > **Settings**.
2. Under the **NMEA Inputs** tab, click **Add**.

3. Choose the type of connection between serial port, UDP or TCP socket.
4. If using a serial port:
   a) In **Port**, select the incoming data you want to add.
   b) In **Baud**, choose the transmission speed (bit per second).
   c) Leave the other default parameters if you have no specific requirements.
   d) Select a different input format if you have Marelec or Rapp Marine/Rapp Hydema equipment. Otherwise, select **Standard NMEA format**.
   e) To broadcast the data received on this serial port to other equipment than Scala, select **Output to UDP**, then enter a port above 1000 and enter 255.255.255.255 to broadcast to all equipments, or enter a different subnet mask.
5. If using UDP:
   a) enter the port of the server sending data.
6. If using TCP:
   a) Enter the IP address of the server and the port.
   b) Select a different input format if you have Marelec or Rapp Marine/Rapp Hydema equipment. Otherwise, select **Standard NMEA format**.
7. Click **OK**.

Note: Minimum data requirements to have trawl positioning are: heading, GPS position, warp length and relative bearing angles from door positioning sensors.

Results

In the control panels, new data appears under **Sensors Data** > **NMEA**.



LEDs blink green when data is received (it may be steady green if data are received continuously). When communication with the NMEA devices is lost, LEDs do not blink anymore.

What to do next

Deactivate the Customize mode when you have finished customizing pages: click **Menu** > **Customize** again.

Receiving Warp Lengths from Scantrol

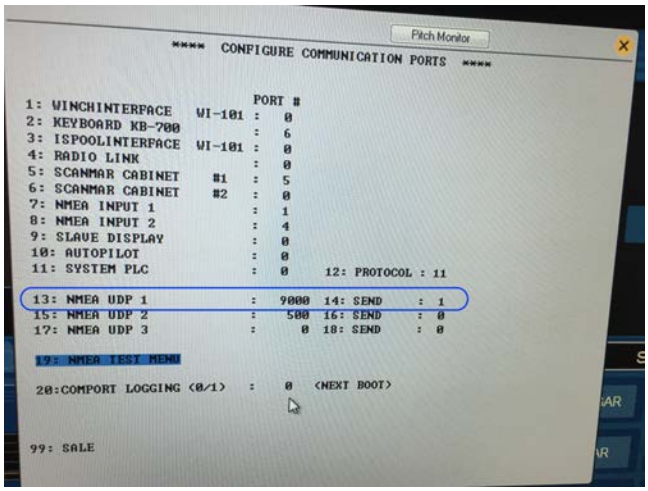
You can output warp length data from Scantrol iSYM Trawl Control application to Scala software.

About this task

Note: In this procedure, data are transmitted via a UDP port but a connection via a serial port can be possible.

Procedure

1. Scantrol and Marport computers must be connected together via an Ethernet wired network. Both computers must be on the same sub-network to communicate with each other: 192.168.0.XX.
   For example, the network IP address can be set at **192.168.0.10** on Scantrol computer and at **192.168.0.12** on Marport computer. The subnet mask address is 255.255.255.0 for both.
2. Go to iSYM's **Configure Communication Ports** menu, then in **13: NMEA UDP 1** enter a port number, such as `9000`, and set **SEND** to `1`.



   Note: The port number must be different from the one on which Scala sends data (if applicable).
3. In Scala, open the control panels then click **NMEA Inputs** > **Add input**.
4. Set a UDP connection and enter the corresponding port.

5. Clear the **Validate Checksum** checkbox.

   Important: If you do not clear this checkbox, you will not receive the data from Scantrol.

Results

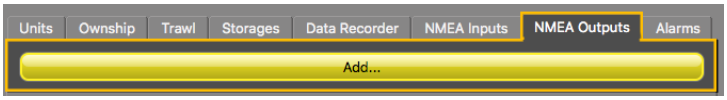
Scantrol data are displayed in Scala.

Outputting NMEA Data to Other Systems

You can send to other systems data you receive from sensors on Scala.

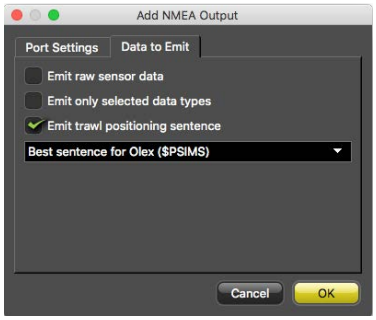
Procedure

1. Click **Menu** > **Settings**.
2. In the **NMEA Outputs** tab, click **Add**.



3. Choose the type of connection between serial port, UDP or TCP socket.
4. Enter the output parameters.
   - Serial port: select the name of the port and baud rate of the device.
   - UDP: enter the port number from which data are broadcast. Then, click the **Interface** menu to select the IP address of the connected device (refer to your network preferences).

     Note: The logical network interface (such as en0, en1) associated with the IP addresses differs from one computer to another. If doing the same installation on another computer, do not enter the same interface on purpose.
   - TCP: enter the port number from which data are sent.
5. Under the **Data to Emit** tab, select which data you want to output:
   - The first two options output data that are received on Scala from Marport sensors.
   - Select **Emit trawl positioning sentence** if you need to send positioning data to another system (such as a cartography software) and choose the sentence corresponding to this system.
   - In Scala Replay, select **Re-emit NMEA sentences** to send NMEA data (for example positioning data) to another software interfacing with Scala (such as a cartography software) in order to replay data that was recorded.



Note: Scala can output NMEA data for trawl door positioning with the following sentences:

- Scala 01.06.06 and later: $PSIMS (Olex), $PTSAL (MaxSea version 12), $PMPT (TimeZero)
- Scala 01.06.14 and later: adding $IIGLL (MaxSea version 12, single position sentence), $IITPT (Simrad)
- Scala 01.06.23 and later: adding $PTSAL (SeaPix)

See NMEA Outputs from Scala on page 140 for more details.

6. Click **OK**.

Displaying Trawl Positioning from Scala on Olex

You can export trawl positioning data coming from Scala to Olex software.

Before you begin

- Olex software version must be able to read **PSIMS** NMEA data.

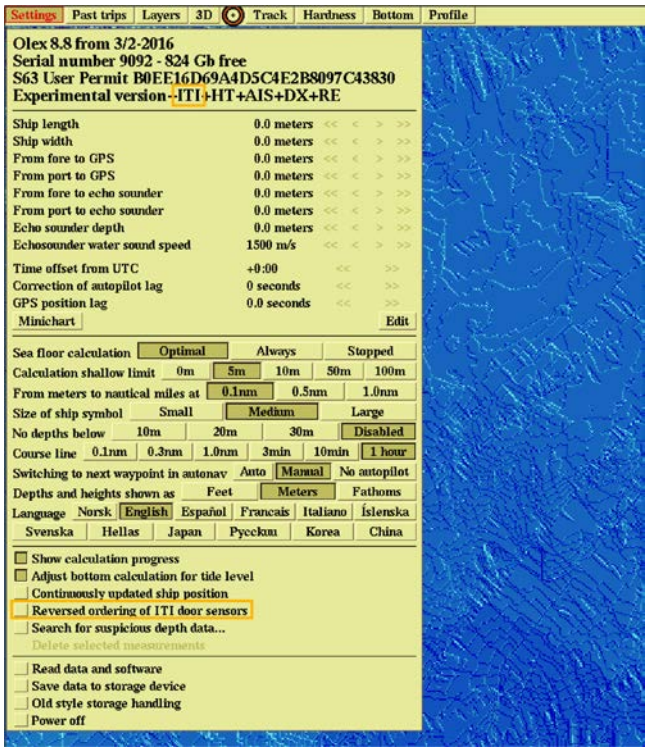
- Olex software must have the ITI option (displays net position).
- You must have a GPS and door positioning sensors.

Procedure

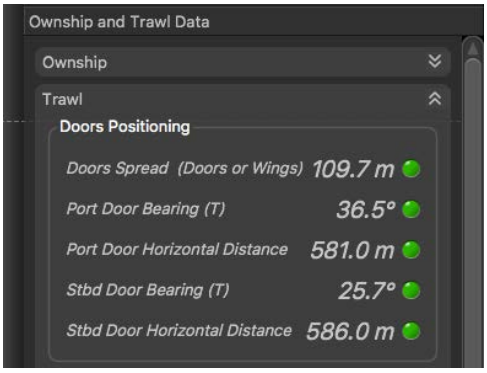
1. From Olex, click **Settings** and check:

   a) There is the **ITI** option. It allows the display of the trawl when positioning data from Scala is received.

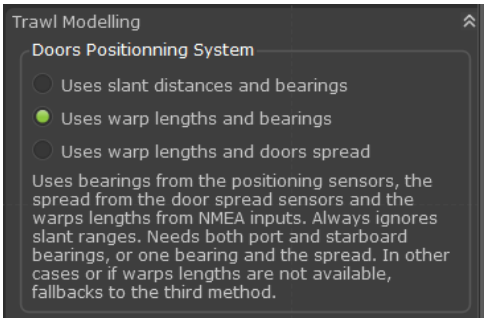
   b) The option **Reversed ordering of ITI door sensors** is **not** selected.



2. On Scala, in **Control Panels** > **Ownship and Trawl Data** > **Trawl** check that you receive **Door Positioning** data.

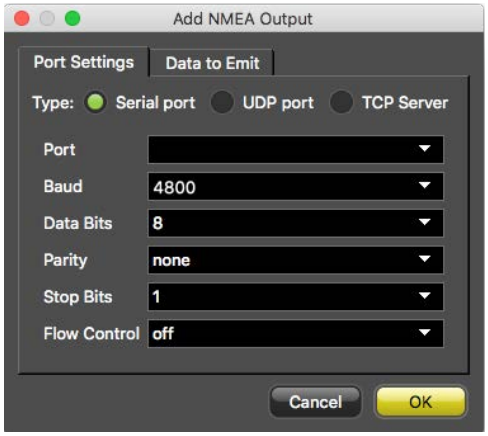


3. In **Control Panels** > **Data Processing** > **Trawl Modelling** > **Door Positioning System**, select **Uses slant distances and bearings** if using a Slant Range sensor or **Uses warp lengths and bearings** if using a Spread sensor.

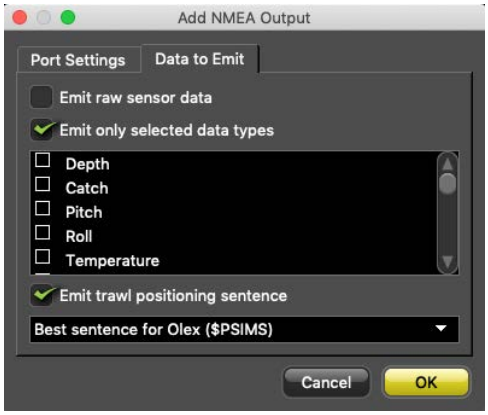


4. Connect a GPS to Scala and Olex.
5. Using a serial to USB cable, connect the USB end to the Mac computer and the serial end to a serial port on the Olex machine (ttyS0/1/2/3).
6. To configure the export of trawl positioning data from Scala:

   a) Click **Menu** > **Settings**.
   b) Under the **NMEA Outputs** tab, click **Add**.
   c) In **Port Settings**, select **Serial port** and enter a port name depending on your serial to USB cable, such as cu.usbserial. Enter a baud rate between 4800 and 57600 (Olex will automatically set the same rate if it is in Autoband mode).

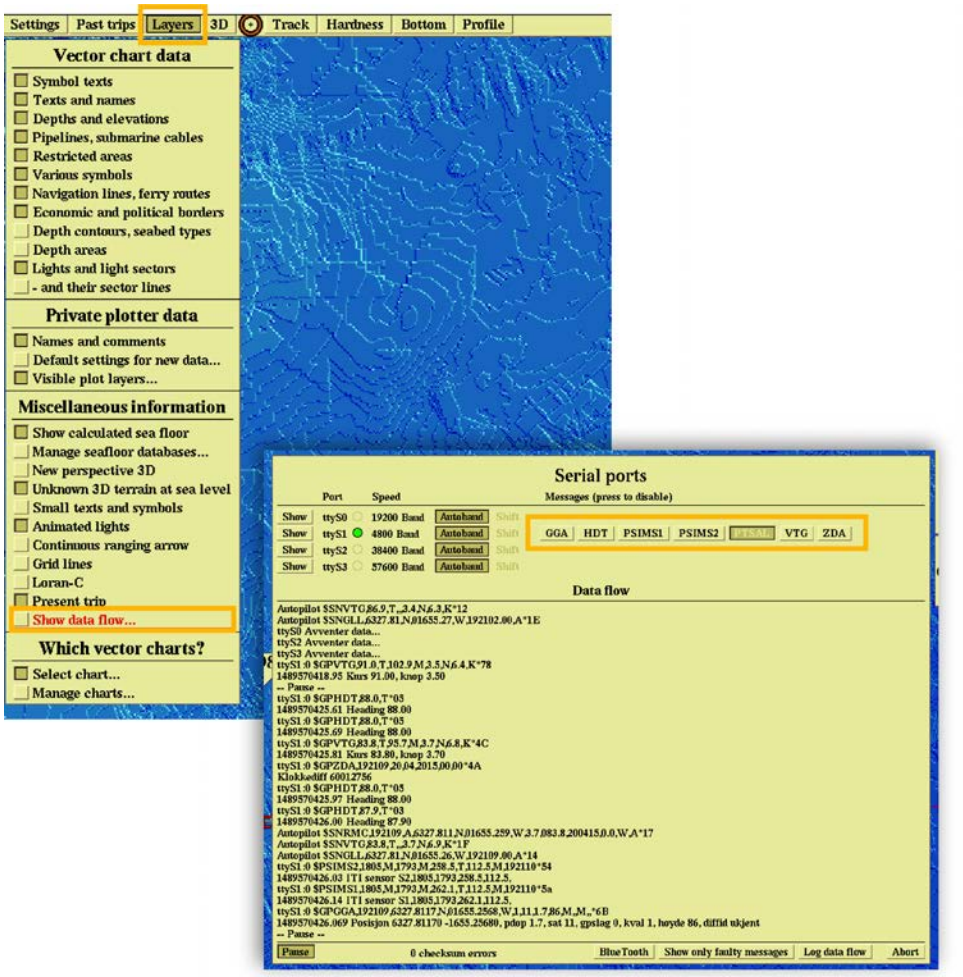


   d) In **Data to Emit**, select **Emit only selected data types** and deselect all the items. This is to make sure Scala do not output these data. If you do not do this, Scala outputs all data and this slows down Olex.
   e) Select **Emit trawl positioning sentence** and click **Best sentence for Olex ($PSIMS)**.



7. If you use a version of Scala older than v. 01.06.06, you cannot choose the sentence that is sent. PSIMS and PTSAL sentences are sent at the same time. This causes display issues on Olex, so you need to disable PTSAL sentences from Olex:

   a) From Olex, click **Layers** > **Show data flow**.
   b) In the list of sentences, click **PTSAL** to disable it.

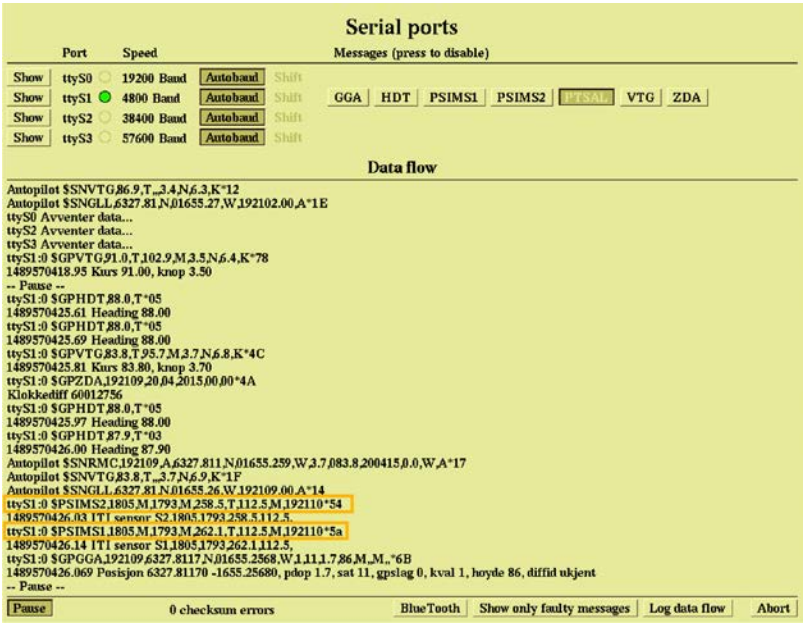


8. In **NMEA Outputs** in Scala, check that there is a green LED next to the created output.

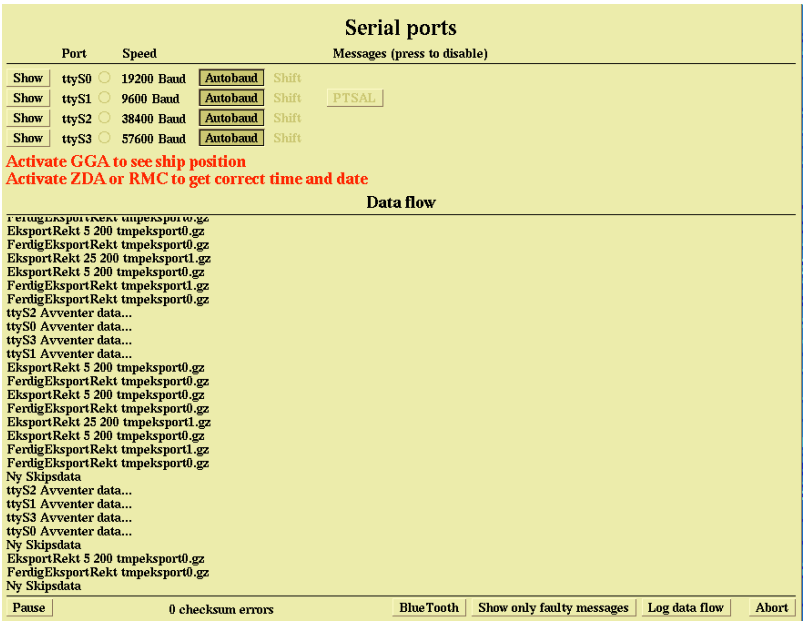
   Troubleshooting: If the LED is grey it means the port is not accessible. Check that you chose the correct port from the list of ports in **Port Settings**.

9. From Olex, check that you correctly receive data:

   a) Click **Layers** > **Show data flow**.
   b) In **Data Flow**, you can see the NMEA sentences that are received. Check if there are PSIMS1 and PSIMS2 sentences with correct data.

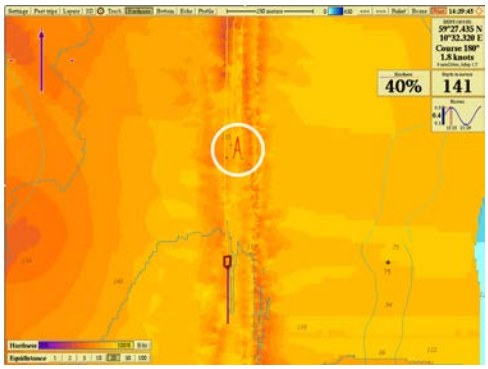


If Olex is not connected to Scala, no NMEA sentences are displayed.



Results

You can see the trawl position on Olex.



Displaying Trawl Positioning from Scala on MaxSea Version 12

You can export trawl positioning data coming from Scala to MaxSea v12 application.

Before you begin

- You must have a GPS and door positioning sensors.
- Compatible MaxSea version: **MaxSea version 12**.
- Compatible Scala version: Scala 01.06.06 (only PTSAL sentence) / Scala 01.06.14.

About this task

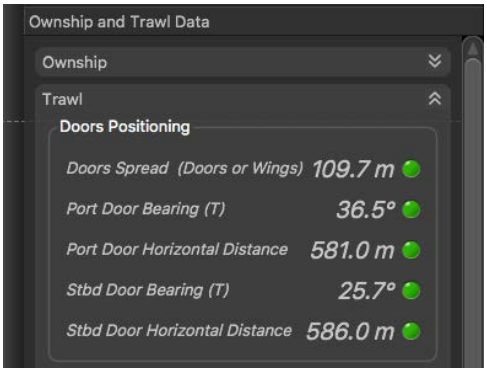
You can export trawl positioning data from Scala to MaxSea with PTSAL or IIGLL sentences. With PTSAL sentence you can display the trawl on MaxSea from the positions of trawl wings and center between both doors. With IIGLL you can display the trawl only from the position of the center between both doors. You cannot display a 3D view of the trawl when using IIGLL sentence.

To use PTSAL sentence, you need a good stability of heading values. If heading values are unstable, the trawl displayed in MaxSea will have erratic movements. If this is your case, use IIGLL instead, as it is more stable for trawl positioning.

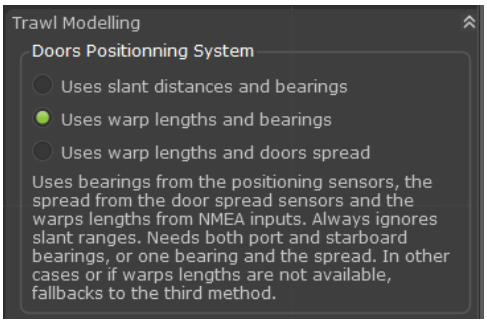
Note: Scala 01.06.06 Scala v.01.06.06 can only emit PTSAL sentence.

Procedure

1. On Scala, in **Control Panels** > **Ownship and Trawl Data** > **Trawl** check that you receive **Door Positioning** data.

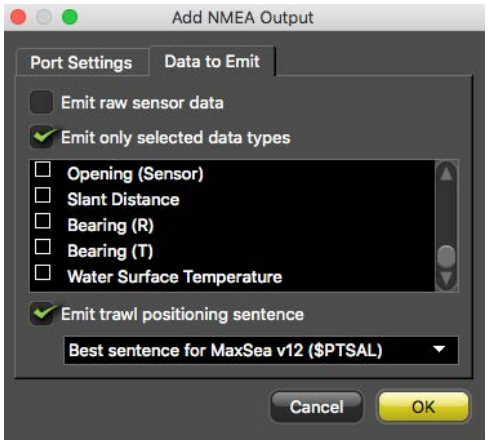


2. In **Control Panels** > **Data Processing** > **Trawl Modelling** > **Door Positioning System**, select **Uses slant distances and bearings** if using a Slant Range sensor or **Uses warp lengths and bearings** if using a Spread sensor.



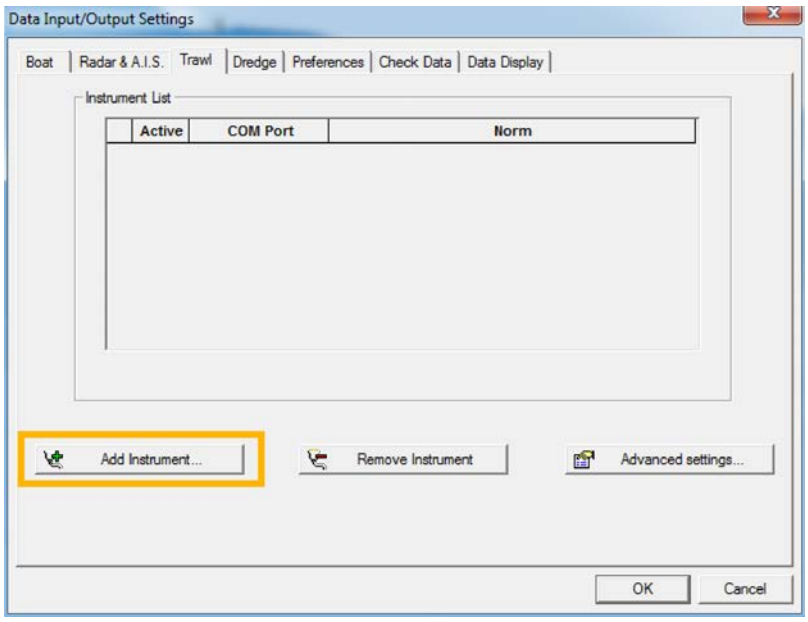
3. To configure the export of trawl positioning data:

   a) Click **Menu** > **Settings**.
   b) Under the **NMEA Outputs** tab, click **Add**.
   c) In **Port Settings**, depending on your installation select **Serial port** or **UDP port** and enter a port. If using a serial port, enter a baud rate of 19200 for PTSAL and 4800 for IIGLL to correspond with baud rates in MaxSea.
   d) In **Data to Emit**, select **Emit only selected data types** and deselect all the items.
   e) Select **Emit trawl positioning sentence** and choose between **$PTSAL** or **$IIGLL**.



4. To display the trawl when using PTSAL sentence, make sure that MaxSea receives heading data from **Boat** instruments. You can check from **Data Display**.
5. To configure **Trawl** parameters:

   a) In **Data Input/Output Settings**, click the **Trawl** tab.
   b) Click **Add instrument**.

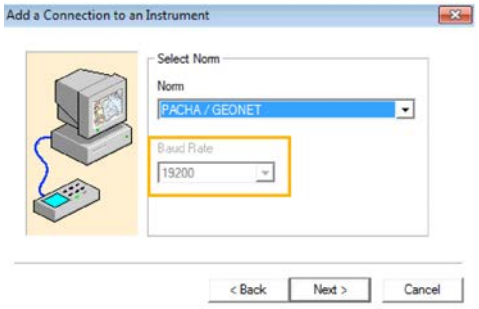


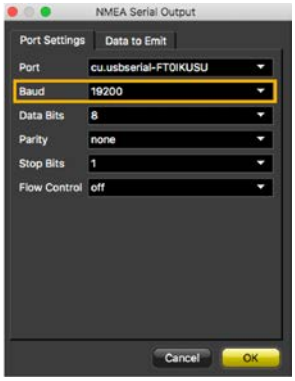
c) Put the same port as configured on Scala.

d) Click **Next**.

e) If using PTSAL sentence select **PACHA/GEONET** and if using IIGLL select **Simrad ITI**.

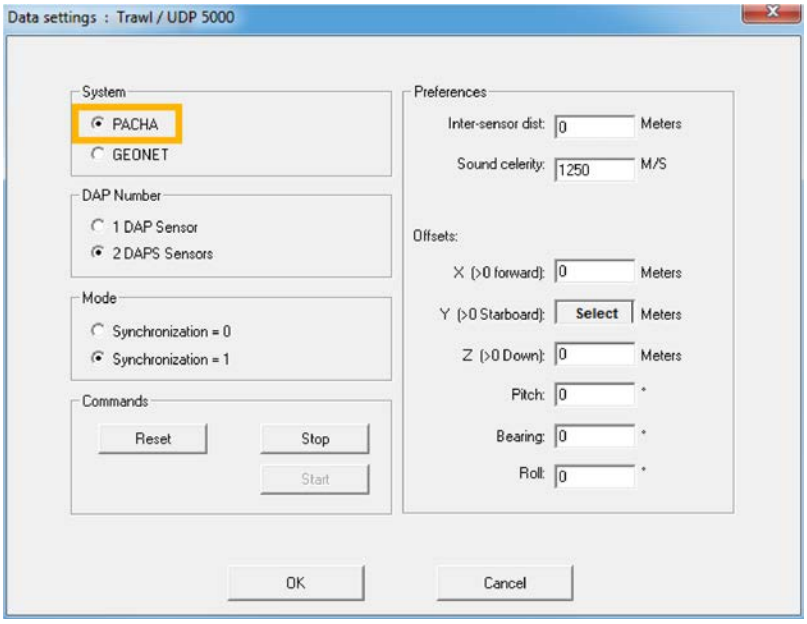
f) You cannot change the baud rate from MaxSea. If using a serial port, make sure you put the same baud rate in Scala.





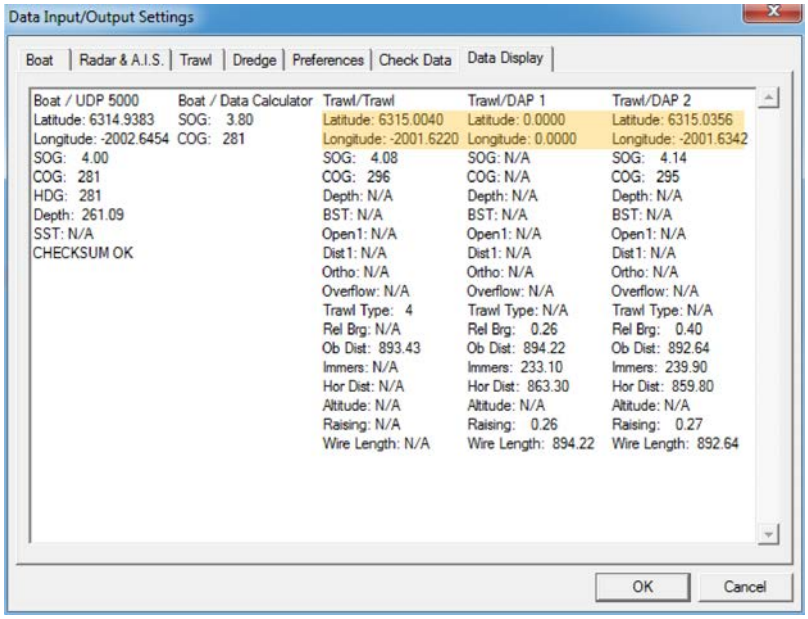
g) Click **Finish**.

6. **If using PTSAL sentence**, click **Boat** > **Advanced Settings** and in **System**, select **PACHA**.

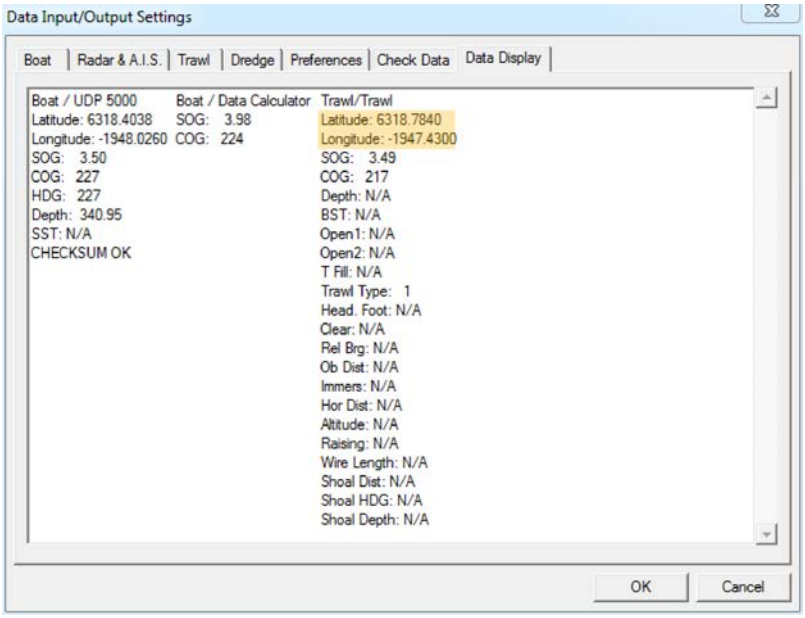


7. Click the **Data Display** tab and check that you see:

- For PTSAL sentence, 3 trawl positions with latitude and longitude data.



- For IIGLL sentence, 1 trawl position with latitude and longitude data.



8. To check incoming data:

a) Click the **Check Data** tab.

b) Select the port.

c) Click **Display**.

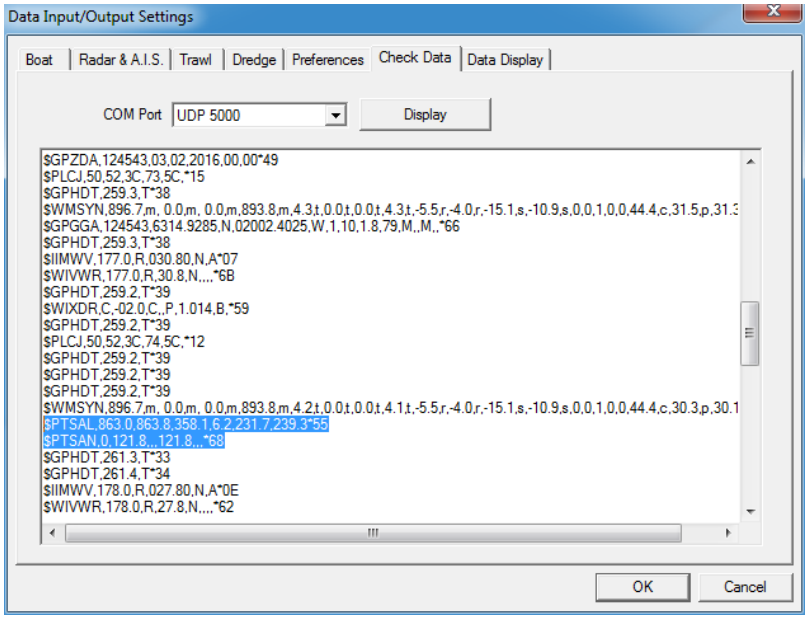
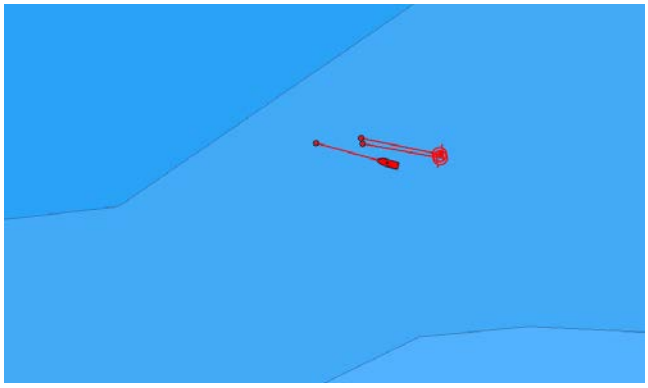


Figure 3: Example of incoming PTSAL sentence

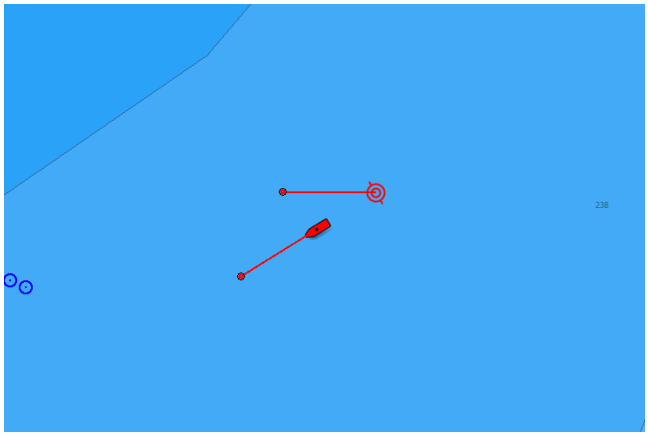
Results

From MaxSea, you should see the trawl behind the boat.

With a PTSAL sentence, there are 3 points corresponding to the location of the 2 trawl wings and of the center between the doors. The 3 lines are the headings of the wings and doors.



With a IIGLL sentence, there is 1 point, corresponding to the center between the doors. The line corresponds to its heading.



Displaying Trawl Positioning from Scala on MaxSea TimeZero

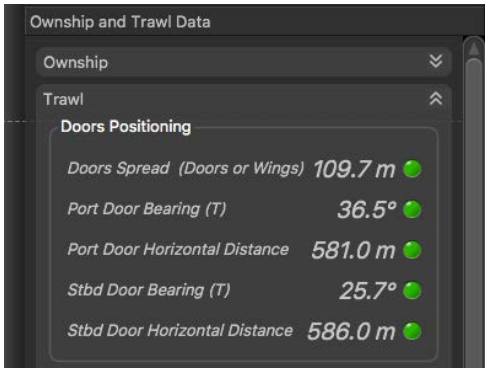
You can export trawl positioning data coming from Scala to MaxSea TimeZero application.

Before you begin

- You must have a GPS and door positioning sensors.
- Compatible MaxSea TimeZero version: TimeZero Professional v3.
- Compatible Scala version: Scala 01.06.06 and later

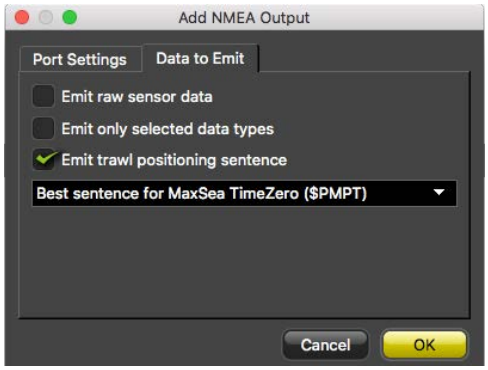
Procedure

1. On Scala, in **Control Panels** > **Ownship and Trawl Data** > **Trawl** check that you receive **Door Positioning** data.



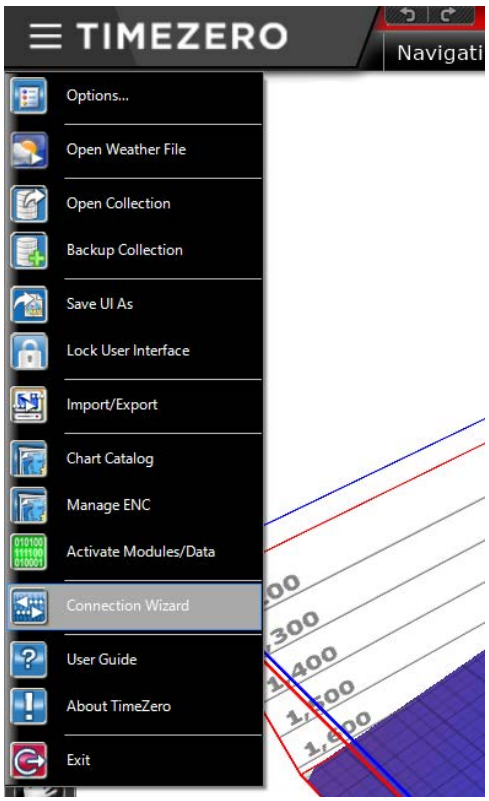
2. To configure the export of trawl positioning data:

   a) Click **Menu** > **Settings**.
   b) Under the **NMEA Outputs** tab, click **Add**.
   c) Under **Port Settings**, depending on your installation select **Serial port** or **UDP port** and enter a port.
   d) Under **Data to Emit**, select **Emit trawl positioning sentence** and choose **Best sentence for MaxSea TimeZero ($PMPT)**.

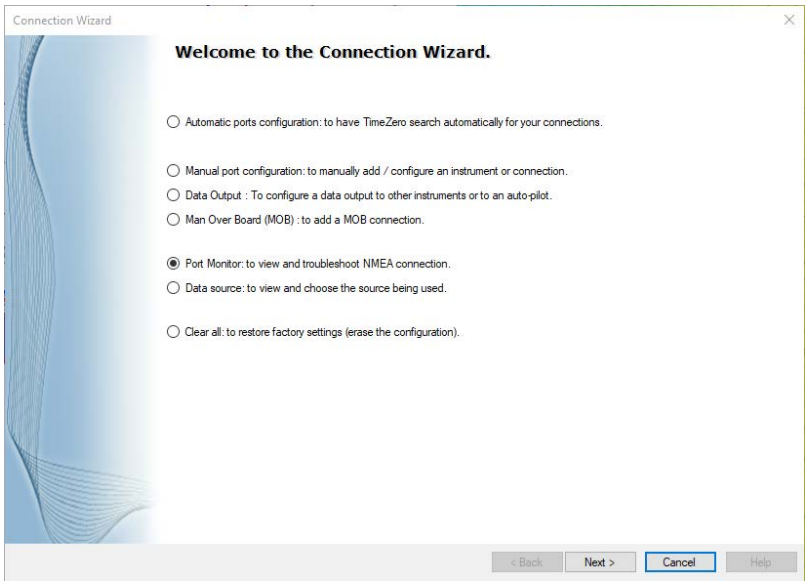


3. From TimeZero, check that you receive NMEA data from Scala and data from a GPS:

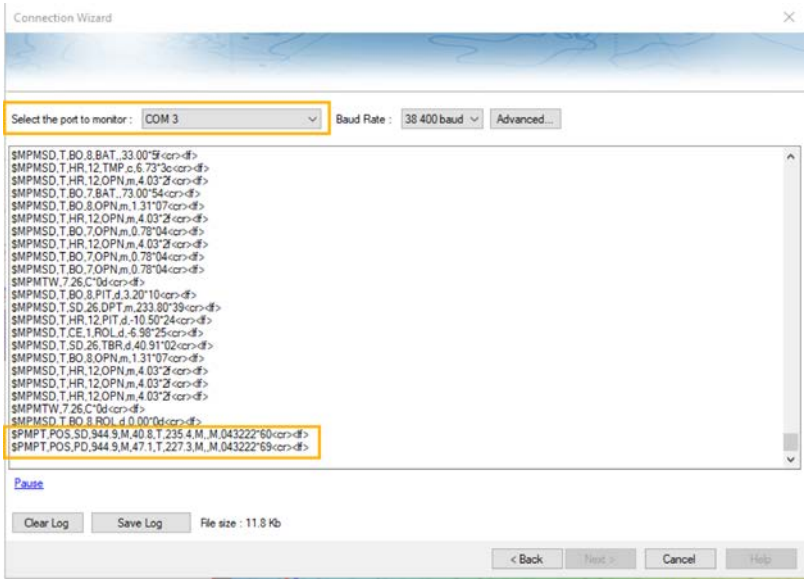
   a) From TimeZero, click **TIMEZERO menu** > **Connection Wizard**.



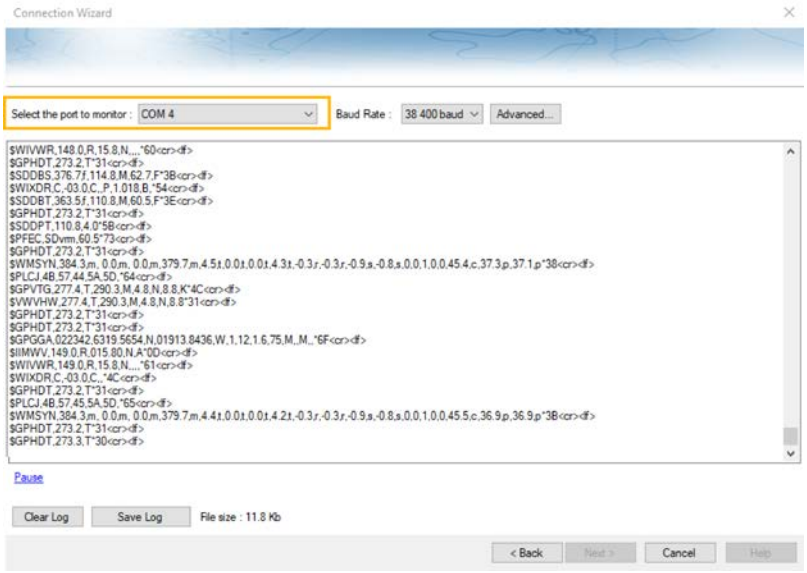
b) In the connection wizard, select **Port Monitor**.



c) Select the port of the NMEA data. You should see Marport NMEA positioning data ($PMPT).



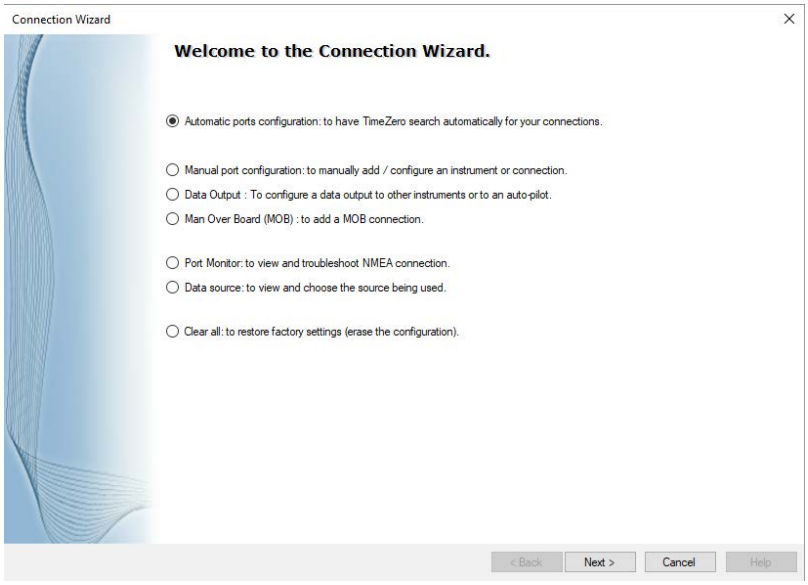
d) Select the port of the GPS. You should see incoming data.



4. To add these data to TimeZero chart:

   a) From TimeZero, click **TIMEZERO menu** > **Connection Wizard**.

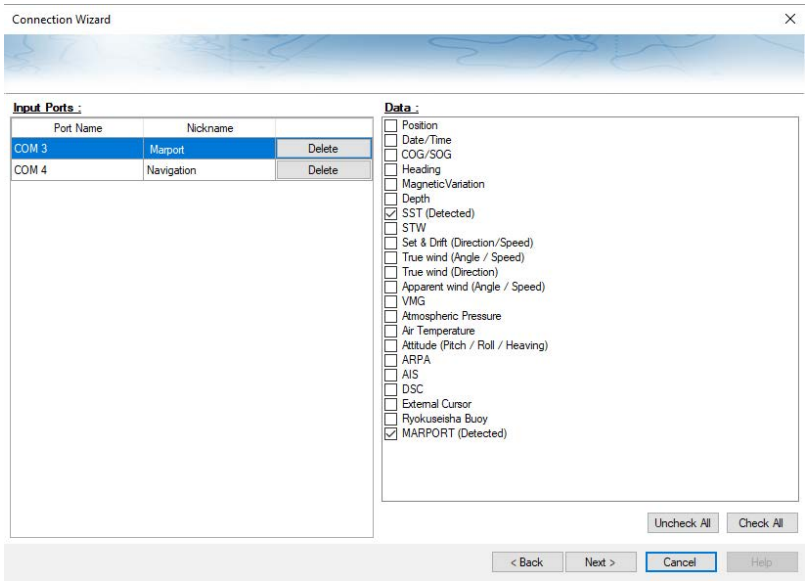
   b) Select **Automatic ports configuration**.



The wizard analyzes the system and search for incoming data. When the search is complete, it shows a list of ports where devices are connected and data they transmit.

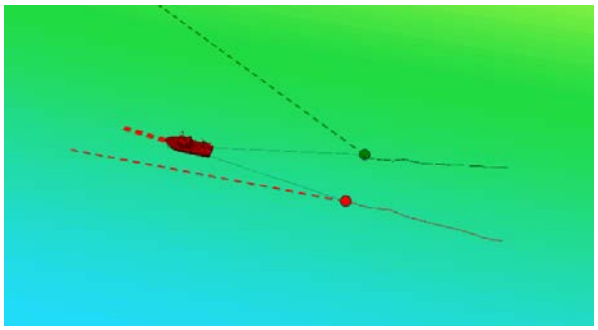
c) Check if the ports and data are correct. You should at least have a GPS device and Marport NMEA data.

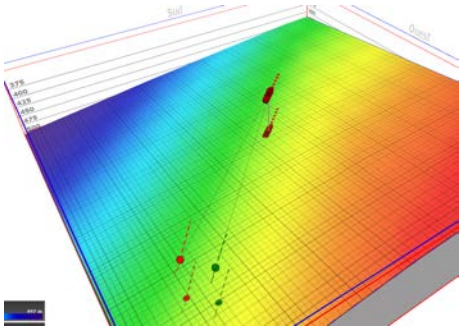
d) From **Nickname** enter a name for the ports to easily recognize them.



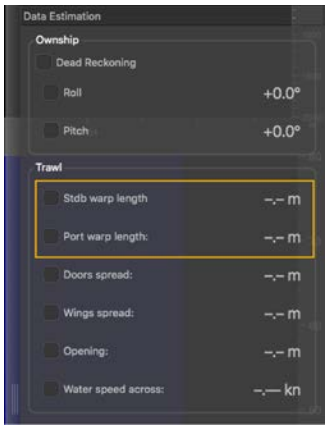
e) Follow the instructions from the wizard.

5. From TimeZero chart, check that you see the trawl behind the vessel.





Trouble: If you see the trawl on Scala chart view whereas it is not in water and you do not see it on TimeZero: from Scala, open the control panels and go to **Data Estimation**. Check that **Stdbd warp length** and **Port warp length** are **not** selected.



Displaying Trawl Positioning from Scala on SeapiX

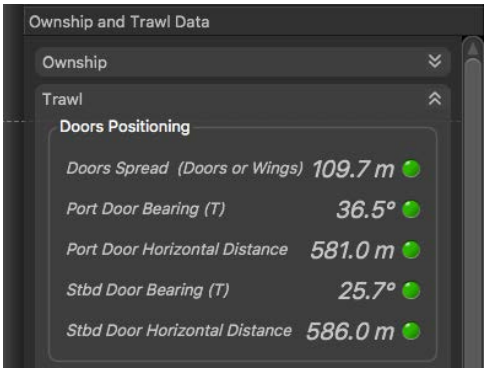
You can export trawl positioning data coming from Scala to SeapiX application.

Before you begin

- You must have a GPS and door positioning sensors.
- Documented SeapiX version: version 8.6.0
- Compatible Scala version: Scala **01.06.23** and later

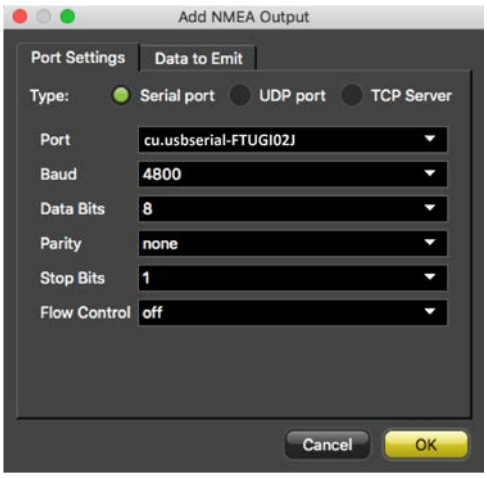
Procedure

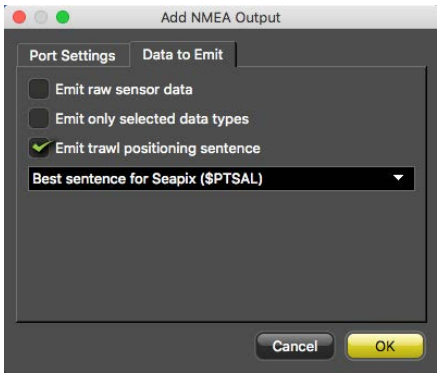
1. On Scala, in **Control Panels** > **Ownship and Trawl Data** > **Trawl** check that you receive **Door Positioning** data.



2. To configure the export of trawl positioning data:

   a) Click **Menu** > **Settings**.
   b) Under the **NMEA Outputs** tab, click **Add**.
   c) In **Port Settings**, depending on your installation select **Serial port**, **UDP port** or **TCP Server** and configure the port.
   d) In **Data to Emit**, select **Emit trawl positioning sentence** and select **Best sentence for Seapix ($PTSAL)**.

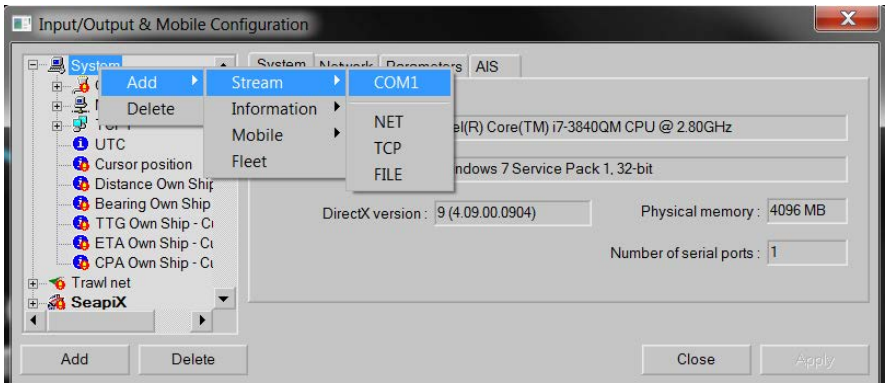




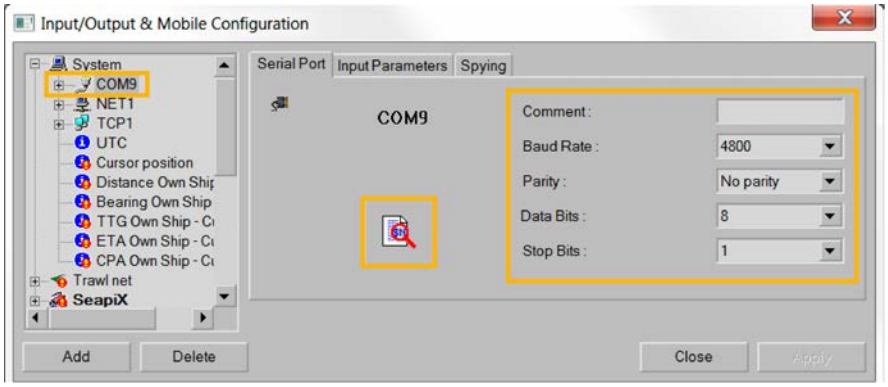
3. From SeapiX, add the communication port used to receive NMEA from Scala:

a) In the menu bar, click **System** > **Settings** > **I/O and Mobiles** > **Input/Output & Mobile Configuration**.

b) In the left panel, right-click **System** and select **Add** > **Stream**, then choose a port between serial (COM), UDP (NET) or TCP.



c) To configure the port, click its name in the left panel. Make sure the baud rate is the same as in Scala.

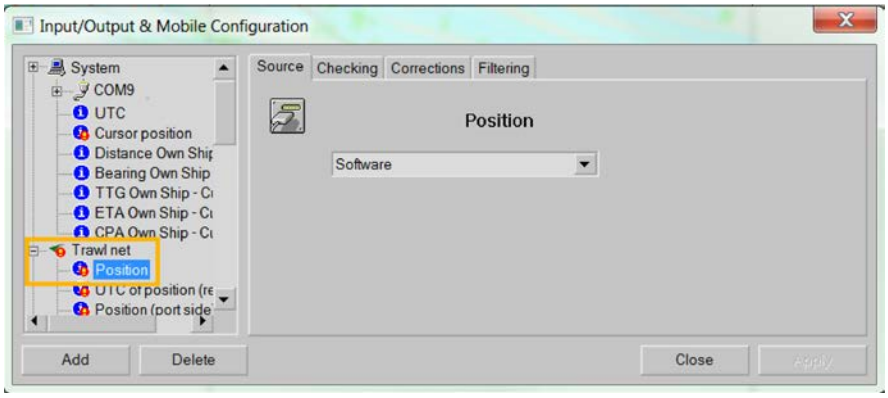


Once you have configured the input from Scala (next step), you can click the magnifying glass to see incoming data.

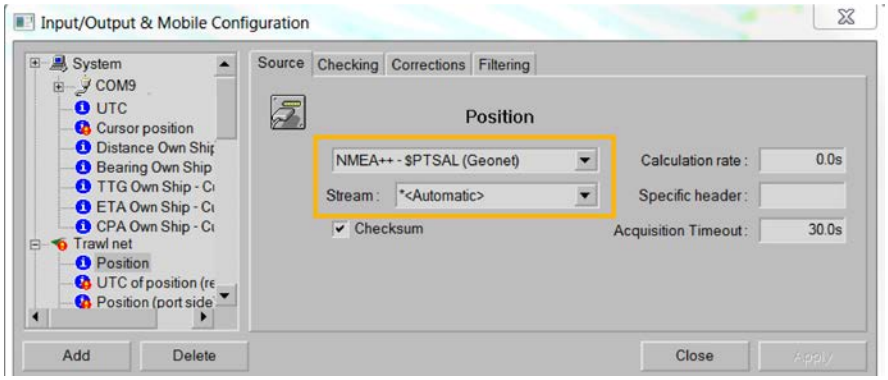
4. Configure the input of positioning NMEA sentences received from Scala:

a) In the menu bar, click **System** > **Settings** > **I/O and Mobiles** > **Input/Output & Mobile Configuration**.

b) In the left panel, click **Trawl net** > **Position**.



c) Under the **Source** tab, select **NMEA++-$PTSAL (Geonet)**.

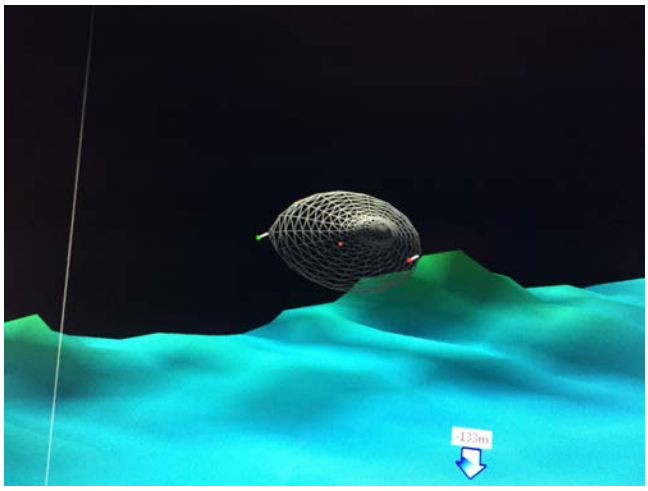


d) From **Stream**, select the port connected to Scala or select **Automatic** to automatically find the port.

e) You do not need to change the other settings.

f) Under the **Checking** tab, you can check if the system understands the sentences it receives.

5. When the trawl is in water, check on SeapiX chart view that you see the trawl with markers. Port door is in red and starboard in green.



Outputting Scala Symmetry Data to Scantrol

You can output across speed data from Scala to Scantrol iSYM application.

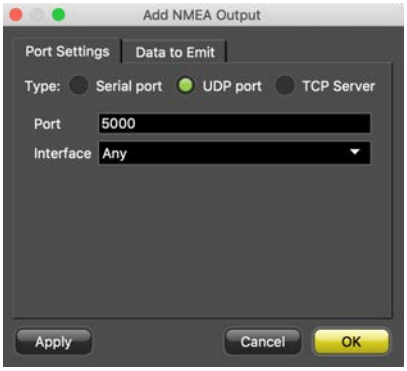
Before you begin

- You need to have iSYM version 3.5.10 (beta version) and above
- Make sure you have a license to use Marport software with Scantrol.

Procedure

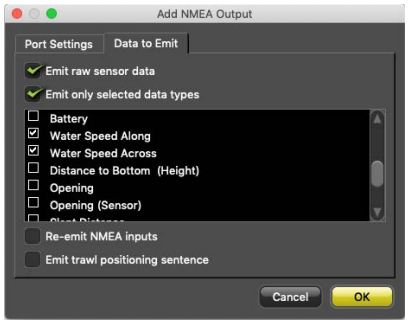
1. Scantrol and Marport computers must be connected together via an Ethernet wired network. Both computers must be on the same sub-network to communicate with each other: 192.168.0.XX.
   For example, the network IP address can be set at **192.168.0.10** on Scantrol computer and at **192.168.0.12** on Marport computer. The subnet mask address is 255.255.255.0 for both.
2. In Scala, go to **Settings** > **NMEA Outputs**.

3. In **Port Settings**, select **UDP port**.
4. Enter a port number, for example `5000`, and leave **Interface** at **Any**.

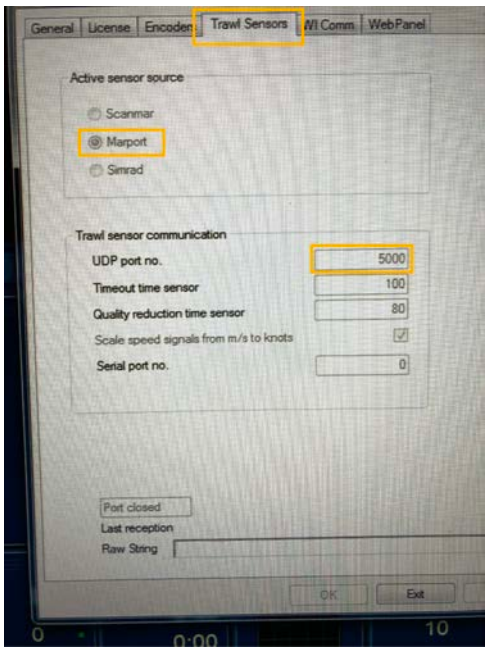


Note: The port number must be different from the one on which Scantrol data are received (if applicable).

5. In **Data to Emit**,
   a) Select **Emit raw sensor data**.
   b) Select **Emit only selected data types**, then select **Water Speed Along** and **Water Speed Across**.



6. Go to iSYM's **System Settings**.
7. Go to **Trawl Sensors** tab, then select **Marport** in **Active sensor source**.
8. Configure the communication settings in **Trawl sensor communication**. Enter the same port you set in Scala.



Note: **Port closed** mention at the bottom of the window does not impact the configuration and should be ignored.

Tip: If you need to test the NMEA connection but the sensors are not in water: configure the same output settings in Scala Replay, then replay SDS files containing positioning data.

Displaying Bathymetric Data from GEBCO Database

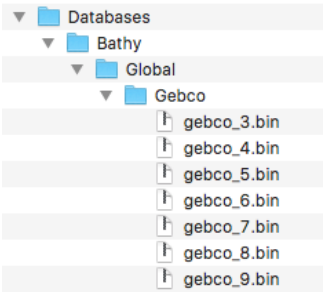
You can display bathymetric data coming from GEBCO database on the 3D overview of the vessel.

Before you begin

- You must have Scala Full dongle.
- You need to have incoming data from a GPS (position, heading)
- You need to have specific GEBCO files. Ask your local Marport office to get them.
- GEBCO files use approximately 5.7 GB of space, make sure you have enough space on your computer.

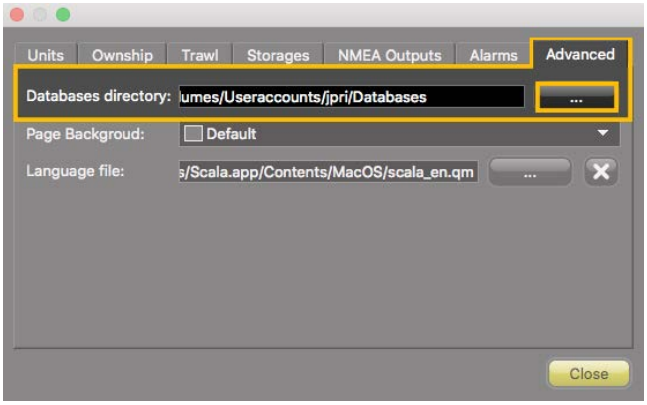
Procedure

1. You need to save GEBCO files according to a specific folder structure:
   a) Create a folder named **Databases** anywhere on the computer.
   b) Create the following folder structure inside **Databases** and save the GEBCO files in the **Gebco** folder.



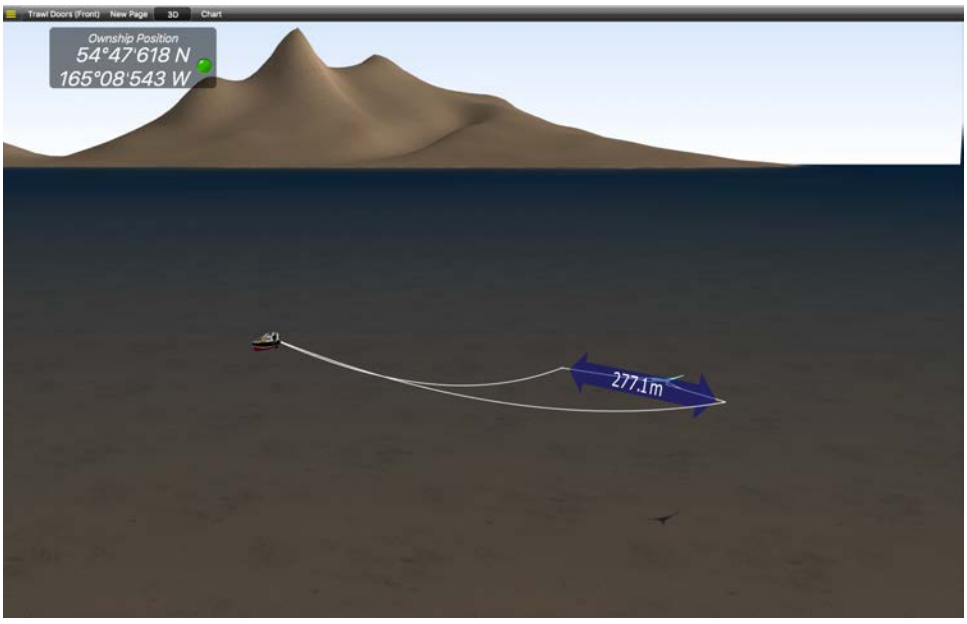
Important: Make sure you write exactly the same names of folders (letter case, spaces).

2. From Scala, click **Menu** > **Expert Mode** and enter the password `copernic`.
3. Click **Menu** > **Settings**.
4. Under the **Advanced** tab, click ... in front of **Databases directory** and select the folder **Databases** you created.



5. Open a page with a 3D overview of the vessel.
6. Right-click the 3D view and select **Display Global Bathymetry**.

   GEBCO bathymetric data is displayed on Scala.

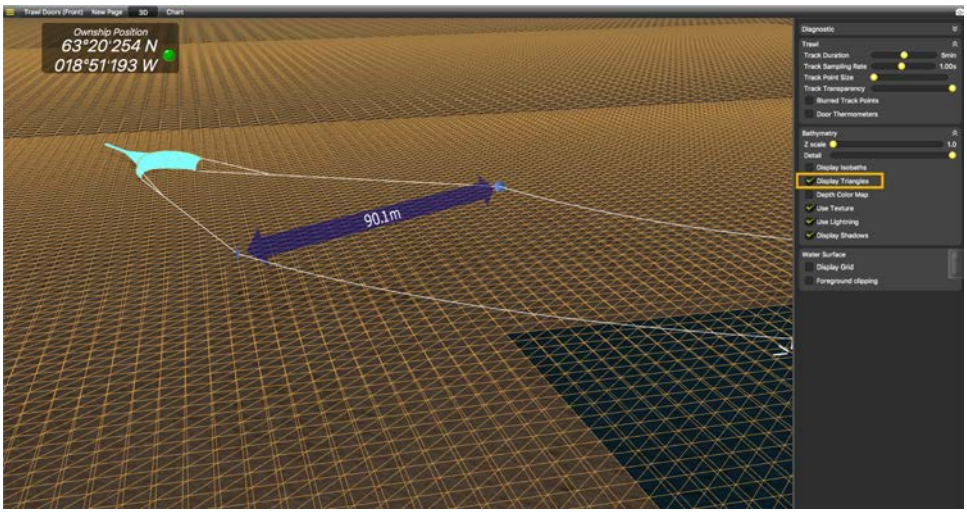


7. To check if the bathymetry is correctly received:

a) Right click the 3D and select **Display Settings**.

b) From the panel on the right side of the screen, from the part **Bathymetry**, select **Display Triangles**.

Triangles are displayed on the 3D.



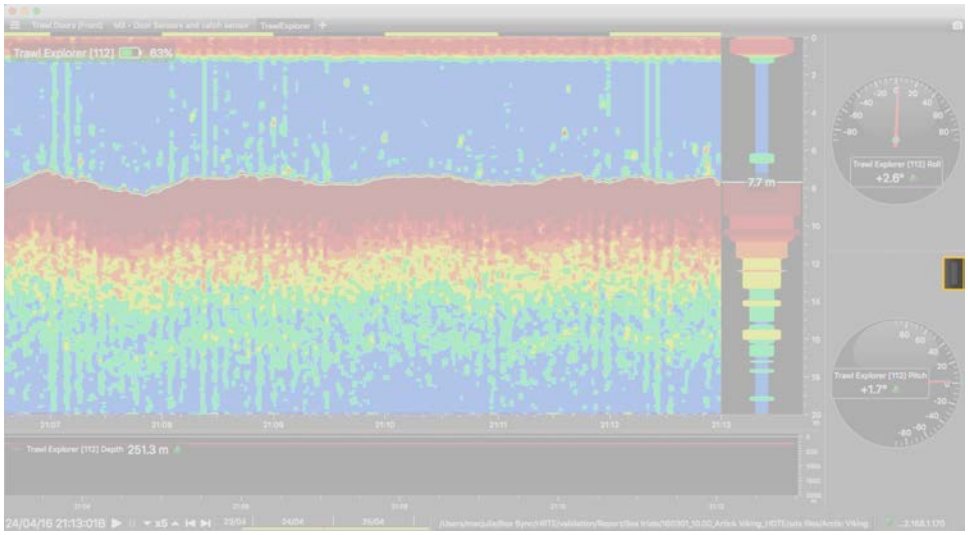
Display Configuration

Read this section to know how data are displayed on Scala and how to change their display.

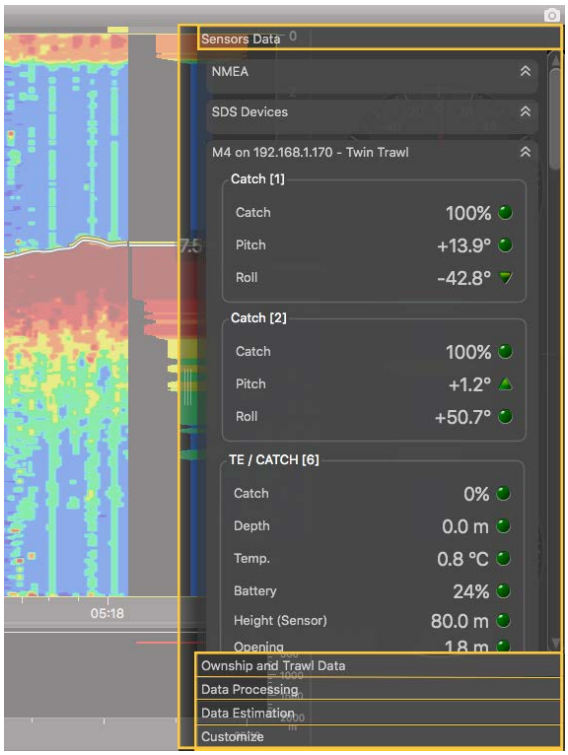
Control Panels

Control panels are displayed on the right side of the screen.

They can be hidden. When they are hidden, you can see a grey rectangle at the right side of the screen.



To open them, click the grey rectangle.

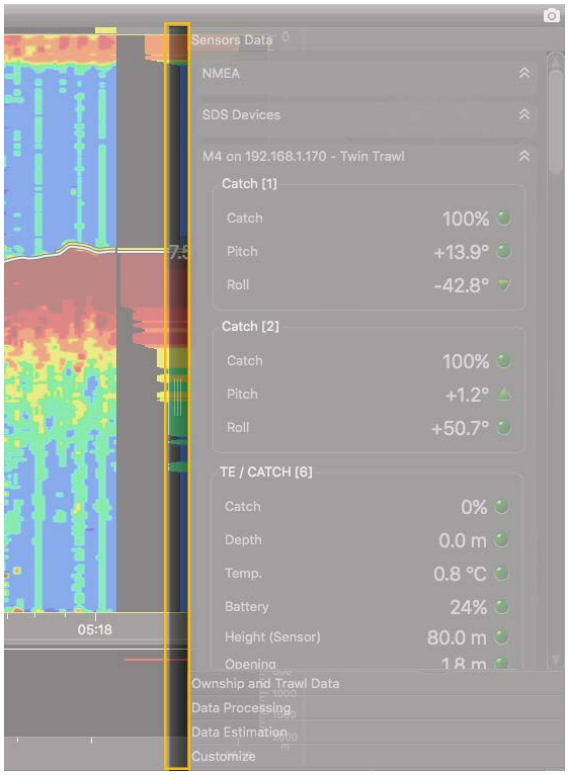


Control panels are the following:

- Sensors Data
- Ownship and Trawl Data
- Data Processing
- Data Estimation
- Customize (only in Customize mode)

Click their title (framed in yellow on picture) to show them.

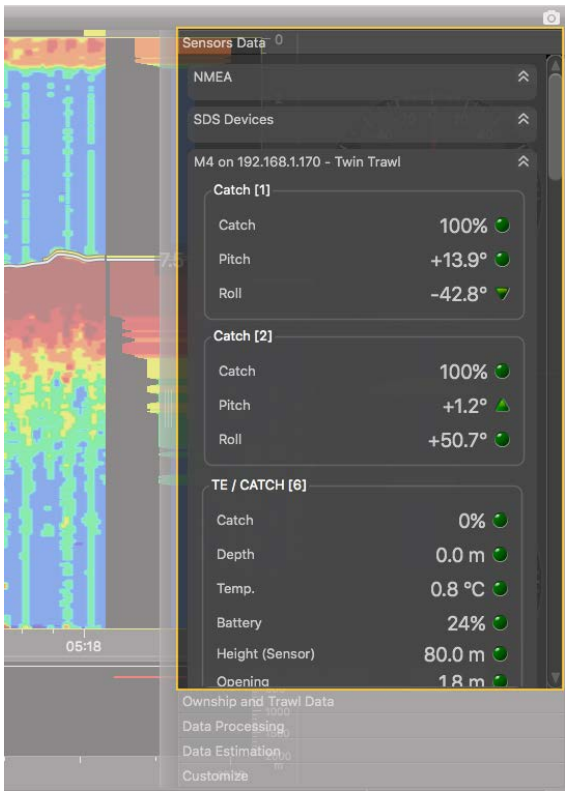
To hide or show the sections within the control panels click  .



To hide all the control panels, click the left border of the control panels.

Sensor Data

Sensor data is displayed in the **Control Panels** on the right side of the screen. Sensor data is raw or filtered data received from the sensors.



By default, the location of the sensor on the trawl gear is written between brackets next to the sensor name. To know to which location the number corresponds, refer to the pictures in Sensor Nodes.

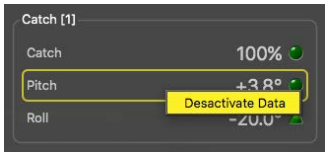
A LED next to data names indicates the status of data received:

- Blinking green: data is received.
- Orange: communication with the receiver has been lost for a few seconds. A connection problem has just occurred.
- Red: there is no more communication with the receiver.

The LED shape changes according to data received:

- : data is stable
- : data value is increasing
- : data value is decreasing

To display raw data, right-click on the title and select **Display Raw Data**.



You can also deactivate the reception of data. It can be useful if for example you have two different sensors sending the same data. Right-click incoming data and select **Deactivate Data**.

Ownship & Trawl Data

Ownship and trawl data are displayed in the **Control Panels** on the right side of the screen. They are always written in italic.

Ownship and trawl data are used for 3D (like 3D door view, 3D trawl speed view and 3D system view) and positioning. These data are extracted and treated from sensors data.

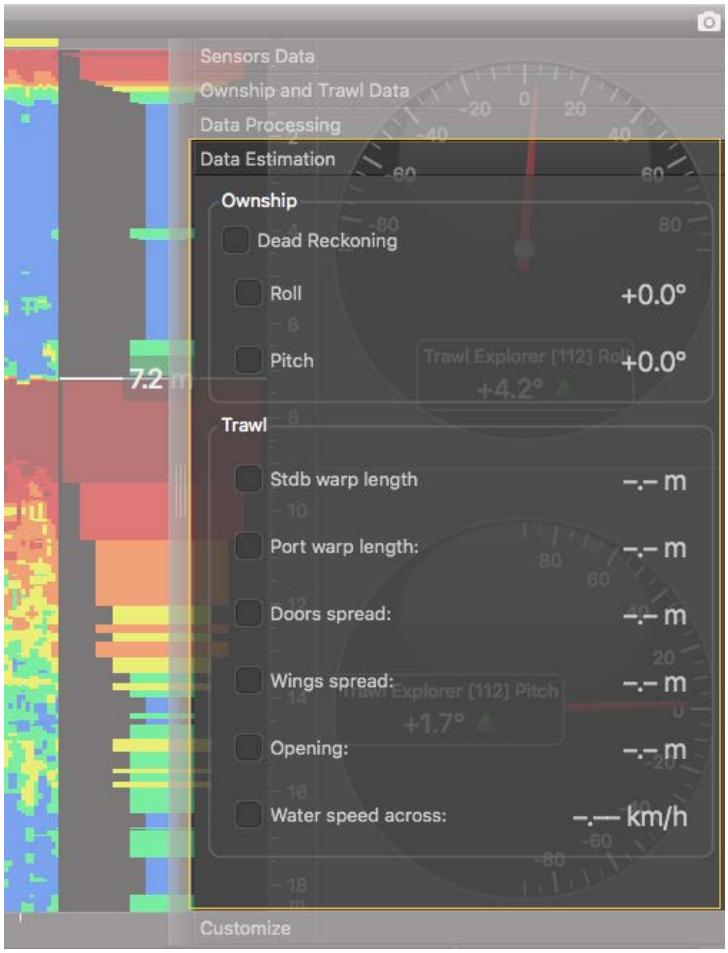
Only use these data if sensor locations are configured on the correct nodes.

Like sensor data, a LED next to data names indicates the status of data received:

- Blinking green: data is received
- Orange: communication with the receiver has just been lost
- Red: there is no communication

Data Estimation

Data estimation control panel is displayed in the **Control Panels** on the right side of the screen.



You can enter here estimation of measures if they are not received from incoming NMEA data.

Note: If you are using a positioning system, do not manually enter warp length measures.

Receiver Data

Receiver activity and its IP address is displayed in the bottom right corner of the screen.

A dot next to the receiver name indicates its activity:

- Mx on 192.168.10.177: the receiver is detected.
- Mx on 192.168.10.177: the receiver is active.
- Mx on 192.168.10.177: the receiver is in Spectrum mode.
- Mx on 192.168.10.177: the receiver is in audio recording mode.
- Mx on 192.168.10.177: the communication with the receiver has just been lost. There is a connection problem.

- Mx on 192.168.10.177: the communication with the receiver has been lost for at least 20 seconds.

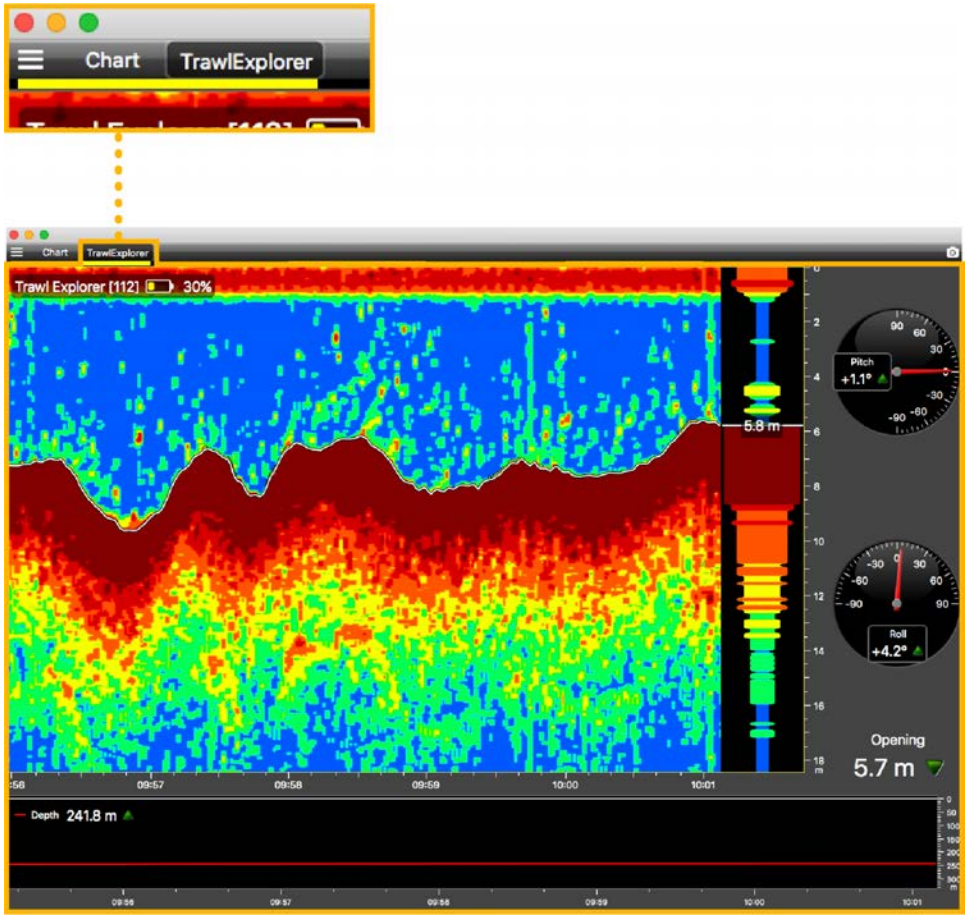
Note: Receiver IP address may change according to equipment.

Creating Data Pages

On Scala, data received from sensors can be displayed on pages. Pages are organized in tabs on the top toolbar.

Click one tab to display the corresponding page.

You can create specific pages according to your needs, for example one page for door spread sensor data, one for Trawl Explorer data.

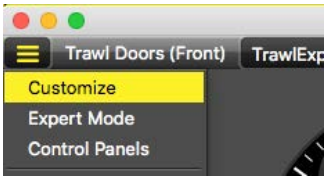


Creating a New Page

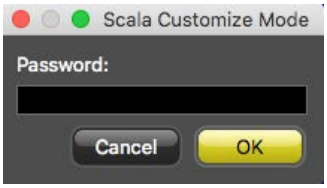
You can create a new page from scratch or from a template.

Procedure

1. From the top left corner of the screen, click **Menu** > **Customize**.



2. Enter the password `eureka`.

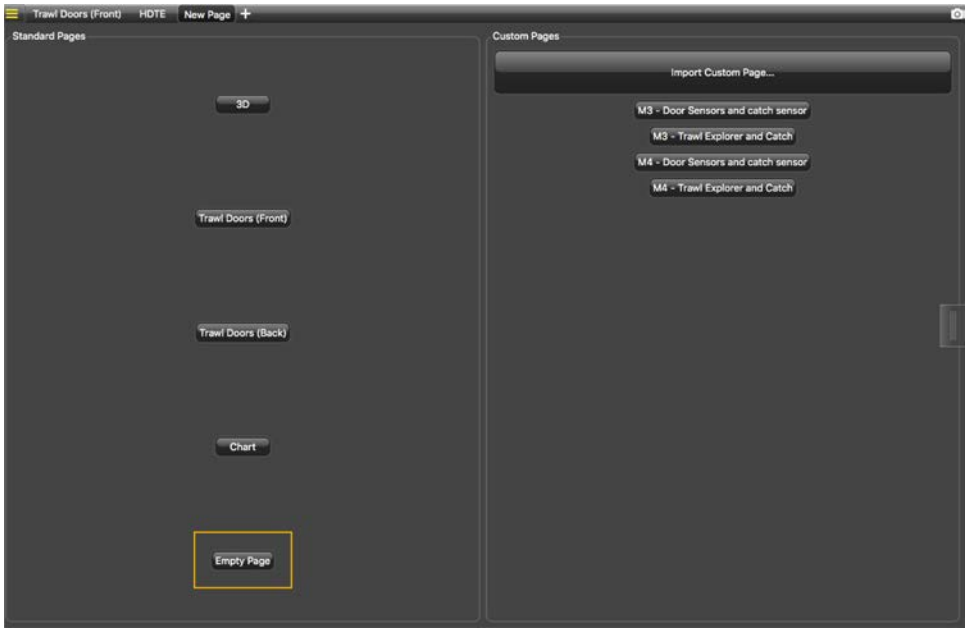


3. From the top toolbar, click the add icon .

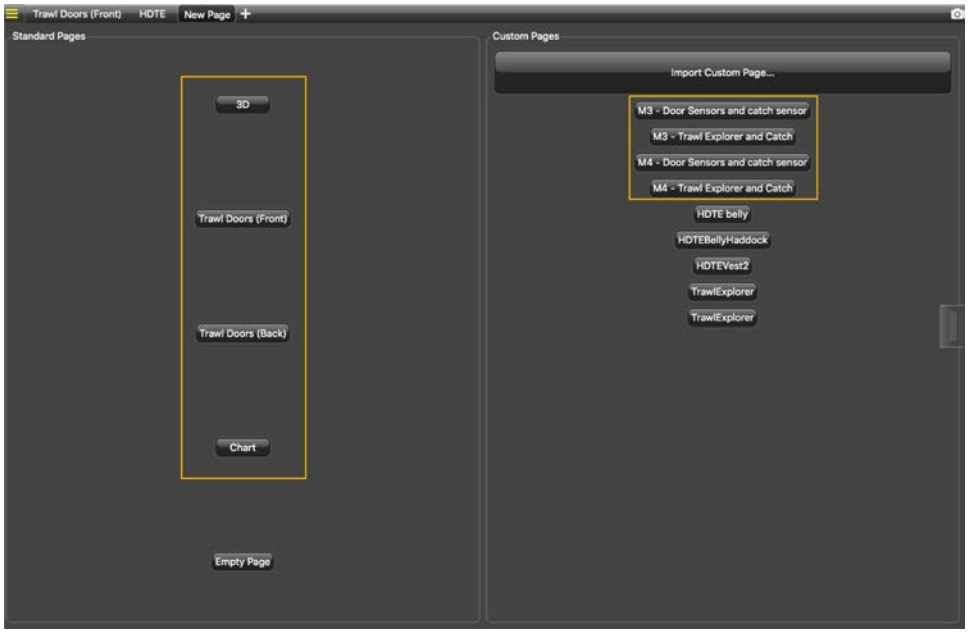
   Page Templates and **Hidden Pages** panels are displayed.

4. Select a type of page.

   - To open a blank page, select **Empty Page**.



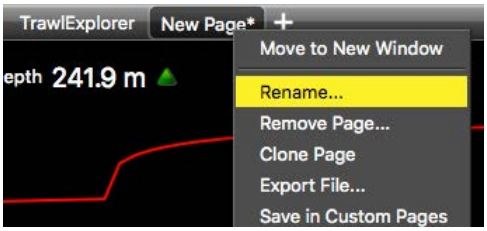
   - To open a page with data already displayed, select a page from the **Page Templates** or the **Hidden Pages**..



Tip: You can use these pages as a basis and add other data.

The new page appears in a new tab.

5. Right-click the new page tab and select **Rename**.



6. Type a name and press Enter.

   The new page name appears.

What to do next

Deactivate the Customize mode when you have finished customizing pages: click **Menu** > **Customize** again.

Adding Data to a Page

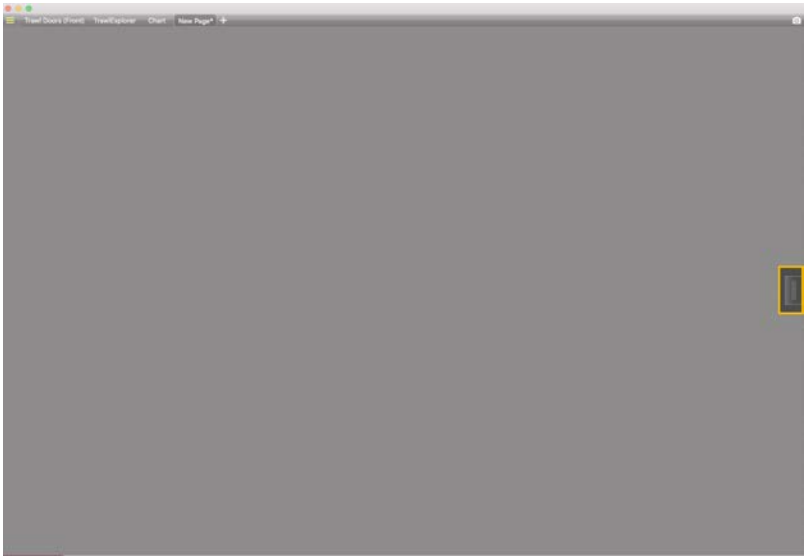
You can choose data that will appear on the screen.

Before you begin

You must be in **Customize** mode to do this task.

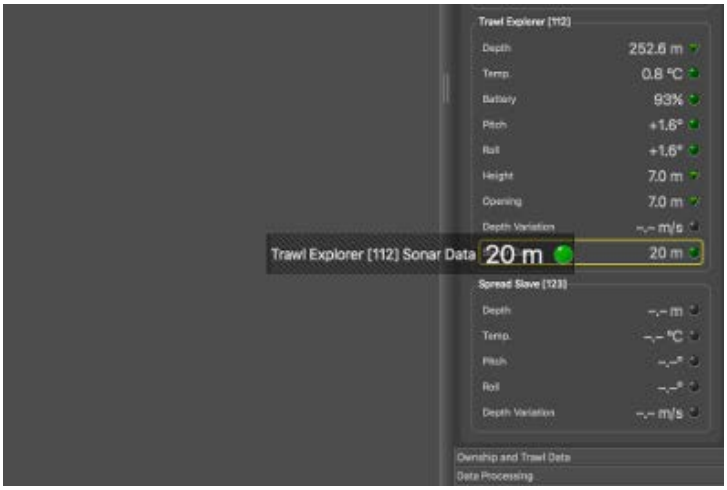
Procedure

1. To open the control panels, click the grey rectangle at the right side of the screen.

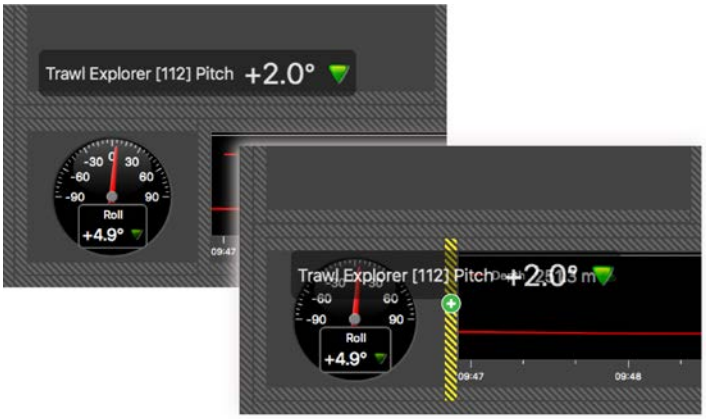


The control panels appear.

2. Under the **Sensors Data** tab, choose data and click + hold for 3 seconds until a rectangle with data appears.

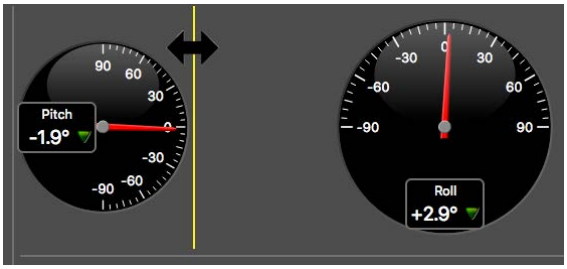


3. Hold + drag the rectangle to the middle of the screen, above grey striped areas. The area becomes yellow when you can place data.

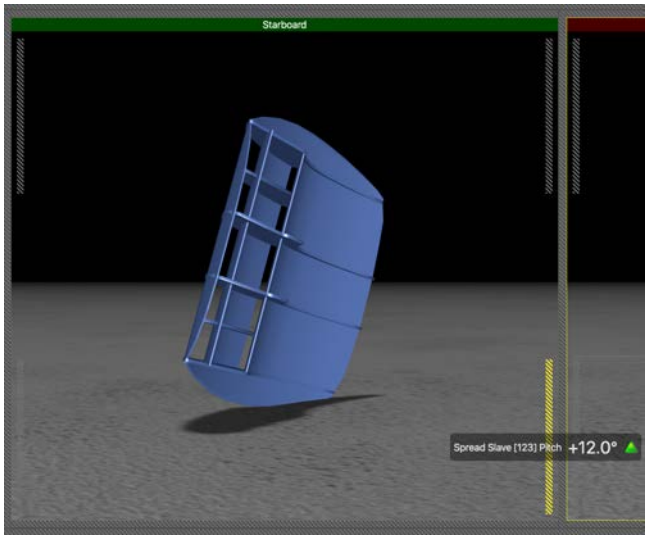


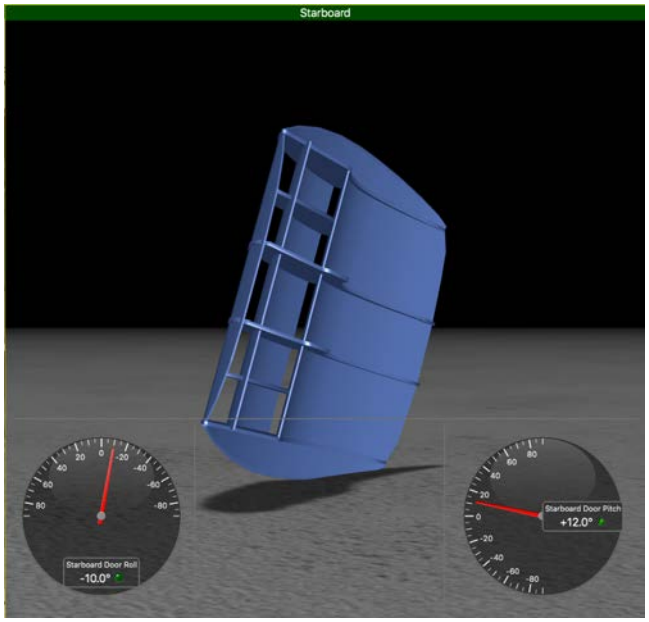
4. Stop holding the mouse button to place data at the chosen area.
5. In the **Choose new Gauge Type** dialog box that appears, select the desired type of display for the corresponding data. See Display Types on page 95 for more information about the types of display.

   Data is displayed on the screen.
6. Drag the lines around data to resize it.



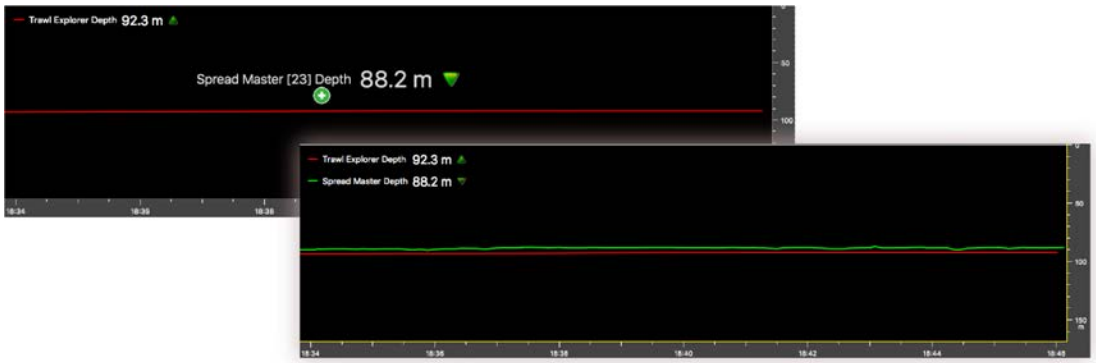
Tip: To place data (e.g. dial, gauge, text) on top of previously placed echogram or 3D views, select data and drag it on the echogram or 3D. Locations where you can drop data are situated on the corners of the views. They appear as yellow stripes when data is dragged above the location.





Tip: You can add multiple data in one history plot in order to easily compare different data at the same time:

1. Drag data, for example Depth from a Trawl Explorer, to a yellow area.
2. In the **Choose new Gauge Type** dialog box, select **History Plot**.
3. Drag other data, for example Depth from a Spread Master, to the first Depth history plot.
4. The second data appear in the history plot in another color.



What to do next

- To add other data, repeat the steps.
- Deactivate the Customize mode when you have finished customizing pages: click **Menu** > **Customize** again.

Removing Data from a Page

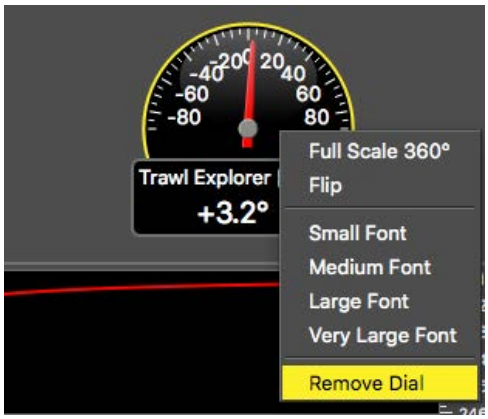
You can remove data such as a dial, an echogram, a plot, that is displayed on a page.

Before you begin

You must be in **Customize** mode to do this task.

Procedure

Right-click data and select **Remove Dial** (or other data type).



What to do next

Deactivate the Customize mode when you have finished customizing pages: click **Menu** > **Customize** again.

Saving a Page

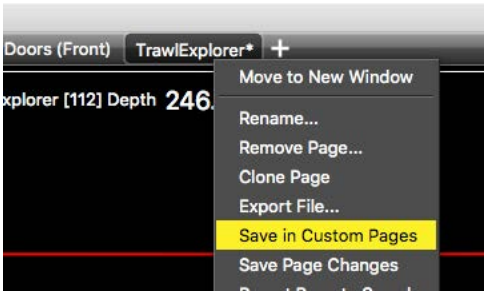
You can save pages you created to be able to find them later.

Before you begin

You must be in **Customize** mode to do this task.

Procedure

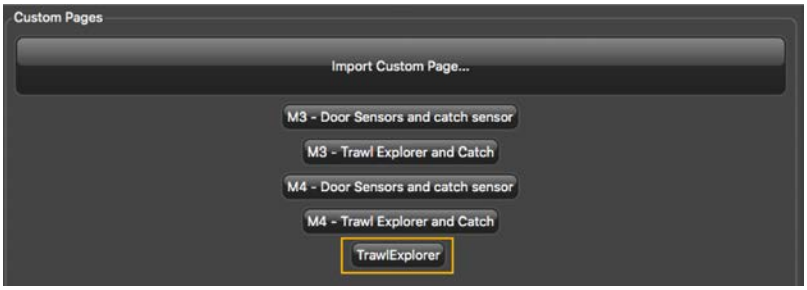
1. Right-click the page tab and select **Save in Custom Pages**.



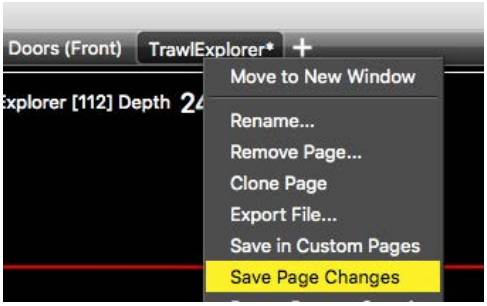
   Note: Saving your page in the **Custom Pages** enables you to recover the page if you remove it from the tabs.

2. From the **Save in Custom Pages** dialog box that appears, click **Save**.

   The page is added to the **Hidden Pages** panel. In the computer, the page is saved in **Documents/Marport/Scala/Pages**.



3. Right-click the page tab again and select **Save Changes**.



What to do next

Deactivate the Customize mode when you have finished customizing pages: click **Menu** > **Customize** again.

Exporting a Page

You can export pages you created, for example if you want to reuse them for other configurations.

Before you begin

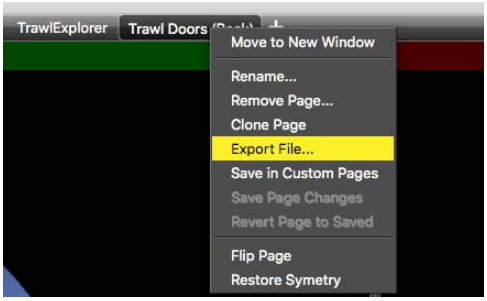
- You must be in **Customize** mode to do this task.

About this task

To reuse pages, you can also copy and paste pages that were saved as custom pages in **Documents/Marport/Scala/Pages**.

Procedure

1. Right-click the page tab and select **Export File**.



2. Choose where you want to save the page.

What to do next

- Deactivate the Customize mode when you have finished customizing pages: click **Menu** > **Customize** again.
- To reuse this page in other configurations: see Adding Data to a Page on page 74.

Deleting a Page

You can delete pages.

Before you begin

You must be in **Customize** mode to do this task.

Procedure

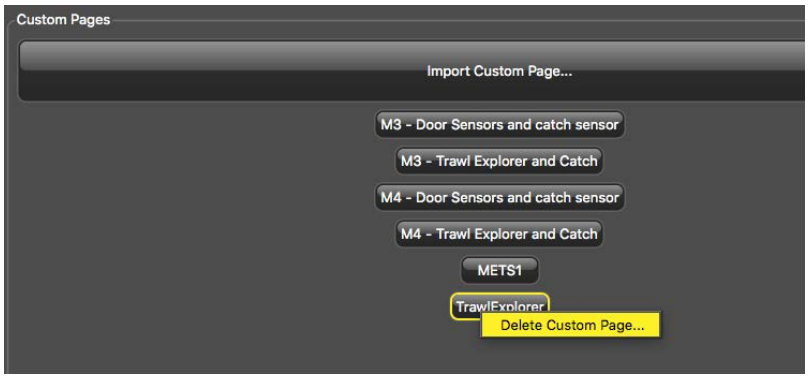
1. To remove a page from the tabs, right-click the page tab and click **Delete**.

   Important: If your page has not been saved in the **Custom Pages**, it will be permanently deleted.

2. If your page was already saved in the **Custom Pages**, click **No** in the dialog box asking you to save the page as custom page template.
3. To remove a page from the **Hidden Pages** panel:

   a) In the top toolbar, click the add icon .

   b) In the **Hidden Pages** panel, right-click the page name and select **Delete Custom Page**.



Note: Find back the page in **Documents/Marport/Scala/Pages**.

What to do next

Deactivate the Customize mode when you have finished customizing pages: click **Menu** > **Customize** again.

Opening a Saved Page

If you removed a page from the top toolbar, you can recover it if you saved it in **Custom Pages**.

Before you begin

- You must be in **Customize** mode to do this task.
- You have pages saved as **Custom Pages**.

Procedure

1. From the top toolbar, click the add icon  .
2. From **Custom Pages**, click the name of the page.

Results

The page opens with its name displayed in the top toolbar.

What to do next

Deactivate the Customize mode when you have finished customizing pages: click **Menu**  > **Customize** again.

Managing Windows

When you have multiple monitors, you can open pages in different windows to see different pages at the same time.

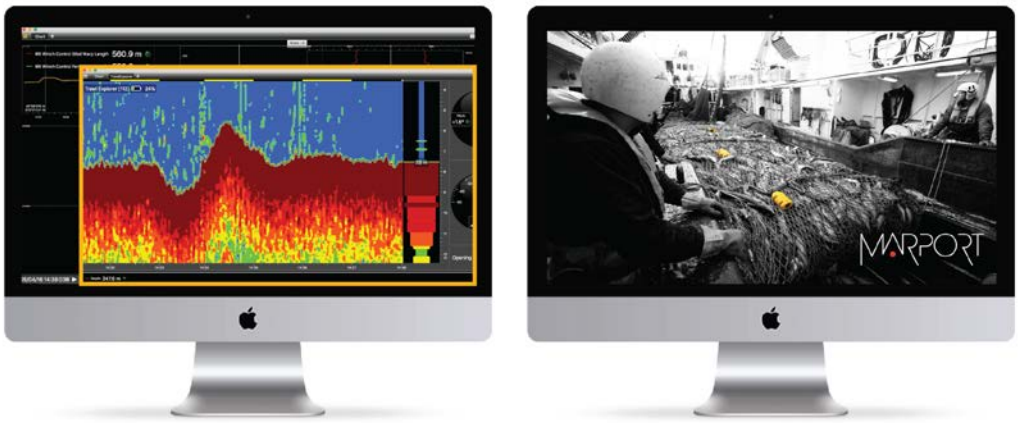
Opening a Page in a New Window

You can open a page in a new window and drag this window to another desktop screen.

Procedure

1. Scala 01.06.23 and after: From the top left corner of the screen, click **Menu** > **Customize** and enter the password `eureka`.
2. In the top toolbar, right-click a page name and select **Move to New Window**.

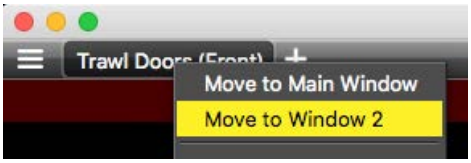
A new window containing the page opens.



3. Drag the new window to another desktop screen.

The initial window is considered as main window and it has the control panels. The window you created is named **Scala - 2**. Its name is displayed on the top of the window.

When moving pages between windows, the window you created is named **Window 2** in the menu.



4. To create additional windows, right-click a page name and select **Move to New Window**.
   Each additional window you create has a number.

What to do next

Scala 01.06.23 and after: Deactivate the Customize mode when you have finished customizing pages: click **Menu** > **Customize** again.

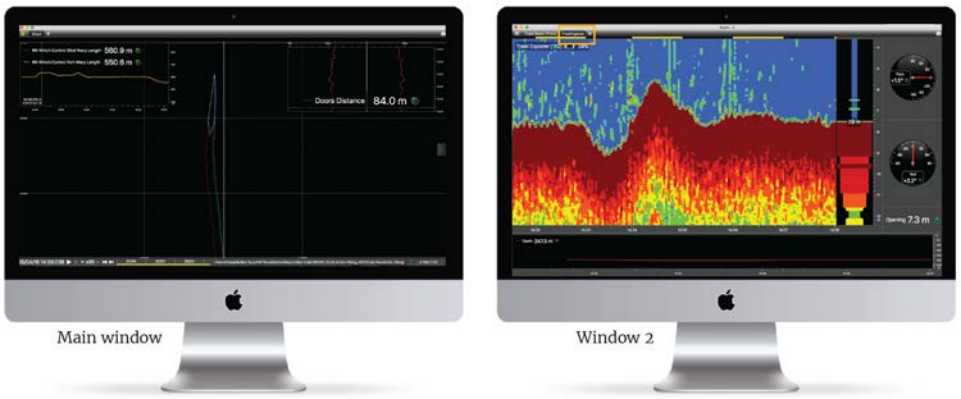
Moving Pages Between Windows

You can distribute pages among different windows.

Procedure

1. From the top toolbar of the main window, right-click a page name and select for example **Move to Window 2**.

The page is moved from the main window to window 2.



2. Check that the page name appears in the top toolbar of window 2.

3. To move back a page to the main window, right-click the page name from window 2 and select **Move to Main Window**.
4. When you have several pages, in the same way, move pages between the main window and window 2, 3, 4...

Closing and Re-opening Windows

You can close all Scala windows at once or close only some windows. If you close some windows, you can find them back or choose to delete them.

Procedure

1. To close Scala and all the windows:
   - Click close from the main window.
   - Or click close from a secondary window and click **Quit** in the dialog box that appears.

   All windows are closed and will be reopened the next time you open Scala.
2. To close only one secondary window, click close from the secondary window and click **Close** in the dialog box that appears.
3. To reopen a secondary window that has been closed, click **Menu** > **Open Window X**.
4. To permanently delete a window, first you need to remove all the pages from this window:
   - You can move pages to another window: right-click page tabs and click **Move to Window X**.
   - Or you can remove pages: right-click page tabs and click **Delete**.

   Important: If you choose **Delete**, make sure the page is saved as a custom page or it will be lost.

   The window disappears when all pages are removed.

Customizing the Display of Data

Note: Customization options are all in the panel on the left side of the screen, available in **Customize** mode.

Echograms

Echograms are a representation of what is detected by the sensors with the acoustic signals.
The strength of a detected target is expressed in Decibels (dB), that correspond to specific colors on the echogram. Blue usually represents the lowest target strengths and red the highest target strengths. The distribution of the color on the Decibels scale can be configured with the color palettes.

In Scala, the control panels display all the sensor data. In the sensor data, **Range of Sonar Data** correspond to echograms.

Adding an Echogram

You can display an echogram view on a page.

Before you begin

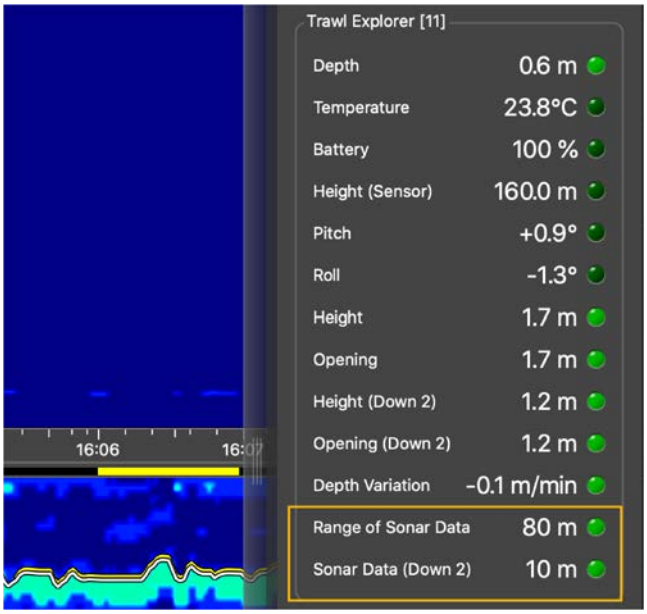
You must be in **Customize** mode to do this task.

Procedure

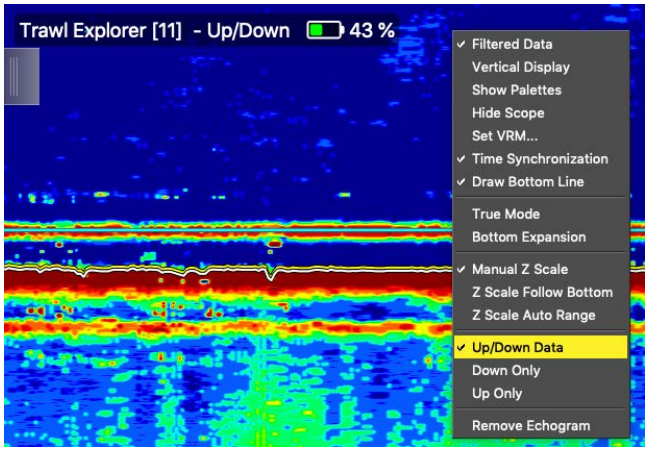
1. Open the drawer on the right side of the screen to display the control panels.
2. In the control panels, from **Sensors Data**, click **Range of Sonar Data** + hold for 3 seconds until a rectangle with data appears.
3. Drag the rectangle to a page and drop it where a yellow area appears.

The echogram is displayed.

4. If the sensor has been configured in **Down 1 + Down 2** sounding mode, there is two different **Range of Sonar Data** in the **Mx** panel. Drag each data to the page.

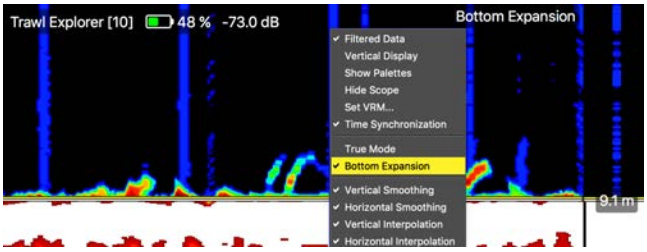


5. If the sensor has been configured in **Down 1 + Up** sounding mode, right-click the echogram to choose if you want to see both signals on the same image, or see **Down only** or **Up only**.



Note: Refer to the sensors' manuals to have more information about the configuration of the sounding mode.

6. You can use the **Bottom Expansion** view to display a more precise view of the bottom to better see fish close to the bottom. This view is usually used with echosounders on the hull, but you can use it with NBTE sensors on the trawl if the reception is good and the bottom is correctly detected.



What to do next

Deactivate the Customize mode when you have finished customizing pages: click **Menu** > **Customize** again.

Changing the Echogram Colors

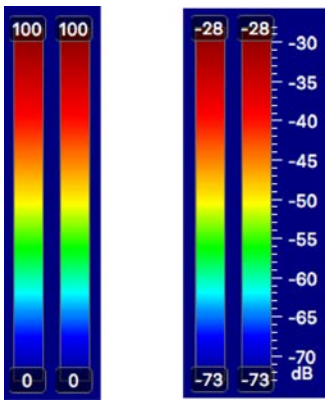
You can change the default colors of the echogram. The ability to configure the color palettes is interesting to highlight specific things, for example to clearly distinguish the sea bottom from fish targets.

Procedure

1. Right-click the echogram, then click **Show Palettes**.

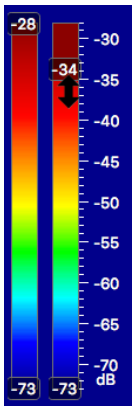
   The two color palettes appear on the left side of the echogram. The first palette is for the area underneath the seabed and the second for the water column.

   Depending on the type of sensor installed, you can have two types of color palettes. The second one is for latest generation sensors. It displays the target strength.



2. For both types of palettes:

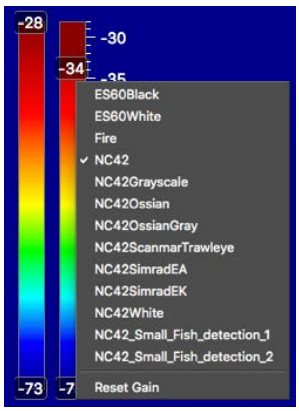
   a) Drag the top handle down to increase the red color.
   b) Drag the bottom handle up to eliminate noises and weak echoes.



3. With the first type of palette only, you can also adjust the gain level. It changes the color intensity. You can for example saturate more or less in red to obtain same colors for different sensors. Click **Menu** > **Expert Mode** and enter the password `copernic`.

   A handle is displayed in the middle of the palette. Drag it to adjust the level.

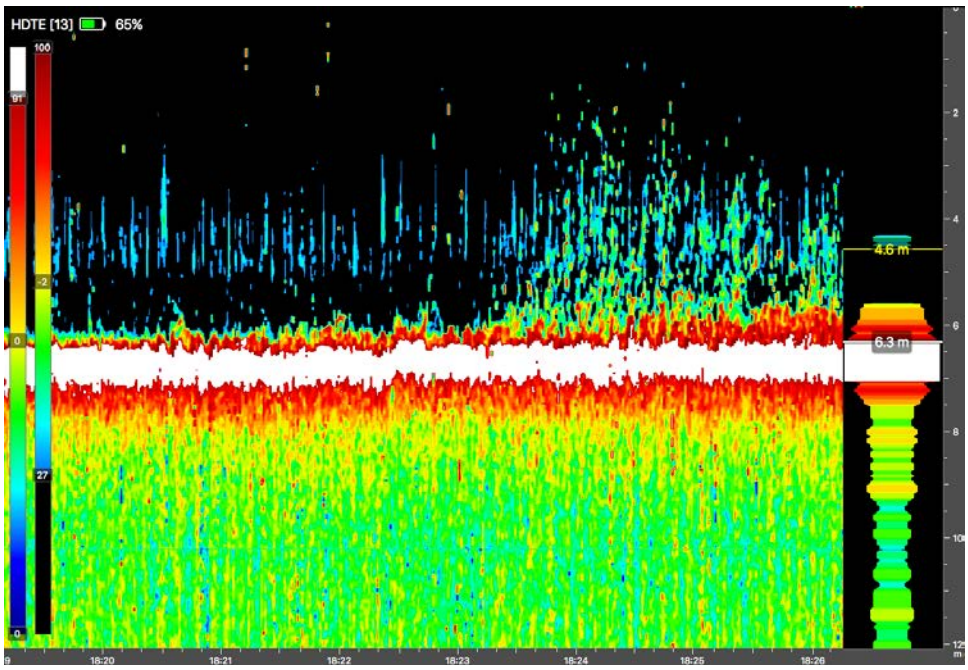
4. To change the color hues, right-click the gauge and select another color palette.



You can choose color palettes from other echosounder brands if you prefer them.

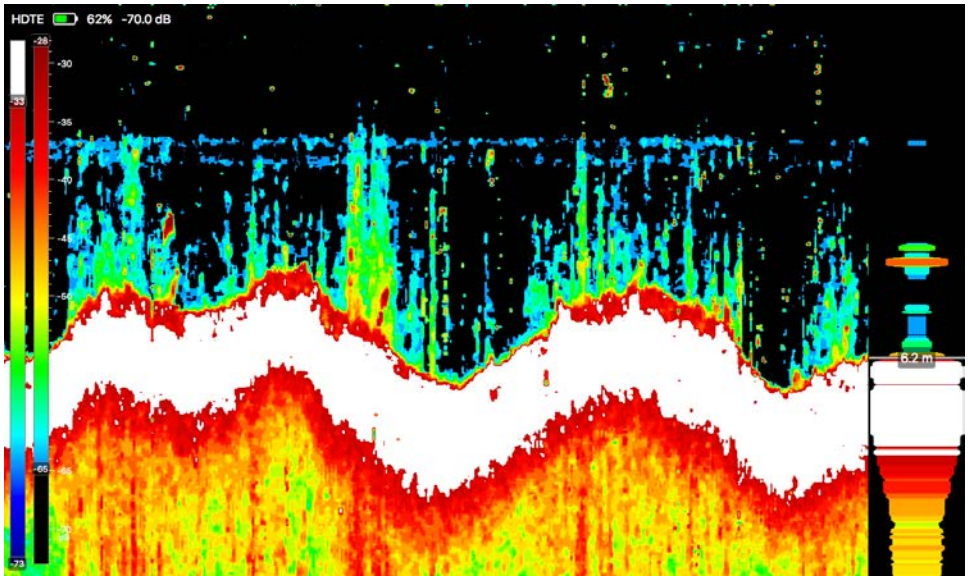
Option	
ES60Black	Simrad color palette
ES60White	Simrad color palette
Fire	Fire color palette
NC42	Standard Scala color palette
NC42Grayscale	Shades of grey
NC42Ossian	Ossian color palette
OssianGrey	Ossian color palette
NC42ScanmarTrawleye	Scanmar Trawleye color palette
NC42SimradEA	Simrad color palette
NC42SimradEK	Simrad color palette
NC42White	Same as NC42, but saturates in white for target strength above high threshold and black below low threshold.
NC42_Small_Fish_detection_1	For V3 echosounders, increases the contrast for small targets.
NC42_Small_Fish_detection_2	For V3 echosounders, increases the contrast for small targets.

5. You can also create your own palette by copying an existing palette and modifying the RGB color codes manually:
   a) Right-click a palette and click **Copy**.
   b) Enter a name. The new palette appears in the contextual menu.
   c) A file with the list of the colors is saved in **Documents/Marport/ScalaLive/mx/SonarPalettes**. You can modify the file directly.
6. For example, to have the following display with the first type of palette:



a) Right-click each palette and select NC42White for both.
b) Drag the top handle of the left palette down to 91 to see the sea bottom in white.
c) Drag the bottom handle of the right palette up to 27 to better see fish.
d) Drag the gain handle of the right palette up to -2 to change the color level.

7. To have the following display with the second type of palette:



a) Right-click each palette and select NC42White for both.
b) Drag the top handle of the left palette down to -33dB to see the sea bottom in white.
c) Drag the bottom handle of the right palette up to -65dB to better see fish.

8. To have smoother transitions between the colors in the echogram, right-click the echogram and select **Vertical Smoothing** and/or **Horizontal Smoothing**.

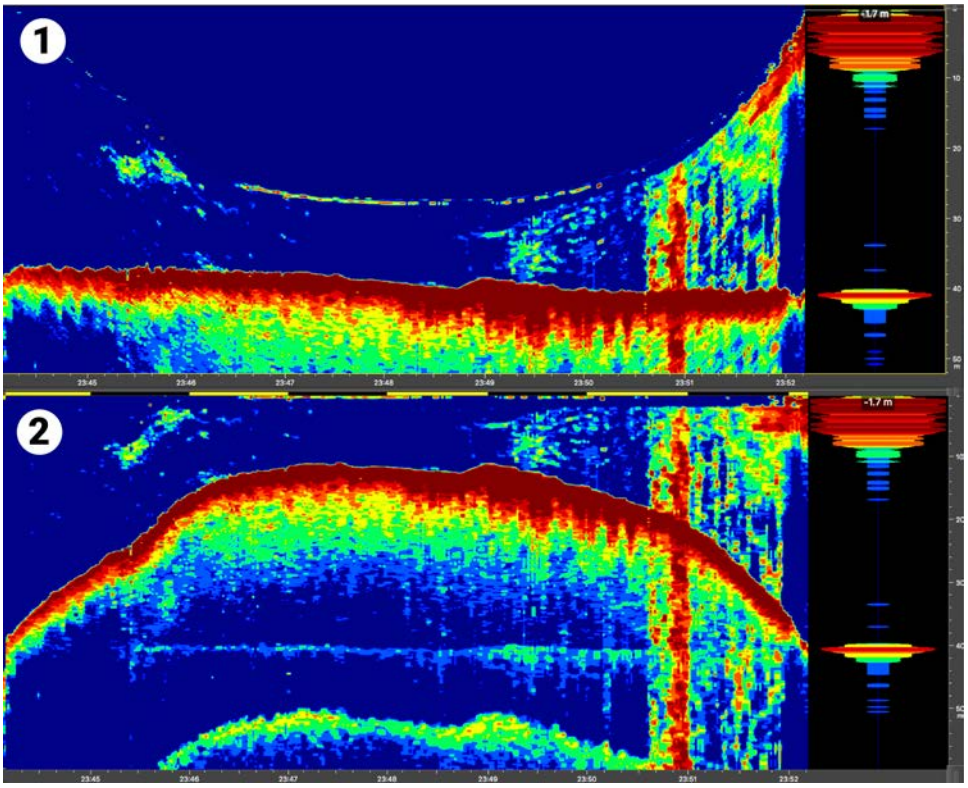
Displaying the View from Surface to Seabed

You can choose to display the echogram beginning from the water surface instead of the default view from the sensor position. Depending on the type of fishery, this is useful to see the trawl descent from the sea surface to the seabed.

Procedure

Right-click the echogram and click **True Mode**.

When **True Mode** option is activated, the echogram is displayed beginning from the water surface (1). When the option is deactivated, the echogram is displayed beginning from the sensor position (2).



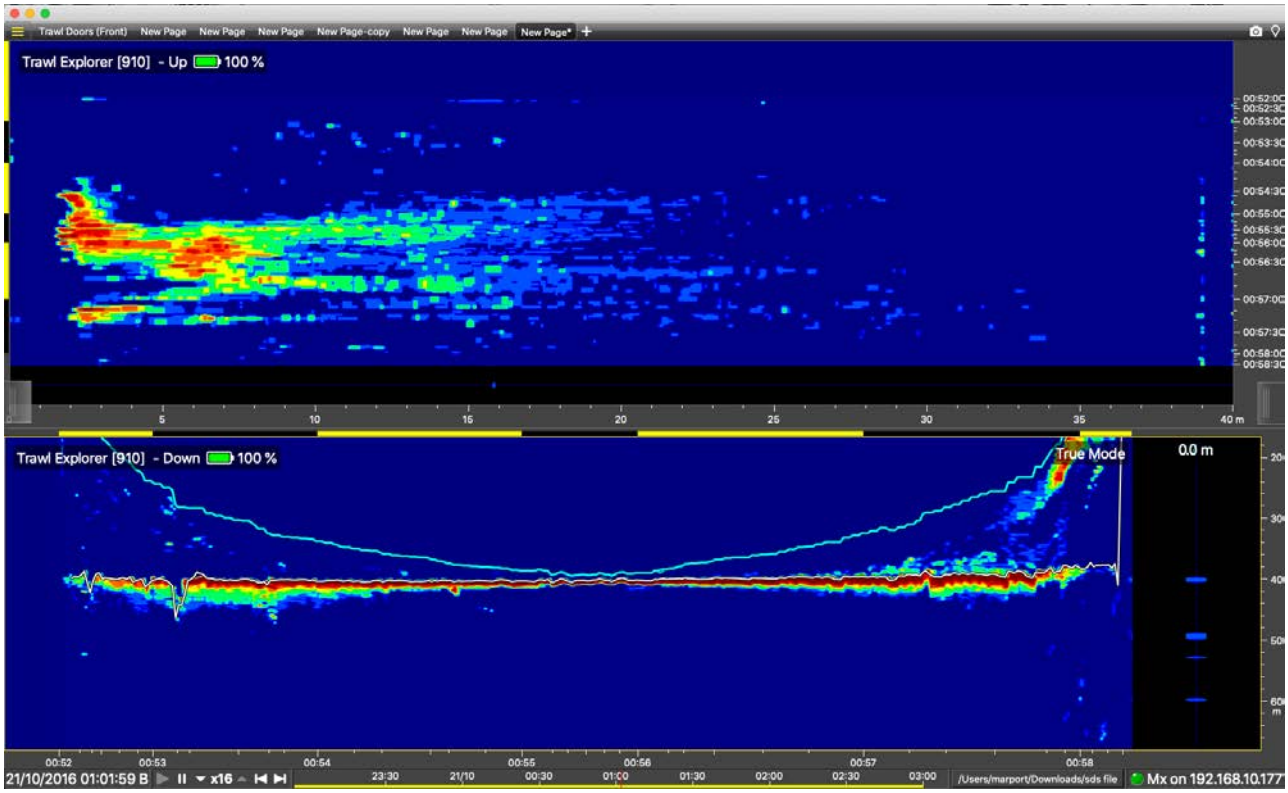
Displaying Echograms of Seine Sensors

You can display an echogram image of the contents of a seine purse when using a Seine sensor with side-looking option.

Procedure

1. Drag **Range of Sonar Data** from a Seine Explorer to a page.
2. Right-click the echogram and then click **Up only**, then **Vertical Display** to see the contents on the seine purse as the sensor goes down.
3. Again, drag **Range of Sonar Data** from the Seine Explorer and place it next to the first echogram.
4. Right-click the echogram and then click **Down only**, then **True Mode** to see the descent of the sensor.

Results



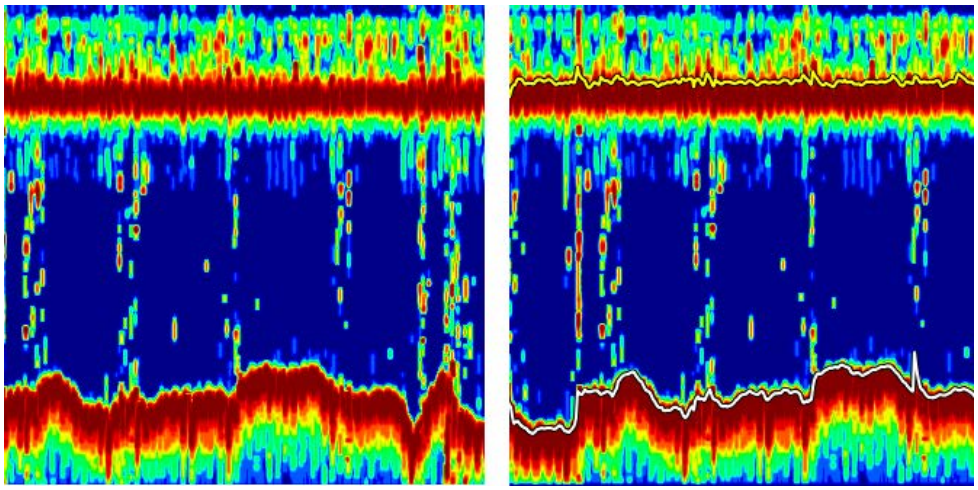
Displaying the Bottom Line

You can display lines on an echogram to mark the bottom of the trawl and the beginning of the seabed.

Procedure

Right-click the echogram, then click **Draw Bottom Line**.

A yellow line appears at the bottom of the trawl and a white line appears at the beginning of the seabed. On the example below, the first echogram does not have a bottom line and the second has one.



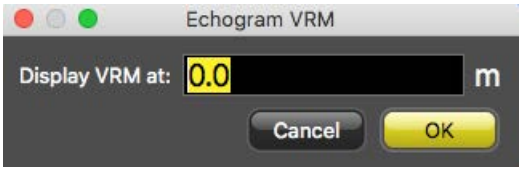
Note: In sensors data, the opening is the distance between the sensor and the yellow line and the height is the distance between the sensor and the white line.

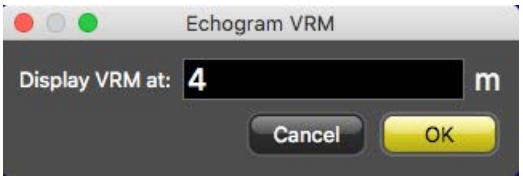
Adding a Range Marker

You can set a range marker at a given depth, for example if you need to ensure that your trawl net stays at this depth. It is called a Variable Range Marker (VRM).

Procedure

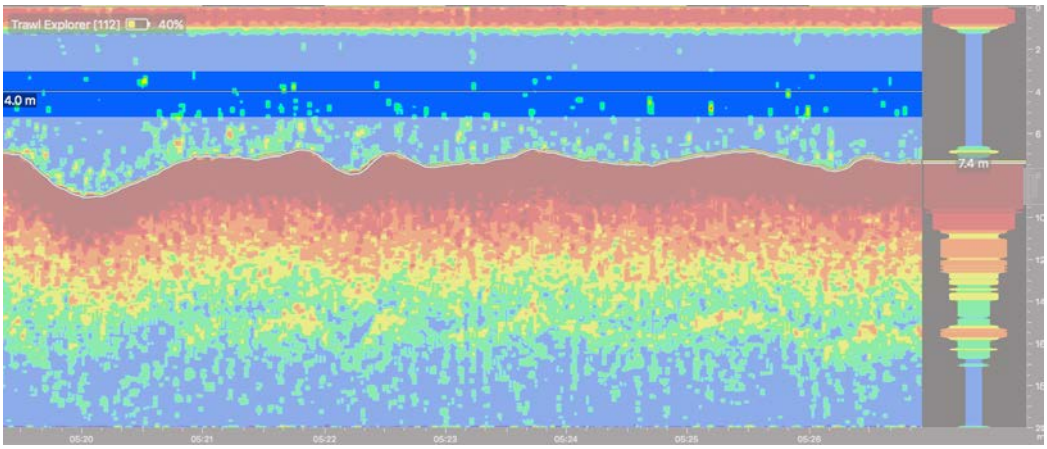
1. Right-click the echogram and select **Set VRM**.
2. With the mouse cursor, select 0.0 and directly type the depth.





3. Click **OK**.

   The range marker is displayed on the echogram.



4. To remove the range marker:

   a) Right-click the echogram and click **Set VRM**.
   b) From the dialog box that appears, select **Remove Marker**.

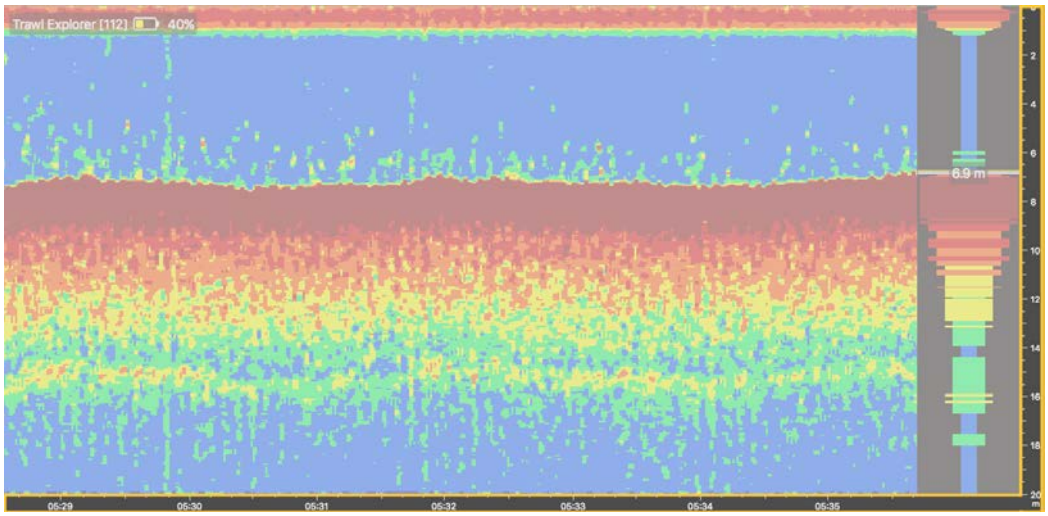
Zooming on Timestamp and Distance Scale

In echograms and history plots, you can zoom in and out on the distance scale and timestamp and move them along.

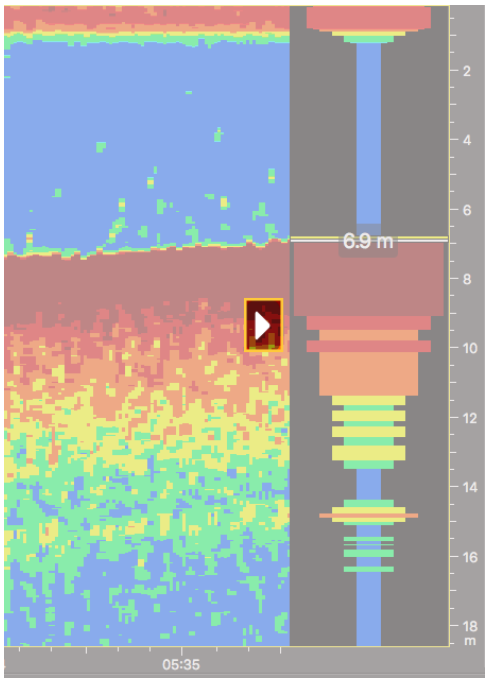
Procedure

1. To zoom in and out of the distance scale, place your cursor on the vertical axis of the echogram or history plot and scroll.
2. To zoom in and out of the time stamp, place the cursor on the horizontal axis and scroll.

   Note: When two echograms or two history plots are displayed one above the other, they have the same time stamp. So if you zoom on one, the other will also zoom. If you do not want the echograms to be synchronized, place them side by side.
3. Drag the scala to move along the time stamp or distance scale.



4. To come back in the time stamp to data currently being received, click the arrow on the right.

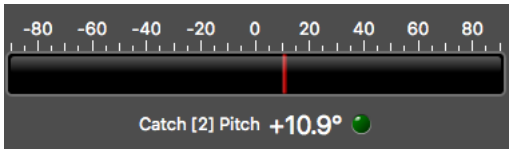
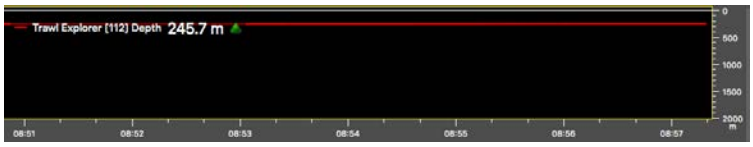


Sensor Numerical Data

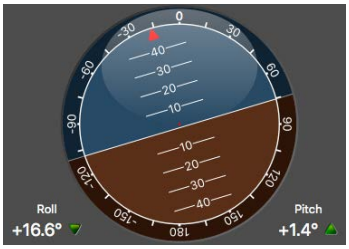
Data such pitch and roll, temperature, depth can be displayed in dials, gauges, history plots or text format.

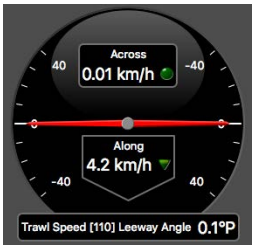
Display Types

You can choose between different types of display when you drag numerical data to a page.

Dial	
Gauge	
History Plot	
Label	

There are also dials specific to certain types of data:

Name	Types of data	Illustration	Display details
Horizon	• Pitch • Roll		Displays horizon line according to pitch and roll. Red dot in the middle indicates pitch angle and red arrow on top indicates roll angle.
Wind dial	• True wind speed • True wind direction • True wind angle • Apparent wind angle • Apparent wind speed		Vessel is displayed in the middle in grey. Apparent wind angle is displayed in blue and true wind angle in orange.

Name	Types of data	Illustration	Display details
Heading dial	• Heading (True) • Heading (Magnetic)		Red arrow displays North. Cardinal points are displayed around.
Trawl Speed Dial	For trawl speed type sensors: • Water speed along • Water speed across		Leeway angle is displayed for port (P) or starboard (S).
Water Speed (WS) Dial	For speed log type of device, data received from NMEA inputs: • Water speed along • Water speed across		Leeway angle is displayed for port (P) or starboard (S). Vessel is displayed in the middle in grey.

Changing the Display of Page Elements

You can change the title, font, unit of measure and arrangement of data displayed on pages.

Before you begin

You must be in **Customize** mode to do this task.

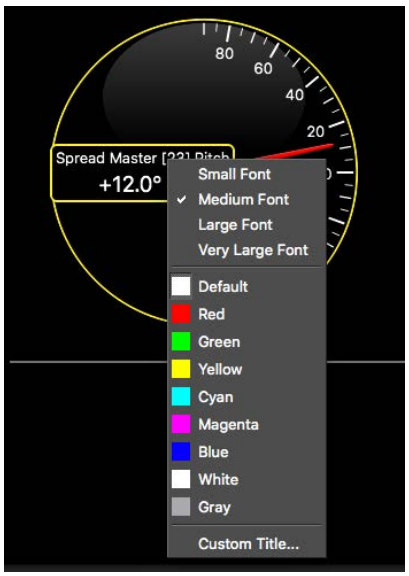
About this task

Changing the display of elements can be done on different areas:

- The title of the element
- The element itself (dial, gauge or history plot).

Procedure

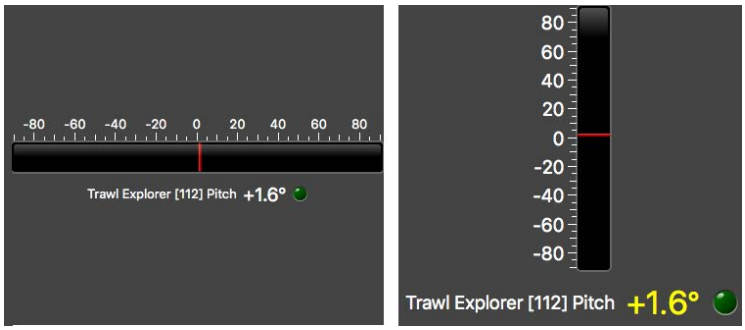
1. To change the title, right-click the title and choose:
   - Font size
   - Font color: it changes only the color of numerical data, except for history plots where it changes the color of the line.
   - **Custom Title** to change the default title.



2. To change the display of plot, gauge or dial, right-click the element and choose:

Option	
Dial	• Font size
Gauge	• Rotate • Font size • Units
History Plot	• Show raw data: useful to check if there are communication problems • Show points: useful to see the interval of received data • Show bars: if you use a seiner, useful to identify the different depths • Vertical/horizontal
Text Display	• Font size • Font color • Units

In the example below, the gauge orientation has been changed to vertical, the font size of the units and title have been changed to large fonts and the font color to yellow.



What to do next

Deactivate the Customize mode when you have finished customizing pages: click **Menu** > **Customize** again.

Displaying Catch Monitoring

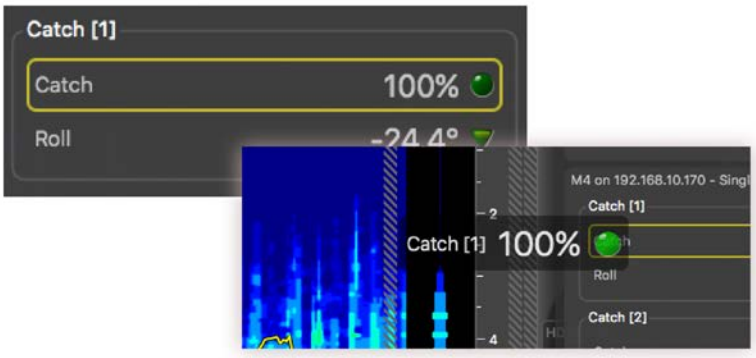
You can be alerted when the codend is full.

Before you begin

You must be in **Customize** mode to do this task.

Procedure

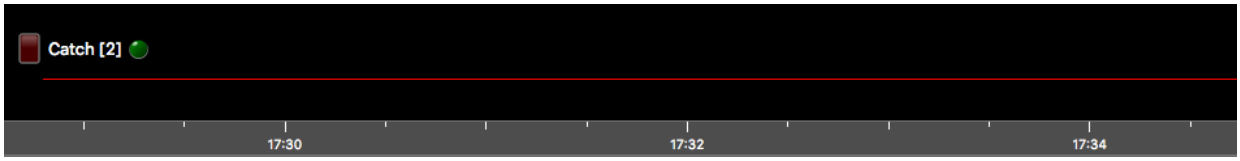
1. Open the control panels and drag **Catch** data to a page.



2. In the **Choose new Gauge Type** dialog box, select **History Plot**.

Results

When there is no catch the history plot is:



When the codend is full:

What to do next

Deactivate the Customize mode when you have finished customizing pages: click **Menu** > **Customize** again.

Displaying Single Trawl Spread

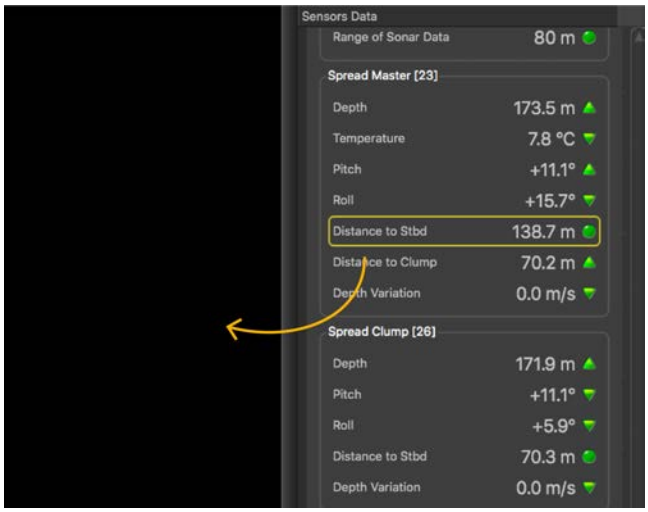
If you have a trawl with door sensors, you can display a plot to see the distance between the trawl doors. For twin trawls, you can also see the distance between both doors and the clump.

Before you begin

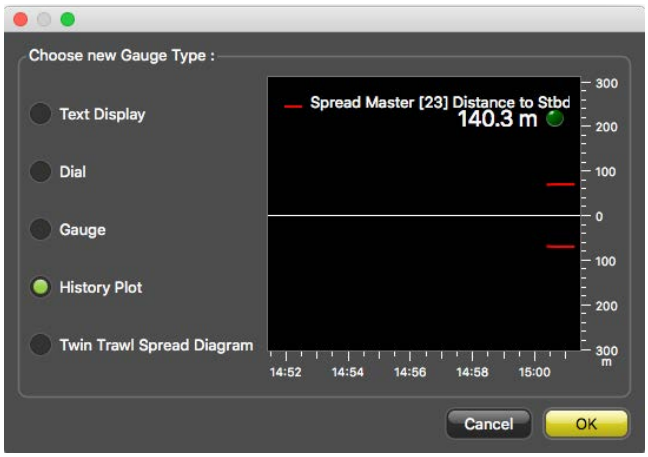
You need to have Spread sensors that send distance between port and starboard doors.

Procedure

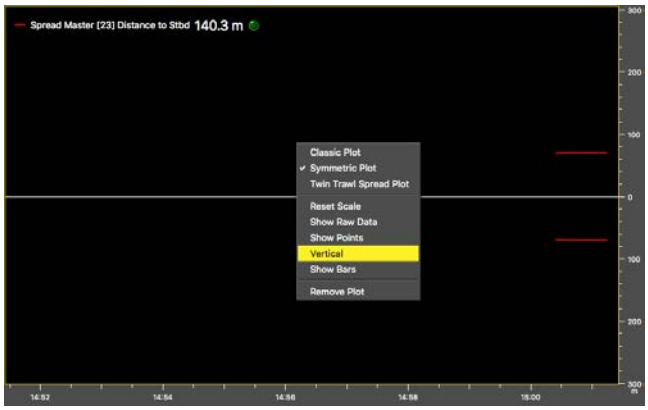
1. In **Control Panels** > **Sensors Data**, click + hold distance data from spread sensors such as **Distance to Stb** from a **Spread Master** and drag it to the page display.



2. In **Choose new Gauge Type**, select **History Plot**.



3. Right-click the history plot and select **Vertical**.



The history plot becomes vertical. You can see the distance between the port and starboard door.

Displaying Twin Trawl Spread

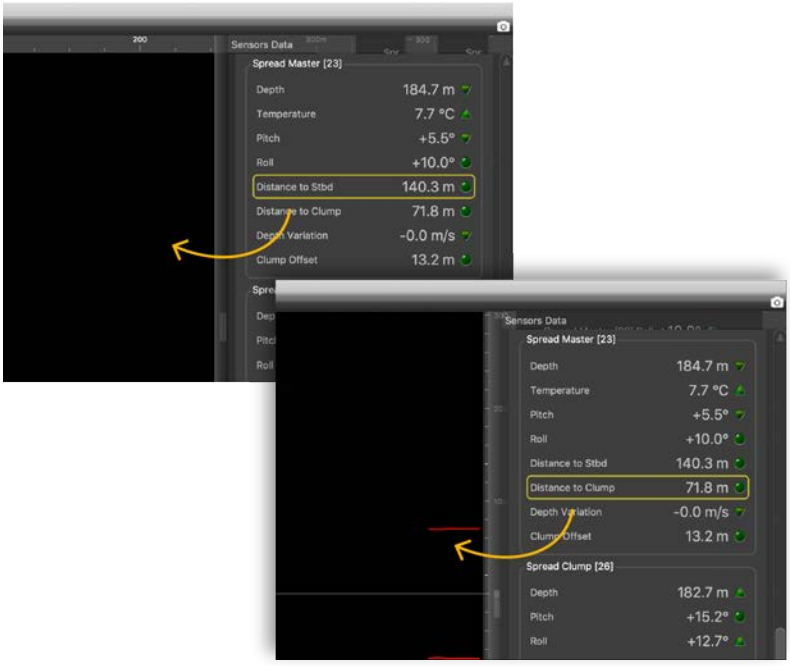
You can display a diagram of twin trawl spread in order to see the distance between the port and starboard doors, and between the clump and port/starboard doors. This way, if the trawl is asymmetric you can adjust accordingly and see live results very easily.

Before you begin

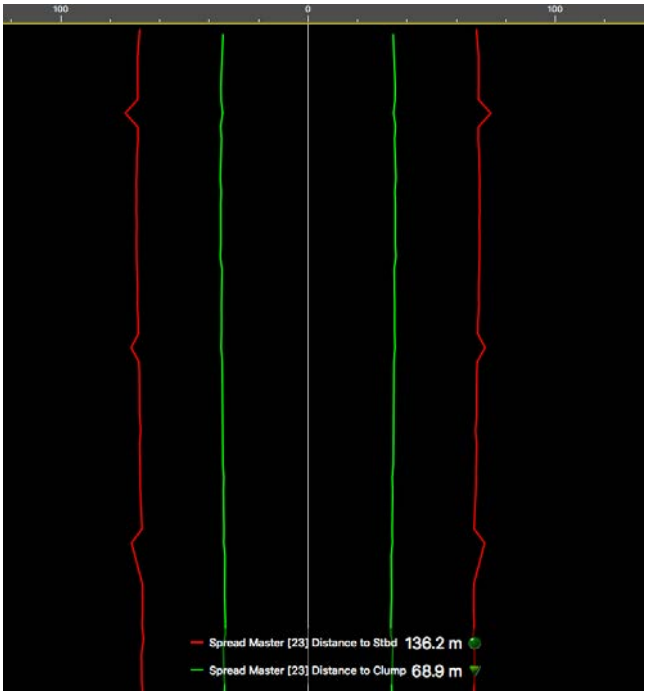
- You must be in **Customize** mode to do this task.
- You need to have twin trawls and door sensors with dual or triple distance option.

Procedure

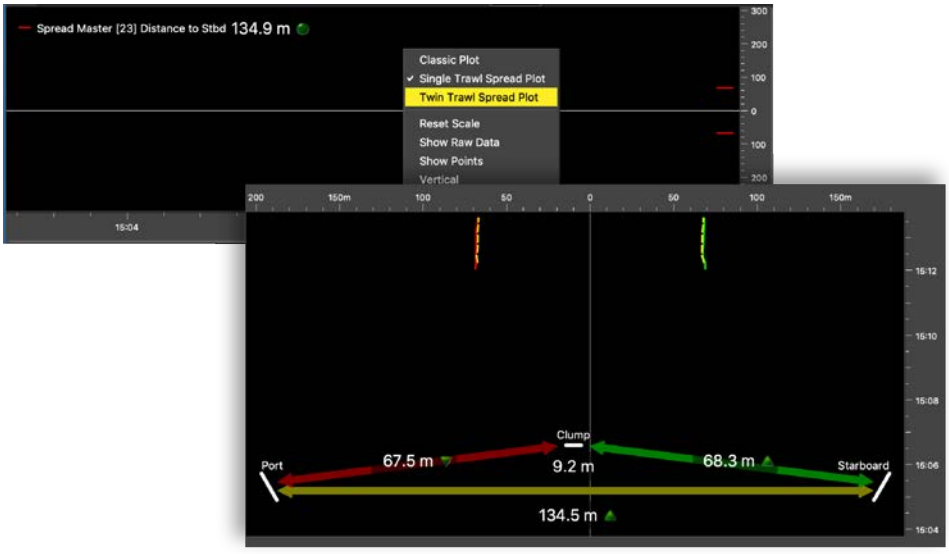
1. If you have twin trawls with **2 measured distances**, drag to the page the Spread Master **Distance to Stbd**, then drag **Distance to Clump** above the plot of the distance to starboard. Right-click the plot and click **Vertical**.



Distances between the port door and starboard door and between the port door and clump are displayed.



2. If you have twin trawls with **3 measured distances**: drag to the page one spread distance such as a Spread Master **Distance to Stbd**, then right-click the plot and click **Twin Trawl Spread Plot**.



You now have an history plot and a diagram displaying the distance between:

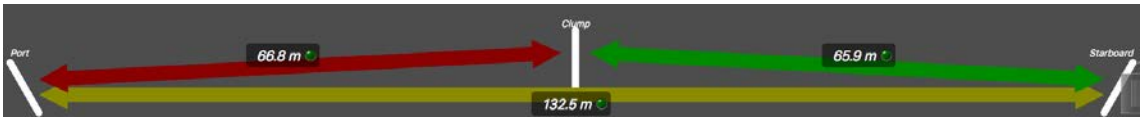
- port door and starboard door,
- port door and clump,
- clump and starboard door.

You can know if the clump is centered when the yellow dashed line is above the red and green lines.

Note: Right-click the diagram and click **Single Trawl Spread Plot** if you need to switch to single trawl.

3. You can also find the diagram for triple distance in the control panels: click **Customize**, then drag the **Twin Trawl Spread Diagram** to the page.

The diagram is displayed.



What to do next

Deactivate the Customize mode when you have finished customizing pages: click **Menu** > **Customize** again.

3D Views

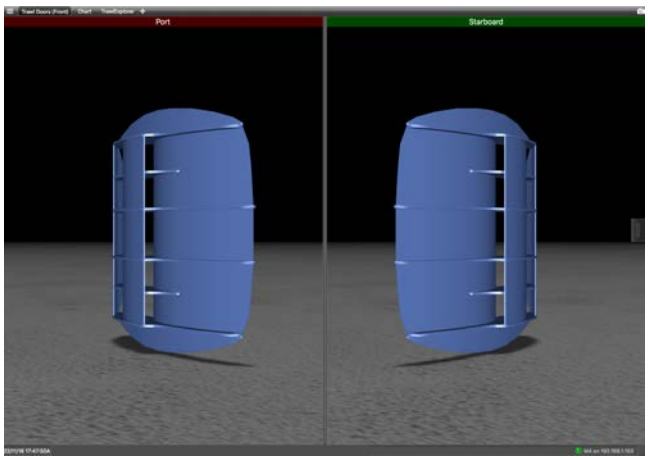
You can display 3D views of different elements from the system, for example the trawl doors or trawl speed sensors.

Displaying Trawl Door 3D View

You can display a 3D view of the trawl doors and clump. This way, you can see the movements of the doors and clump.

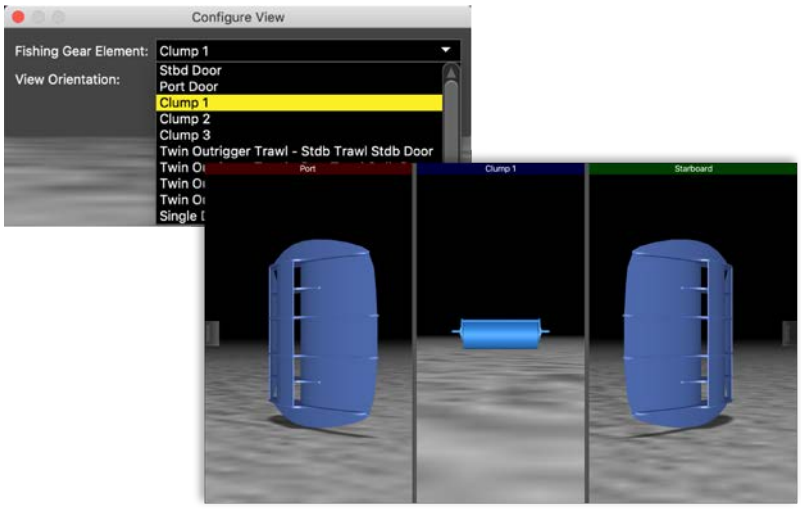
About this task

A 3D view of the trawl doors is already in some page templates, for example **Trawl Doors (Front)/Trawl Doors (Back)**.

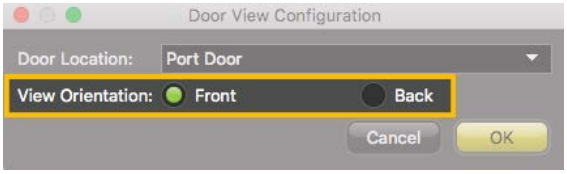


Procedure

1. In the top toolbar, select a page with a 3D view of the trawl doors, for example **Trawl Doors (Front)**.
2. If you have no page in the top toolbar with a 3D view of the trawl doors:
   a) From the top left corner of the screen, click **Menu** > **Customize**.
   b) Enter the password `eureka`.
   c) In the top toolbar, click the add icon .
   d) Select a page template in the **Standard Pages** or **Custom Pages** panel that has a trawl door 3D view.
3. If you have twin trawls you can display the clump and if you have twin outrigger trawls you can set which doors are displayed. Right-click the 3D view, then click **Configure**. Choose from the drop-down menu.

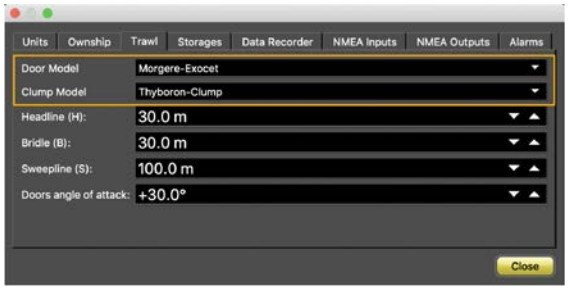


4. You can also change the viewing angle: looking from the trawl toward the vessel (front), or from the vessel toward the trawl (back).

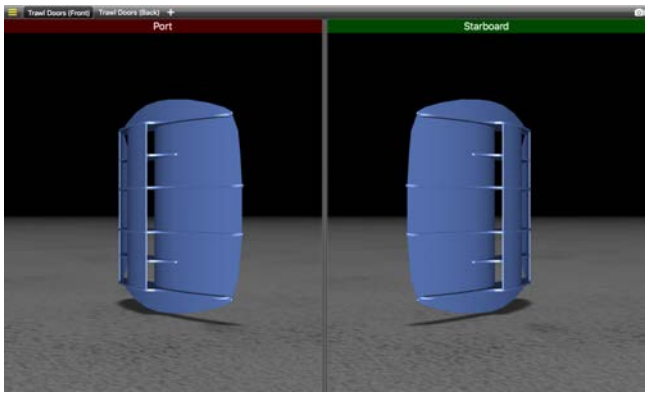


5. To change the door or clump model:

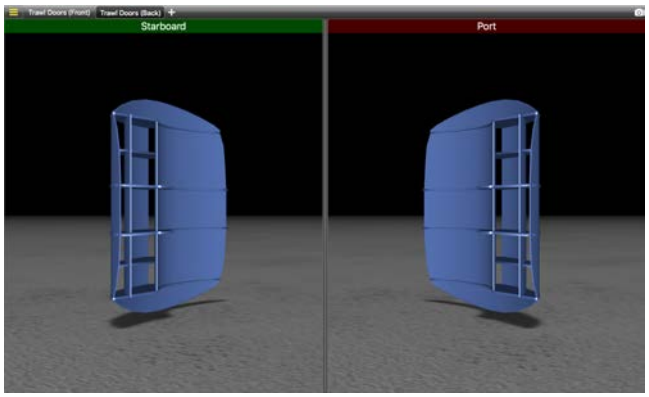
   a) From the top left corner, click **Menu** > **Settings**.
   b) Click the **Trawl** tab and select the models from the drop-down lists.



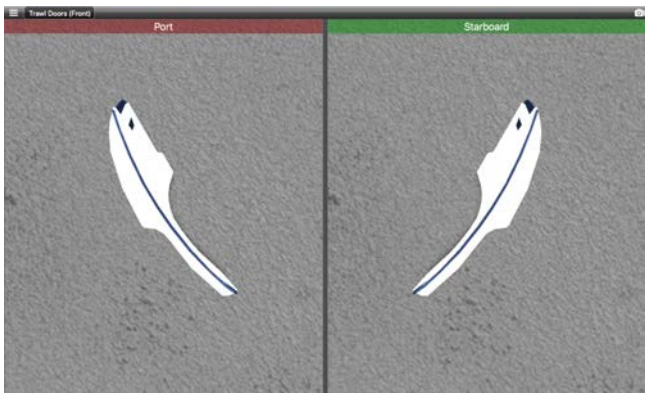
6. To change the view angle of the door, right-click the 3D view and choose:
   - **Horizontal Camera** to see the doors from the front:



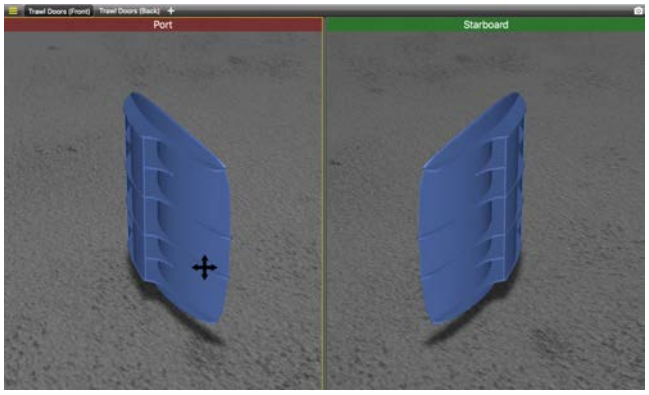
   Or back:



   - **Vertical Camera** to see the doors from above.



- **Free Camera** to adjust the viewing angle yourself, by clicking and dragging the 3D doors.



7. To display or hide the ground, right-click the 3D view and select or not **Display Ground**. You should leave the ground displayed, in order to see if the doors are touching it.

Displaying Trawl Speed 3D View

You can display a 3D view of the trawl speed sensor to see the positioning of the trawl and the across and along water speeds. You can use this view instead of the dial display, as this is more intuitive.

Before you begin

You must be in **Customize** mode to do this task.

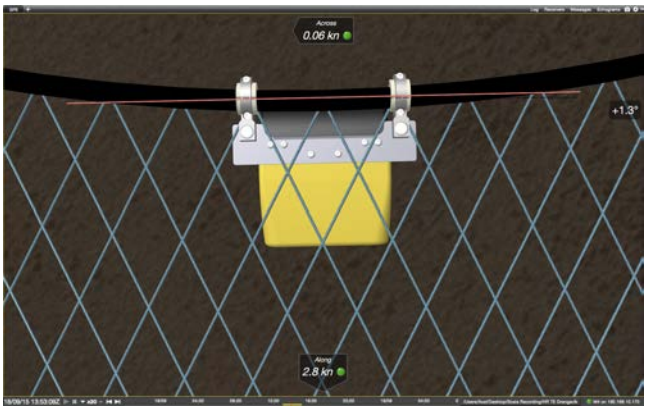
Procedure

1. From the lower part of the control panels, click **Customize**.

   The **Customize** panel appears.
2. Click + drag the **TS 3D** to the page.

3. Drop it in a yellow area.
4. In the dialog box that appears, select the location of the trawl speed sensor.

   The 3D view of the trawl speed sensor is displayed. You can see the along and across speeds and the positioning angle of the trawl.



What to do next

Deactivate the Customize mode when you have finished customizing pages: click **Menu** > **Customize** again.

Displaying Vessel System 3D View

You can display a 3D overview of the vessel system if you have the Scala Full version. To know if you have the 3D enabled, check in **Menu** > **About Scala**.

Before you begin

You must be in **Customize** mode to do this task.

You need to have incoming data from:

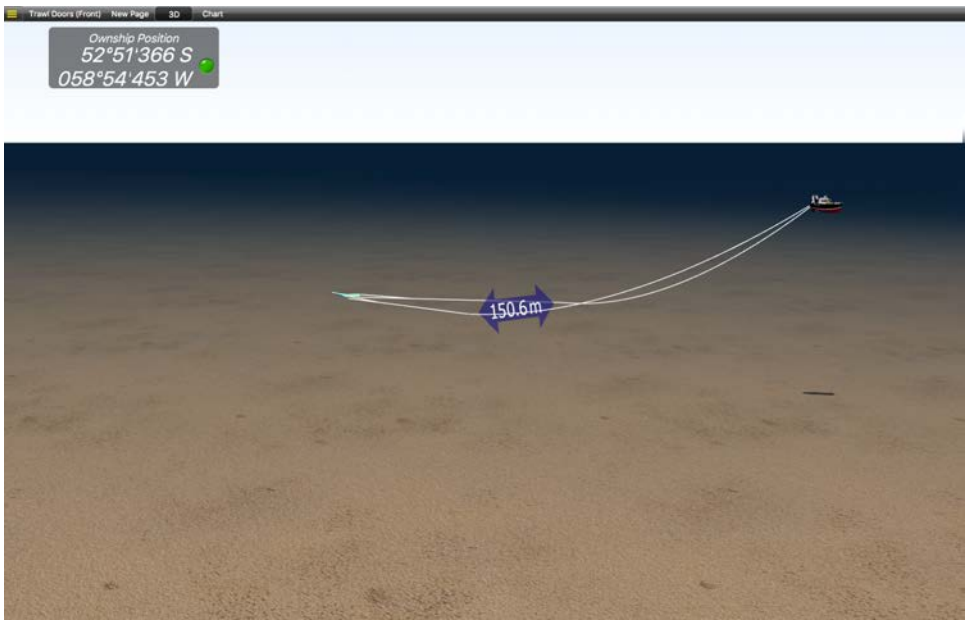
- GPS (position, heading)
- Sensors with positioning
- Warp lengths or Slant Range sensors giving distance to vessel

Procedure

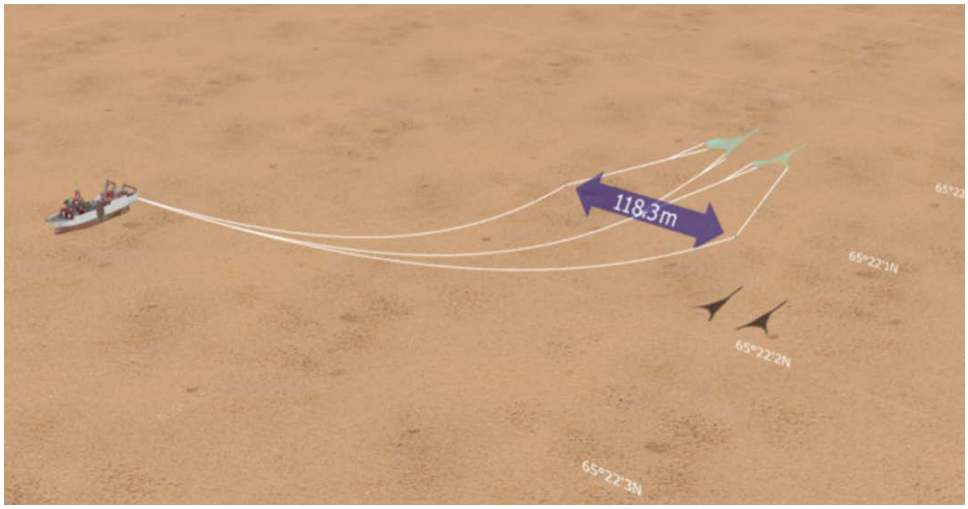
1. From the lower part of the control panels, click **Customize**.

   The **Customize** panel appears.
2. Click + drag the **3D Overview** to the page.

A 3D view of the vessel and trawl is displayed.



If you have twin trawls, you can see it on the 3D view as well. Make sure you have configured twin trawls in the receiver settings.



3. To change the vessel 3D model, from the upper left corner of the screen click **Menu** > **Settings** and click the **Ownship** tab.
4. To change the view, you can use the numeric keypad: press 5 to see the vessel from above, press the digits around to make the vessel turn accordingly (2 being front view and 8 back view).
5. Or, right-click the 3D view and choose:
   - **Moves Camera with** to select which part of the system the camera follows.
   - **Reset Camera Position** to come back to the default view.
   - **Fix Camera on Ownship** so that the camera moves with the vessel.

What to do next

Deactivate the Customize mode when you have finished customizing pages: click **Menu** > **Customize** again.

Displaying the Chart View

You can display the location and trajectory of the trawl behind the vessel if you receive GPS data and have door positioning sensors.

Before you begin

- You must be in **Customize** mode to do this task.

You must have:

- Incoming GPS data and heading data.
- Spread or Slant Range sensors with bearing measurement
- Warp lengths or Slant Range sensors giving distance to vessel

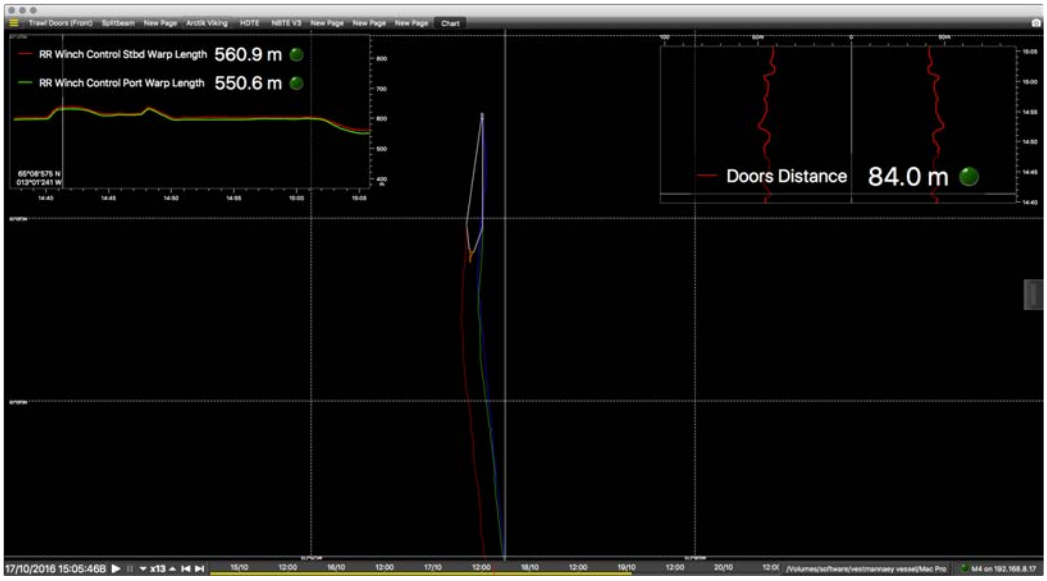
Procedure

1. From the lower part of the control panels, click **Customize**.

   The **Customize** panel appears.
2. Click + drag **Chart** to the page.

3. Drop it in a yellow area.

   The chart view is displayed. The blue trail is the heading of the vessel, red trail is the port door and green trail is the starboard door.



4. If the view looks empty it might be because the view is not centered on the vessel. Right-click the view and click **Center on Ownship** or **Center on Ownship and Trawl**.

What to do next

Deactivate the Customize mode when you have finished customizing pages: click **Menu** > **Customize** again.

Displaying a Position Marker

You can place a marker on plots and echograms to display the GPS position at a given time on the timestamp.

Before you begin

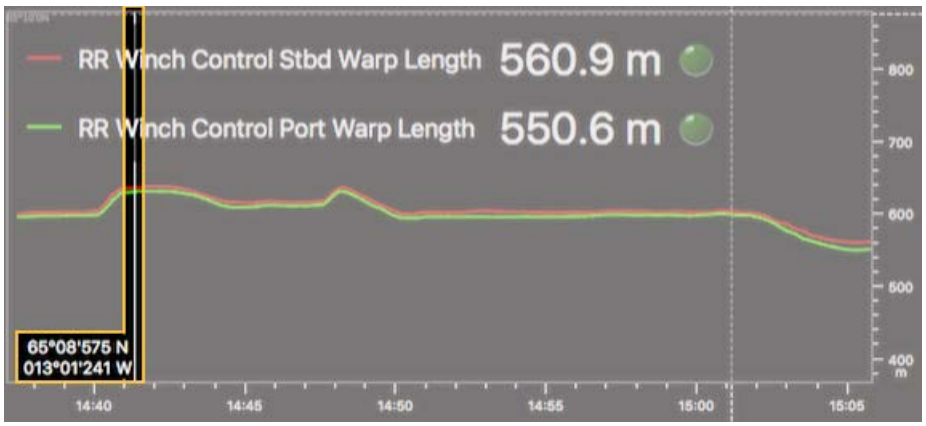
You need incoming GPS data.

Procedure

1. From the top left corner, click **Menu** > **Settings**.
2. Under the tab **Storages**, select **Display global position cursor on plots and echograms**.

Results

A marker with your position is displayed on plots and echograms.



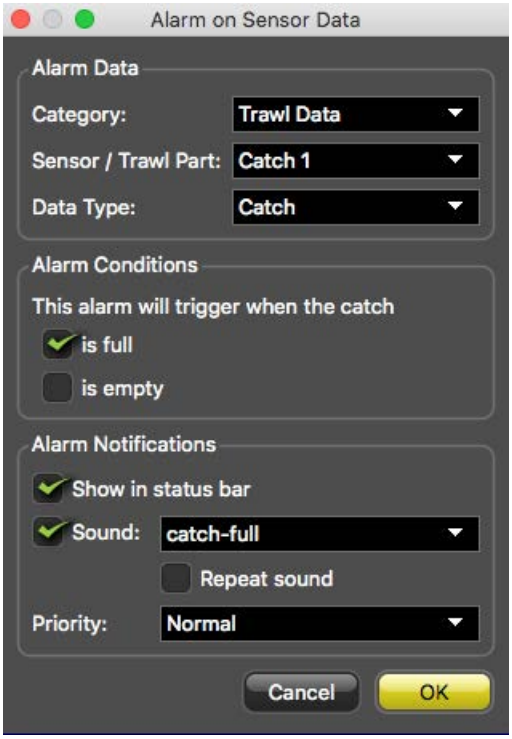
Setting an Alarm on Incoming Data

You can be alerted by an alarm when data received have a given value.

Procedure

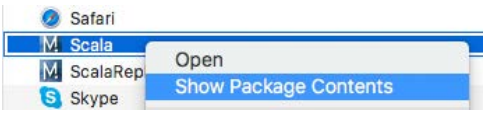
1. From the top left corner of the screen, click **Menu** > **Settings**.
2. In **Alarms**, click **Add**.
3. In **Alarm Data**, choose on which equipment and type of data you want to set an alarm.
4. In **Alarm Conditions**, choose the conditions on which the alarm is triggered.
5. In **Alarm Notifications**, choose if you want to display a visual notification in the status bar and a sound.

For example, you can put these parameters to be alerted when the catch is full:

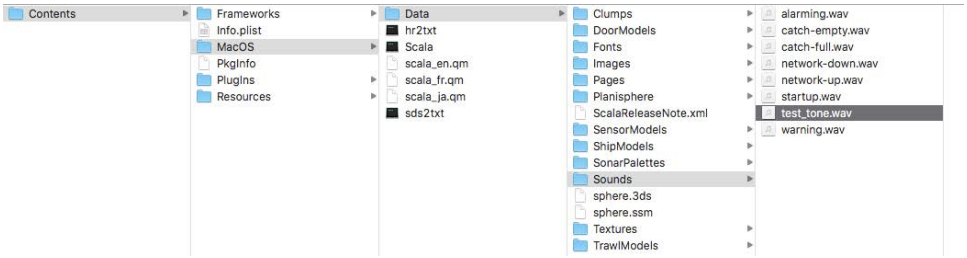


6. You can import your own sounds:

   a) In the **Applications** folder, right-click Scala icon and select **Show Package Contents**.



   b) Click **Contents** > **MacOS** > **Data** > **Sounds**.



   c) Add a new *.wav sound file in this folder.

   This sound is now available for selection in the alarm settings.

Changing the Default Units

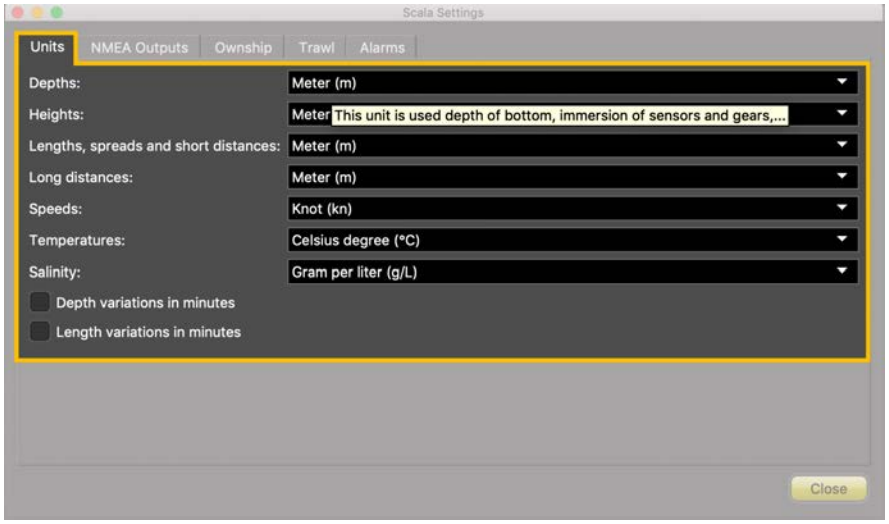
You can change the default units of data displayed in Scala.

Procedure

1. From the top left corner, click **Menu** > **Settings**.
2. In **Units**, select the units to use in Scala among the following units:
   - For distance data: meter, foot, yard, fathom, cable length (only for lengths)

- For speed data: kilometer/hour, knot, meter/second, mile/hour
- For temperature data: Celsius or Fahrenheit

Tip: Hover over the units in the menu to see for which data they are used.



Recording and Replaying Data

Data received by Scala can be replayed with Scala Replay application.

Recording of Incoming Data

Data received by Scala can be recorded on your computer.
By default, when you first install Scala, data are automatically recorded.

If you want to stop or start the recording of data, click **Menu** > **Stop Recording** or **Start Recording**.

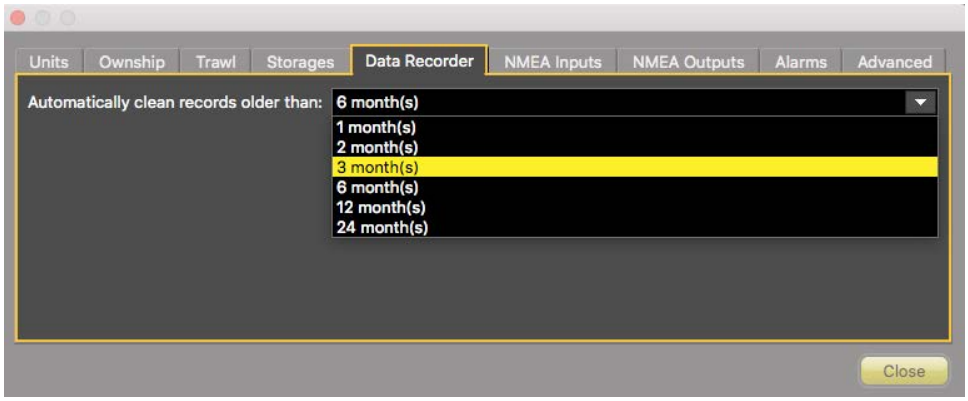
All incoming data is by default recorded in **Documents/Marport/SDSRecord**.

The name of the SDS files indicates the year, month, day and hour of the beginning of the record, in GMT timezone. Click **Menu** > **Settings** > **Data Recorder** to change the folder where recorded data are saved. Connect in **Expert Mode**, then click **Menu** > **Settings** > **Advanced** to change the folder where recorded data are saved.

Data recorded can take a significant amount of space on your computer. Go to **Settings** > **Data Recorder** and set how much disk space need to remain available on the computer. This will avoid disk overload. When the maximum disk space is reached, the oldest files are deleted as new files are created.

By default, the recording interval is set to 1 month. This means that files older than 1 month are automatically deleted as new files are recorded.

Note: For versions before 01.06.34, files older than 6 months are deleted. If updating Scala to 01.06.34, the period remains 6 months. We strongly recommend to set the period to 1 month in order to save disk space on the computer.


Units
Ownship
Trawl
Storages
Data Recorder
NMEA Inputs
NMEA Outputs
Alarms
Advanced
Automatically clean records older than:
6 month(s)
1 month(s)
2 month(s)
3 month(s)
6 month(s)
12 month(s)
24 month(s)
Close

Replaying Data on Scala Replay

You can replay on Scala Replay data you have recorded.

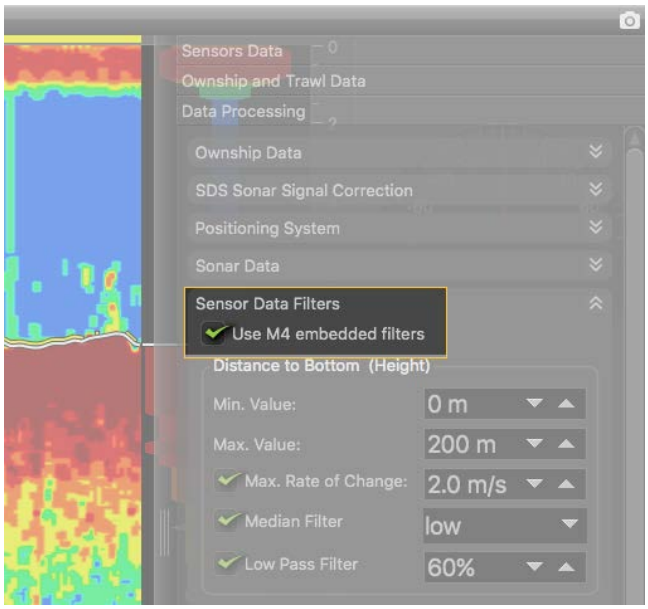
Procedure

1. Click the **Launchpad** icon in the Dock. Then click the Scala Replay icon.

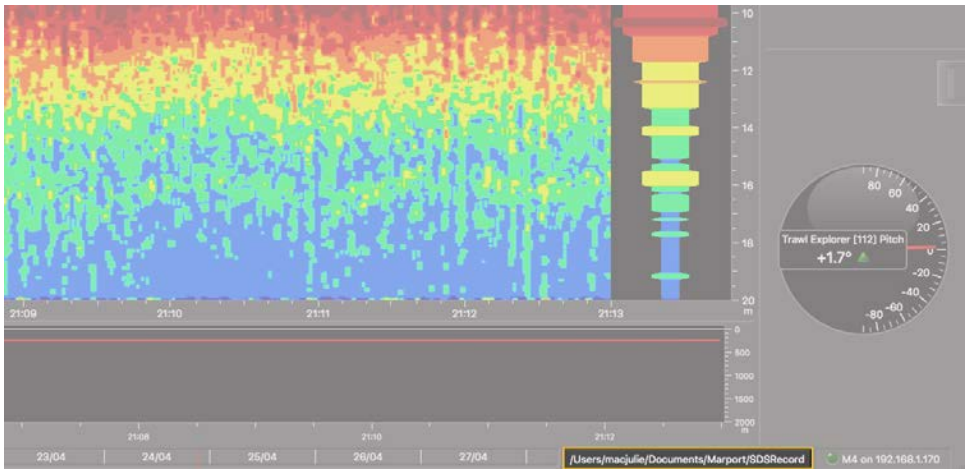
Scala Replay opens.

Note: macOS Catalina: when opening Scala Replay for the first time, click **OK** when the computer asks you to access folders such as **Documents**, **Downloads** or **Photos**.

2. Open the control panels, then click **Data Processing** > **Sensor Data Filters** and select **Use Mx embedded filters**.

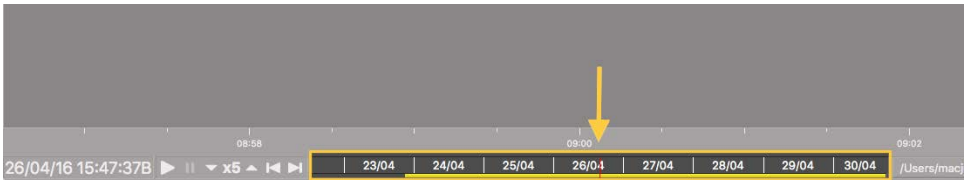


3. In Scala Replay, click the file path on the lower right corner of the screen.



4. The path of the folder where the SDS files are stored is displayed at the bottom of the page. By default, Scala Replay reads files that are in **Documents/Marport/SDSRecord**. If there is no path displayed, or if you want to change the source folder, click the path.

   Data from the source folder is displayed at the bottom of the screen, in the timeline. Periods containing recorded data are in yellow and your position in the timeline is marked by a red line.

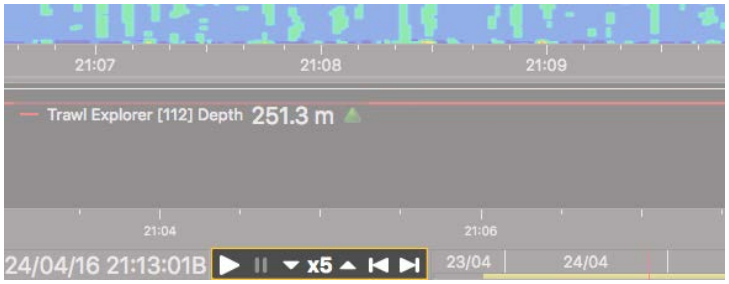


5. To zoom in and out on the timeline, place your mouse on the timeline and scroll.
6. To move along the timeline, click + drag the timeline.

7. The date and time of the recording is displayed on the left side of the timeline. Right-click the hour to change it to UTC timezone.

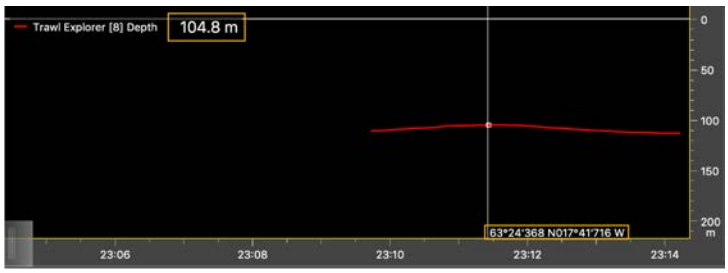
8. Control the playback using the play, pause and speed control buttons at the left of the timeline.

   Note: You can change the display of page data only when the playback is paused.



9. To display with a marker the global position and value of data in plots:

   a) Click **Menu** > **Settings** > **Data History**.
   b) Select **Display global position cursor on plots and echograms**.
   c) Pause the replay, then hover the mouse over plots to see the global position and value of data, or over echograms to see the global position.



Adding Events

You can mark a specific moment when receiving live data to find it back when replaying data with Scala Replay.

Procedure

1. Make sure the recording of data is activated.
2. On Scala, click  on the top right corner of the screen when you want to mark an event.
3. Add a legend.
4. Open the corresponding SDS files on Scala Replay.

   You can see a marker on the timeline at the time at which you created the event.

5. You can also manually add events to the timeline of replay files: mark a specific moment in the replay, or jump forward or backward in the timeline:

   a) Create an XML document named Markers.xml and put it in the same folder as the SDS files you are replaying. The document must begin by `<Markers>` and end by `</Markers>`.
   b) To add a marker (**1**, **2**), enter the following line: `<Marker date="YYYY-MM-DDTHH:MM:SSZ" text="xxx"/>`. The time is in UTC time zone. The content of "text" appears when hovering over the marker in the timeline (**1**).
   c) To add jumps, enter the following line: `<Jump from="YYYY-MM-DDTHH:MM:SSZ" to "YYYY-MM-DDTHH:MM:SSZ"`. Jumps allow you to directly jump from a given position (green arrow) to another location (blue arrow). You can jump forward (**3**) or backward (**4**) in the timeline.

   Here is an example of a code and the result.

```
<Markers>
    1 <Marker date="2016-02-03T08:15:00Z" text="fish"/>
    2 <Marker date="2016-02-03T09:25:00Z" text="fish"/>
    3 <Jump from="2016-02-03T06:30:00Z" to="2016-02-03T07:45:00Z"/>
    4 <Jump from="2016-02-03T10:30:00Z" to="2016-02-03T10:00:00Z"/>
</Markers>
```

Figure 4: Example of XML file

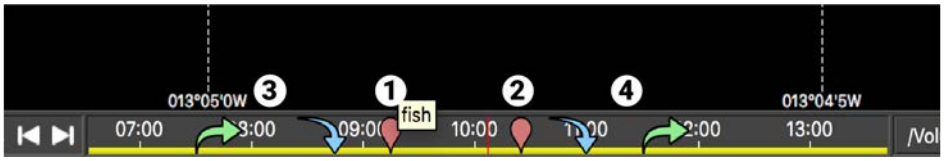


Figure 5: Example of display in the timeline

Extracting Data from SDS Files

You can extract data contained in SDS files and display the contents in a table on a spreadsheet application, using Marport sds2txt application.

Ask your local Marport office for more details about how to get the application and how to use it.

Maintenance and Troubleshooting

Read this section for troubleshooting and maintenance information.

Installing Updates

You can install new versions of Scala once they are released. Ask your local dealer to obtain them.

Procedure

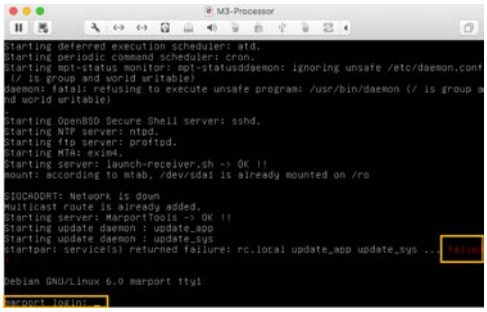
1. Double-click the installation zip file.
2. Follow the installation steps.
3. From the installation window that appears, drag Scala icon to the **Applications** icon.

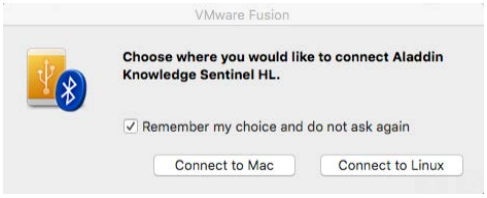
4. Do the same for the Scala Replay icon.

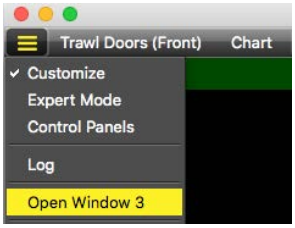
Troubleshooting

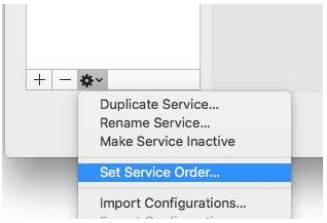
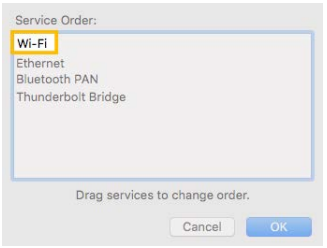
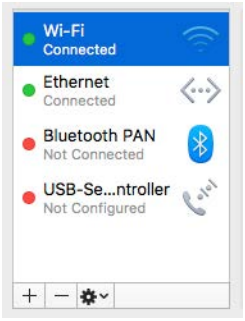
Read this section to find solutions for common problems.

Problem	Possible causes	Solution
Scala does not open due to error message saying Scala cannot be opened.	Your Mac security preferences do not allow you to open applications not downloaded from the App Store.	1. Click **Apple menu** > **System Preferences** > **Security & Privacy** 2. From the lower-left corner of the **Security & Privacy** dialog box, click the lock icon and enter your password if you have one. 3. In **Allow apps downloaded from**, select **Anywhere**. 4. If you are under OS X Sierra and above, click **Open Anyway** or see Installing Scala on page 14 to know how to add the **Anywhere** option.

Problem	Possible causes	Solution
When starting the system, there is a black window saying **failed** and asking for a login.	This window comes from a virtual machine software that analyzes sensors data. This program is necessary for the correct operation of the receiver.	**Important: DO NOT CLOSE this window**. **Failed** and **login** indications are normal and always appear. You do not need to enter anything. • On the top of the window, click minimize to hide it. Change the settings as explained in Automatically Opening Scala at Start Up on page 16 to keep it hidden. This icon should always appear at the bottom of your desktop screen:  • If you close the window, restart the computer. • Do not click inside the window or you will loose the mouse. If you lost the mouse, connect a keyboard and press **ctrl + cmd** (Apple) / **ctrl + window** key (Windows). 
Sensor data is not displayed, LEDs are red or orange.	You may have closed the virtual machine when you opened Scala or when you plugged in a device.	1. Check if this icon is in the dock, at the bottom of your screen:  2. If it is not present, restart the system. **Important:** A virtual machine starts automatically when starting your computer and is necessary for Scala functioning. The virtual machine window can appear when opening Scala. Do not close it. A message is also displayed when plugging an USB device. For guidance, see: A VMware Fusion message appears when adding a new USB key.

Problem	Possible causes	Solution
	Ethernet connection is down.	1. Click **Menu** > **Expert Mode** and enter the password `copernic`. 2. Click **Menu** > **Receivers**. 3. From the system setting page, check on the schema at the bottom is there are green checks.  4. If there is a red cross, check that the power supply for PoE adapter is connected to the mains supply. 5. From the system page, click **Hydrophones** from the panel on the left. 6. Check the hydrophones current status. If there is no current: 1. Check from the configuration page that the correct hydrophone type between passive and active is selected. 2. Check that the wiring in the hydrophone junction box is correct.
A VMware Fusion message appears when adding a new USB key.	This message is due to the virtual machine that is installed on your computer with Scala. It appears when adding an external USB device.	 1. Select **Remember my choice and do not ask again**. 2. Click **Connect to Mac**.
The size of Scala window is smaller than before.	Scala window must have lost the full screen display.	Double-click the top of the window to have a full screen window.

Problem	Possible causes	Solution
I cannot find a window I created.	You may have closed the window.	Click **Menu** > **Open Window X**.  The window opens. **Note:** If you moved or deleted all the pages contained in a window, this window is permanently deleted.
I do not see pages I created on the top toolbar.	You may have moved these pages to a new window.	1. Check your other windows to see if your page appears in it. If you created a window and cannot find it, see the previous troubleshooting case. 2. If you want to move your page to another window, connect in **Customize** mode. To move it to the window with the control panels, right-click the page name and click **Move to Main Window**. To move it to another window click **Move to Window X**. 

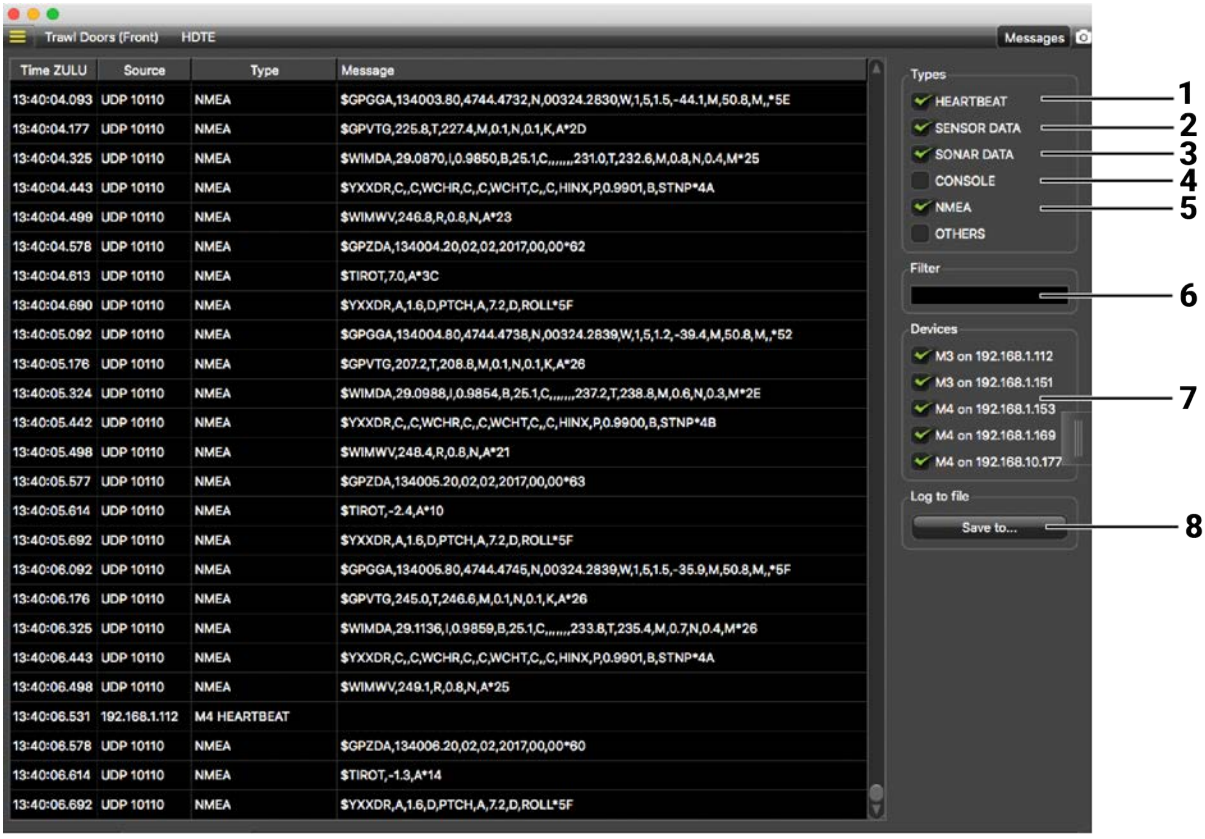
Problem	Possible causes	Solution
I cannot connect to the internet.	Internet network might be too far in the network list.	1. Click **Apple menu** > **System Preferences** > **Network**. 2. From the bottom of the network list, click the wheel icon and select **Set Service Order**.  3. Drag on top of the list the network you use to have internet. It can be for example your phone WiFi, your WiFi router, a USB to Ethernet adapter...  

Advanced Troubleshooting Tools

Messages

You can see on Scala incoming messages from the equipment connected to the system.

To see incoming messages, click **Menu** > **Expert Mode** . Click the menu icon again and click **Messages**.



One message is displayed in 4 columns indicating the ZULU time at which data is received, the source of the message (receiver on which data is received, connection type for NMEA), the type of data and the content of the message.

Below are the types of messages that are displayed:

1 **Heartbeat**: Receiver inputs. Read to check if computer is correctly connected to the receiver.

2 **Sensor Data**: Inputs from PRP sensors. At each ping of the sensor, shows one message for raw data and one message for filtered data. One message contains the type of data sent by the sensor, the node number, the hydrophone receiving data (such as H1, H2) and the quality of the reception. Read these messages to check if data is correctly received. Look at the names of the receiving hydrophone to know on which hydrophone data are better received.

3 **Sonar Data**: Inputs from narrow band sensors (digital communication). At each ping of the sensor, shows one message for raw data and one message for filtered data. One message contains the type data sent by the sensor, the node number, the direction of the ping and the hydrophone receiving data. Read theses messages to check if data is correctly received. Look at the names of the receiving hydrophones to know on which hydrophone data are better received.

4 **Console**: Used for development only. Not displayed by default.

5 **NMEA**: Displays full NMEA sentences that are received. Read these messages to check if NMEA sentences from external devices (such as a GPS) are correctly decoded.

6 **Filter**: Filter messages. For example, type `Temp` to only display temperature data.

7 **Devices**: Receivers on the system.

8 **Log to File**: Export incoming messages into a text file.

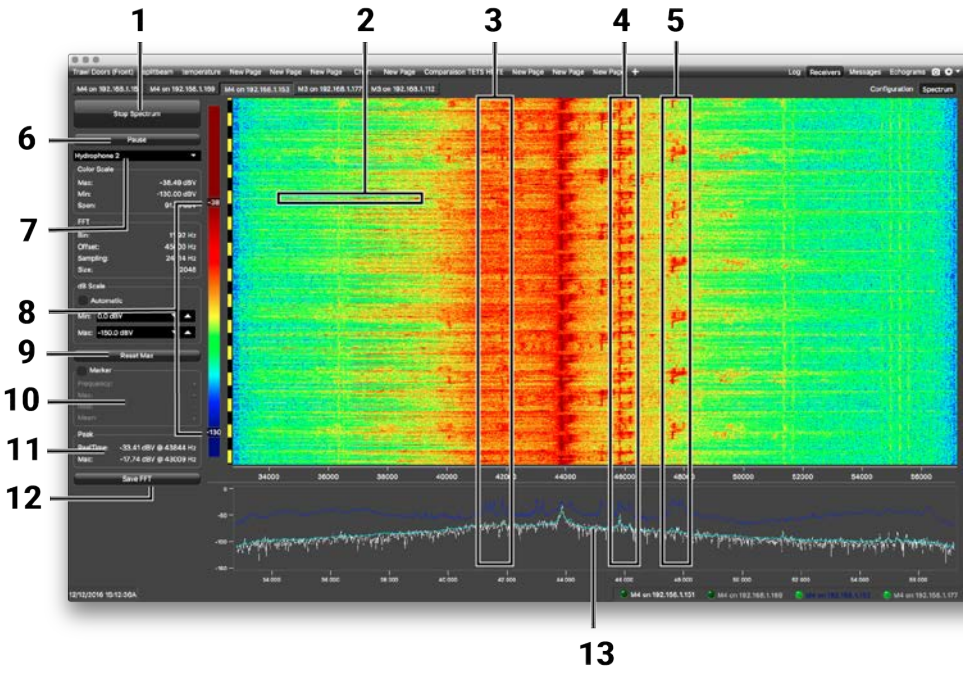
Log

If you have issues on Scala, the log can be useful to know what are the latest actions that happened. Scala log displays every action that happens on Scala.

- To see the log, click **Menu** > **Log**.

Spectrum Analyzer Display

The following picture explains the main parts of the spectrum analyzer page on Scala.



1 Start/Stop spectrum analyzer

2 Noise interference

3 Pulses of the sensors (PRP)

4 Narrow band/HDTE signals

5 Door sounder signals

6 Pause spectrum analyzer

7 Select hydrophone

8 Drag to adjust color scale

9 Reset the Max line.

10 **Marker**: display frequency and levels of noise (dB) at the mouse pointer location on the graph.

11 **Peak**:

- **RealTime**: latest highest level of noise recorded.
- **Max**: highest level of noise recorded since the beginning of the spectrum.

12 Export recorded max, mean and real time noise levels in a txt file.

13
- Dark blue line: maximum signal level
- Cyan line: average signal level
- White line: last received signal level

Checking Noise Interference

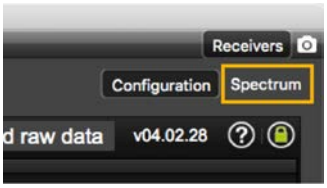
You can use the spectrum analyzer to check the noise level of the hydrophones and check for interference.

About this task

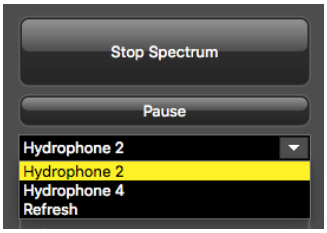
See Spectrum Analyzer Display on page 125 for details about the spectrum analyzer display.

Procedure

1. Click **Menu** > **Expert Mode** and enter the password `copernic`.
2. Again in the menu, click **Receivers**.
3. From the top right corner of the screen, click **Spectrum**.



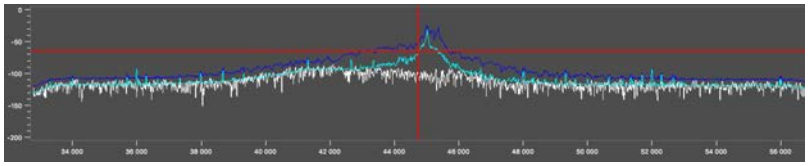
4. Select the hydrophone you want to test. Only the hydrophones that are switched on are displayed. Select refresh to update the list.



5. From the top left corner of the screen, click **Start Spectrum**.

   The graph at the bottom of the page shows three levels of noise in dBV:

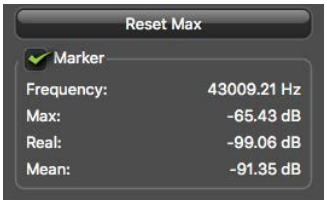
   1. **RealTime** (white): level of noise recorded in real time.
   2. **Mean** (cyan): mean recorded level of noise. It is useful to assess the noise floor.
   3. **Max** (dark blue): shows the latest highest level of noise recorded. It is useful to see on which frequencies are the sensors.



   The acceptable average level of noise depends on the conditions (distance from the sensor to the hydrophone, fishing method, type of hydrophone). You can have better performance with the following levels:

   - Active wideband hydrophone with high/low gain: below -100 dBV
   - Active narrowband: NC-1-04 below -80 dBV / NC-1-07 below -100 dBv
   - Passive hydrophone: below -110 dBV

6. To see the maximum, mean and real time measures of noise level at a specific frequency, select **Marker** on the left side of the screen and move the mouse over the graph.



   Frequency and levels of noise (dB) at the mouse pointer location are displayed under **Marker**.

7. Under **Peak**, you can check:
   - **RealTime**: the latest highest level of noise recorded.
   - **Max.**: the highest level of noise recorded since the beginning of the spectrum.
8. Check that there is more than 12dBV between the maximum noise level (dark blue line) and the average noise level (light blue line) on the peak of sensor frequencies.
9. If you changed the configuration of the hydrophone or sensors, click **Reset Max** to reset the dark blue line showing the maximum level of noise.
10. To save data recorded by the spectrum in a *.txt file, click **Save FFT**.

    The FFT file lists for the entire bandwidth used by the hydrophone (frequencies are in Hz) the maximum and mean levels of noise since the FFT export has started and the last real time level of noise before the export (dBV).

FFT level for Hydrophone 1 of Receiver 192.168.1.153			
Freq	Max	RealTime	Mean
32793	-129.07	-136.64	-138.50
32804	-129.31	-138.41	-139.65
32816	-128.72	-142.89	-139.02
32828	-128.09	-147.78	-139.86
32840	-127.95	-143.07	-140.06

11. When you have enough data, click **Stop Spectrum**.

Recording Audio Files

If there are issues with the reception of sensor data or with noise interference, the support service may need a recording of the system noise in order to analyze it.

Procedure

1. From the lower right corner of Scala window, right-click the receiver name.
2. Click **Record WAV Files** and confirm.

   The receiver name becomes yellow. The recording lasts 180 seconds.
3. From the lower right corner of Scala window, right-click the receiver name, then click **Record WAV Files**.

   The receiver name becomes yellow. The recording lasts 180 seconds.
4. When the recording is finished, click **OK** to download it.

   The audio file is saved in: **Documents/Marport/Scala/(ReceiverIPAddress-Date)/Output**.
5. Send the recording to Marport support service for a diagnosis.

Giving Remote Access to the Computer

If you have an issue with the system, you may need to give remote access to the computer to the support team with **TeamViewer** application.

Before you begin

You need to have access to a good internet connection.

Procedure

1. From the **Launchpad** or Dock, click **TeamViewer**.

2. Check that you have the message **Ready to connect** at the bottom left corner of TeamViewer. If the message is **Not ready** it means you have no internet connection.
3. You can give access to your computer to the support team by giving them the ID and Password displayed under **Allow Remote Control**.

Uninstalling Scala

You can uninstall Scala and Scala Replay from your computer.

About this task

Important: Removing completely Scala preferences and settings means all pages and customizations will be lost. Only do this task if necessary.

Procedure

1. Go in **Applications**.
2. Right-click Scala or Scala Replay icon and select **Move to Trash**.
3. To remove all Scala and Scala Replay preferences and settings from the computer:
   a) Find the *.dmg file that you downloaded when you installed Scala. By default it should be in the **Downloads** folder of the computer.
   b) Double-click the *.dmg file.

      The installation panel appears.

c) Double-click **UninstallScala.command**.

Support Contact

You can contact your local dealer if you need maintenance on your Marport products. You can also ask us at the following contact details:

FRANCE

Marport France SAS

8, rue Maurice Le Léon

56100 Lorient, France

supportfrance@marport.com

ICELAND

Marport EHF

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supporticeland@marport.com

NORWAY

Marport Norge A/S

Breivika Industrivei 69

6018 Ålesund, Norway

ggrimsson@marport.com

SOUTH AFRICA

Marport South Africa

Cape Town, Western Cape

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Paarden Eiland, 7405

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Mukilteo, WA 98275, USA

supportusa@marport.com

Appendix

Compatible Incoming NMEA Sentences

Scala can decode and use the following types of NMEA sentences coming from external devices (GPS, winch system, sounder...).

NMEA 0183 Standard Sentences

Symbol (*) indicates which parts of the sentence Scala uses.

NMEA Sentence	Format	First compliant version of Scala
DBK - Depth Below Keel	`$--DBK,a.a,F,b.b,M,c.c,F*hh<CR><LF>` **1.** $--: Talker identifier* **2.** DBK: Sentence formatter* **3.** a.a,F: Depth, feet **4.** b.b,M: Depth, meters* **5.** c.c,F: Water depth, fathoms **6.** *hh: Checksum*	1.4.0.0
DBT - Depth Below Transducer	`$--DBT,a.a,F,b.b,M,c.c,F*hh<CR><LF>` **1.** $--: Talker identifier* **2.** DBT: Sentence formatter* **3.** a.a,F: Water depth, feet* **4.** b.b,M: Water depth, meters* **5.** c.c,F: Water depth, fathoms* **6.** *hh: Checksum*	1.2.0.0
DPT - Depth	`$--DPT,a.a,b.b,c.c*hh<CR><LF>` **1.** $--: Talker identifier* **2.** DPT: Sentence formatter* **3.** a.a: Water depth relative to the transducer, meters* **4.** b.b: Offset from transducer, meters (positive = distance from transducer to water line; negative = distance from transducer to keel)* **5.** c.c: Maximum range scale in use **6.** *hh: Checksum*	1.0.0.0

NMEA Sentence	Format	First compliant version of Scala
GGA - Global Positioning System Fix Data	`$--GGA,hhmmss.ss,aaaa.aa,b,cccc.cc,d,e,ff,g.g,h.h,M,i.i,M,j.j,kkkk*hh<CR><LF>` **1.** $--: Talker identifier* **2.** GGA: Sentence formatter* **3.** hhmmss.ss: UTC of position* **4.** aaaaa.aa, b: Latitude North/South (N/S)* **5.** cccc.cc, d: Longitude East/West (E/W)* **6.** e: GPS quality indicator **7.** ff: Number of satellites in use (00-12) **8.** g.g: Horizontal dilution of precision **9.** h.h, M: Antenna altitude above/below mean sea level (geoid), meters* **10.** i.i, M: Geoidal separation, meters **11.** j.j: Age of differential GPS data **12.** kkkk: Differential reference station ID **13.** *hh: Checksum*	1.0.0.0
GLL - Geographic Position - Latt/Long	`$--GLL,aaaa.aa,L,bbbbb.bb,L,hhmmss.ss,C,d*hh<CR><LF>` **1.** $--: Talker identifier* **2.** GLL: Sentence formatter* **3.** aaaa.aa,L: Latitude North/South (N/S)* **4.** bbbbb.bb,L: Longitude East/West (E/W)* **5.** hhmmss.ss: UTC of position* **6.** C: status (A= data valid / V: data not valid)* **7.** d: Mode indicator **8.** *hh: Checksum*	1.2.6.0

NMEA Sentence	Format	First compliant version of Scala
GNS - GNSS Fix Data	`$--GNS,hhmmss.ss,aaa.aa,L,bbbbb.bb,L,c--c, dd,e.e,f.f,g.g,h.h,i.i,a*hh<CR><LF>` **1.** $--: Talker identifier* **2.** GNS: Sentence formatter* **3.** hhmmss.ss: UTC of position* **4.** aaaa.aa,L: Latitude North/South (N/S)* **5.** bbbbb.bb,L: Longitude East/West (E/W)* **6.** c--c: Mode indicator **7.** dd: Total number of satellites in use (00-99) **8.** e.e: Horizontal dilution of precision **9.** f.f: Antenna altitude above/below mean sea level (geoid), in meters* **10.** g.g: Geoidal separation, meters **11.** h.h: Age of differential data **12.** i.i: Differential reference station ID **13.** *hh: Checksum*	1.0.0.0
HDG - Heading, Deviation & Variation	`$--HDG,a.a,b.b,M,c.c,M*hh<CR><LF>` **1.** $--: Talker identifier* **2.** HDG: Sentence formatter* **3.** a.a: Sensor magnetic heading (degrees)* **4.** b.b,M: Magnetic deviation (degrees), Easterly/Westerly (E/W)* **5.** c.c,M: Magnetic variation (degrees), Easterly/Westerly (E/W)* **6.** *hh: Checksum*	1.0.0.0
HDT - Heading, True	`$--HDT,a.a,T*hh<CR><LF>` **1.** $--: Talker identifier* **2.** HDT: Sentence formatter* **3.** a.a,T: Heading (degrees) True* **4.** *hh: Checksum*	1.0.0.0
MTW - Water Temperature	`$--MTW,a.a,C*hh<CR><LF>` **1.** $--: Talker identifier* **2.** MTW: Sentence formatter* **3.** a.a,C: Temperature, degrees C* **4.** *hh: Checksum*	1.4.0.0

NMEA Sentence	Format	First compliant version of Scala
MWD - Wind Direction & Speed	`$--MWD, a.a,T,b.b,M,c.c,N,d.d,M*hh<CR><LF>` **1.** $--: Talker identifier* **2.** MWD: Sentence formatter* **3.** a.a,T: Wind direction, 0° to 359° true* **4.** b.b,M: Wind direction, 0° to 359° magnetic* **5.** c.c,N: Wind speed, knots* **6.** d.d,M: Wind speed, meters/second* **7.** *hh: Checksum*	1.6.0.0
MWV - Wind Speed & Angle	`$--MWV,a.a,b,c.c,d,E *hh<CR><LF>` **1.** $--: Talker identifier* **2.** MWV: Sentence formatter* **3.** a.a: Wind angle, 0 to 359 degrees* **4.** b: Reference, R = relative, T = true* **5.** c.c: Wind speed* **6.** d: Wind speed units, K = km/h, M = m/s, N = knots* **7.** E: Status, A = data valid V= data invalid* **8.** *hh: Checksum*	1.0.0.0
VBW - Dual Ground/ Water Speed	`$--VBW,a.a,b.b,A,c.c,d.d,A,e.e,A,f.f,A*hh<CR><LF>` **1.** $--: Talker identifier* **2.** VBW: Sentence formatter* **3.** a.a: Longitudinal water speed (knots), "-" = astern* **4.** b.b: Transverse water speed, "-" = port* **5.** A: Status, A = data valid, V = data invalid* **6.** c.c: Longitudinal ground speed, "-" = astern* **7.** d.d: Transverse ground speed, "-" = port* **8.** A: Status, A = data valid, V = data invalid* **9.** e.e: Stern Transverse water speed, "-" = port* **10.**A: Status, A = data valid, V = data invalid* **11.** f.f: Stern Transverse ground speed, "-" = port* **12.**A: Status, A = data valid, V = data invalid* **13.***hh: Checksum*	1.4.0.0

NMEA Sentence	Format	First compliant version of Scala
VHW - Water Speed and Heading	`$--VHW,a.a,T,b.b,M,c.c,N,d.d,K*hh<CR><LF>` **1.** $--: Talker identifier* **2.** VHW: Sentence formatter* **3.** a.a,T: Heading, degrees True* **4.** b.b,M: Heading, degrees Magnetic* **5.** c.c,N: Speed, knots* **6.** d.d,K: Speed, km/hr **7.** *hh: Checksum*	1.4.0.0
VLW - Dual Ground/ Water Distance	`$--VLW,a.a,N,b.b,N,c.c,N,d.d,N*hh<CR><LF>` **1.** $--: Talker identifier* **2.** VLW: Sentence formatter* **3.** a.a,N: Total cumulative water distance, nautical miles* **4.** b.b,N: Water distance since reset, nautical miles* **5.** c.c,N: Total cumulative ground distance, nautical miles* **6.** d.d,N: Ground distance since reset, nautical miles* **7.** *hh: Checksum*	1.3.3.0
VTG - Course Over Ground and Ground Speed	`$--VTG,a.a,T,b.b,M,c.c,N,d.d,K*hh<CR><LF>` **1.** $--: Talker identifier* **2.** VTG: Sentence formatter* **3.** a.a,T: Course over ground, degrees, True* **4.** b.b,M: Course over ground, degrees, Magnetic **5.** c.c,N: Speed over ground, knots* **6.** d.d,K: Speed over ground, km/hr* **7.** *hh: Checksum*	1.3.3.0
VWR - Relative (Apparent) Wind Speed and Angle	`$--VWR,a.a,L,b.b,N,c.c,M,d.d,K*hh<CR><LF>` **1.** $--: Talker identifier* **2.** VWR: Sentence formatter* **3.** a.a,L: Relative Wind angle, 0 to 180 degrees, Left or Right (L/R)* **4.** b.b,N: Wind speed, knots **5.** c.c,M: Wind speed, meters/second **6.** d.d,K: Wind speed in Km/Hr **7.** *hh: Checksum*	1.3.3.0

Proprietary Sentences

Symbol (*) indicates which parts of the sentence Scala uses.

Sentence	Format	First compliant version of Scala
ATW - Naust Marine winch control system	`$NMATW,aaaaaa,bbbbbb,cccccc,dddddd,eeeeee,ffffff, ggggg,hhhhh,iiiii,jjjjj,kkkkk,lllll,mm:mm*hh <CR><LF>` $NMATW: Talker identifier + sentence formatter* a. Winch starboard tension (kg)* b. Winch port tension (kg)* c. Winch middle tension (kg)* d. Winch starboard length (meter or feet)* e. Winch port length (meter or feet)* f. Winch middle length (meter or feet)* g. RPM starboard h. RPM port i. RPM middle j. Line speed starboard (meter or feet/min) k. Line speed port (meter or feet/min) l. Line speed middle (meter or feet/min) m. Towing time (meter or feet/min)	1.2.0.0
CON - Consumption, attitude of vessel (Silecmar)	`$SICON,aaa,bbb,cc,ddd,ee.e,ff.f*hh<CR><LF>` **1.** $SICON: Talker identifier + sentence formatter* **2.** aaa: consumption of the main engine (L/H)* **3.** bbb: RPM of the main engine* **4.** cc: tilt of propeller's blade (%)* **5.** ddd: Out temperature of the exhaust gases, Celsius degrees* **6.** ee.e: Vessel pitch, degrees* **7.** ff.f: Vessel roll, degrees*	1.2.6.0
	`$SICON,aaa,bbb,cc,ddd,e.e*hh<CR><LF>` **1.** $SICON: Talker identifier + sentence formatter* **2.** aaa: consumption of the main engine* **3.** bbb: RPM of the main engine* **4.** cc: tilt of propeller's blade (%)* **5.** ddd: average trim angle of vessel, degrees* **6.** e.e: Out temperature of the exhaust gases, Celsius degrees*	1.6.19.0

Sentence	Format	First compliant version of Scala
FEC - Furuno attitude message	`$PFEC,GPatt,aaa.a,bb.b,cc.c,*hh<CR><LF>` **1.** $PFEC: Talker identifier + sentence formatter* **2.** GPatt: Global positioning attitude, sentence formatter **3.** aaa.a: Heading true* **4.** bb.b: Pitch* **5.** cc.c: Roll* **6.** *hh: Checksum*	1.0.5.0
KW - Karmoy Winch	`$KWIN,a,b.b,T,c.c,M,d.d,rpm*hh<CR><LF>` **1.** $KWIN: Talker identifier + sentence formatter* **2.** a: Winch 0 = Stbd / Trawl 1 = Port Trawl Winch **3.** b.b, T: Tensions (tons) **4.** c.c, M: Length (meters) **5.** d.d, rpm: Speed (rpm)	1.6.25.0
MA DD - Marelec winch length and tension	`# MA DD dd/mm/yy hh:mm:ss LB aaaam LS bbbbm LM ccccm TB ddddK TS eeeeK TM ffffK gg<CR><LF>` **1.** # MA DD: talker identifier* **2.** dd/mm/yy: date **3.** hh:mm:ss: time **4.** LB aaaam: Shooted length portside in meters* **5.** LS bbbbm: Shooted length starboard in meters* **6.** LM ccccm: Shooted length center in meters* **7.** TB ddddK: Tension of portside in kg* **8.** TS eeeeK: Tension of starboard in kg* **9.** TM ffffK: Tension of center in kg* **10.** gg: system in 00 = MANUAL (stop), 10 = auto shooting, 20 = auto fishing, 30 = auto hauling, 40 = slow tension alarm without propeller reduction, 41 = slow tension alarm with propeller reduction, 50 = fast tension alarm without propeller reduction, 51 = fast tension alarm with propeller reduction*	1.2.0.0
NAV - Ifremer proprietary sentence	`$NANAV,04/09/yy,hhmmss.sss,NASYC,N,48,22.92315,W,004,28.90527,D,00.0,WG84,04/09/13, 13:05:37.000,COU,346.08,-00.22,+00.13,+00.00,+00052.172,000,0000`	1.0.0.0

Sentence	Format	First compliant version of Scala
IFM - Ifremer versatile sentence	`$PIFM,EU,MES,dd/mm/yy,hh:hh:ss.sss,TRFUN, ±a,bb,ccccc,dddd,e.e,f,ggggg,hhhh,i.i,j,<CR><LF>` **1.** $PIFM: Talker identifier + sentence formatter* **2.** OCGYR: pitch, roll, heading **3.** TRFUN: winch lengths (starboard, port) and winch tensions (starboard, port)	1.0.0.0
SYN - Winch Syncro 2020, winch length and tension	`$WMSYN,aaa.a,m,bbb.b,m,ccc.c,m,ddd.d,m,ee.e,t,ff.f, t,gg.g,t,hh.h,t,0.5,r,0.7,r,1.6,s,2.0,s,0,0,1,0,0, 45.5,c,33.0,p,32.8,p*31` **1.** $WMSYN: Talker identifier + sentence formatter* **2.** aaa.a: winch starboard length in meters* **3.** bbb.b: winch inner starboard length in meters* **4.** ccc.c: winch inner port length in meters* **5.** ddd.d: winch port length in meters* **6.** ee.e: winch starboard tension in tons* **7.** ff.f: winch inner starboard tension in tons* **8.** gg.g: winch inner port tension in tons* **9.** hh.h: winch port tension in tons* **10.**Other strings are not used.	1.0.0.0
	`$WMSYN,aaa.a,c,bbb.b,c,ccc.c,c,dd.d,t,ee.e,t,ff.f, t*hh<CR><LF>` **1.** $WMSYN: Talker identifier + sentence formatter* **2.** aaa.a,l: Starboard wire length (m=meter)* **3.** bbb.b,l: Mid wire length (m=meter)* **4.** ccc.c,l: port wire length (m=meter)* **5.** dd.d,t: Starboard wire tension, tons* **6.** ee.e,t: Mid wire tension, tons* **7.** ff.f,t: Port wire tension, tons*	1.6.19.0
TAWWL - RappHydema, PTS Pentagon warp length	`@TAWWL,a,M,b,M,c,M*hh<CR><LF>` See below. M = meter	1.4.4.0
	`@TAWWL,x,y,z*hh<CR><LF>` **1.** @TAWWL: Talker identifier + sentence formatter* **2.** a: Starboard winch length* **3.** b: Port winch length* **4.** c: Middle winch length*	1.6.19.0

Sentence	Format	First compliant version of Scala
TAWWT - RappHydema, PTS Pentagon warp tension	`@TAWWT,a.a,T,b.b,T,c.c,T*hh<CR><LF>` See below. T = tons	1.4.4.0
	`@TAWWT,a.a,b.b,c.c*hh<CR><LF>` **1.** @TAWWT: Talker identifier + sentence formatter* **2.** a.a: Starboard winch tension* **3.** b.b: Port winch tension* **4.** c.c : Middle winch tension*	1.6.19.0
WCT - Warp length and tension (Silecmar)	`$SIWCT,aaa,bbb,ccc,d.d,e.e,f.f*hh<CR><LF>` **1.** $SIWCT: Talker identifier + sentence formatter* **2.** aaa: Port winch cable, meters* **3.** bbb: Starboard winch cable, meters* **4.** ccc: Clump winch cable, meters* **5.** d.d: Tension in the port winch, tons* **6.** e.e: Tension in the starboard winch, tons* **7.** f.f: Tension in the clump winch, tons* **8.** *hh: Checksum*	1.2.6.0
WLP - Scantrol winch length (port)	`$SCWLP,a.a,M,b.b,M*hh<CR><LF>` **1.** $SCWLP: Talker identifier + sentence formatter* **2.** a.a,M: paid out wire in meters* **3.** b.b,M: wirespeed in meters/sec., positive when paying out wire **4.** *hh: Checksum*	1.0.6.0
WLS - Scantrol winch length (starboard)	`$SCWLS,a.a,M,b.b,M*hh<CR><LF>` **1.** $SCWLS: Talker identifier + sentence formatter* **2.** a.a,M: paid out wire in meters* **3.** b.b,M: wirespeed in meters/sec., positive when paying out wire **4.** *hh: Checksum*	1.0.6.0
WLC - Scantrol winch length (clump)	`$SCWLC,a.a,M,b.b,M*hh<CR><LF>` **1.** $SCWLC: Talker identifier + sentence formatter* **2.** a.a,M: paid out wire in meters* **3.** b.b,M: wirespeed in meters/sec., positive when paying out wire **4.** *hh: Checksum*	1.0.6.0

Sentence	Format	First compliant version of Scala
WTP - Scantrol winch tension (port)	`$SCWTP,a.a,T*hh<CR><LF>` **1.** $SCWTP: Talker identifier + sentence formatter* **2.** a.a,T: tension in tons* **3.** *hh: Checksum*	1.0.6.0
WTS - Scantrol winch tension (starboard)	`$SCWTS,a.a,T*hh<CR><LF>` **1.** $SCWTS: Talker identifier + sentence formatter* **2.** a.a,T: tension in tons* **3.** *hh: Checksum*	1.0.6.0
WTC - Scantrol winch tension (clump)	`$SCWTC,a.a,T*hh<CR><LF>` **1.** $SCWTC: Talker identifier + sentence formatter* **2.** a.a,T: tension in tons* **3.** *hh: Checksum*	1.0.6.0

NMEA Outputs from Scala

Scala can output data in the following formats.

Marport's proprietary sentence

Scala uses the following sentence to output sensor data:

$MPMSD, X, YY, ZZZ, TTT, u, VV.VVV*<chk>

1. **$MP**: Talker identifier
2. **MSD**: Sentence formatter (Marport Sensor Data)
3. **X, YY, ZZZ**: location of the emitting sensor on the trawl gear
4. **TTT**: type of sensor data
5. **u**: acronym of the unit
6. **VV.VVV**: decimal value
7. ***<chk>**: checksum. The checksum is a security measure to ensure that the sentence is transmitted accurately. The checksum follows the NMEA specifications (IEC 61162-1 Ed.4).

The following sections give more details about the contents of the sentence.

Sensor location

X, YY, ZZZ specifies the location of the emitting sensor on the trawl gear.

- **X**: 1 or 2 letters indicating on which gear the sensor is installed. This is useful only for twin or triple trawl gears.
- **YY**: 2 letters indicating the part of the gear where the sensor is installed.
- **ZZZ**: numerical code that is a Marport sensor node identifier related to the Mx receiver configuration. It is used in Scala to position the sensors in the 3D views.

Type of gear	Gear position	X
Single		T
Twin trawl	Starboard	ST
Twin trawl	Port	PT
Triple trawl	Starboard	ST
Triple trawl	Middle	MT
Triple trawl	Port	PT
Unknown		<Empty>

Trawl gear part	YY
Port Door	PD
Starboard Door	SD
Port Wing	PW
Starboard Wing	SW
Headrope	HR
Footrope	FR
Body	BO
Cod-end	CE

Clumps in twin or triple gears are coded as a starboard door of the trawl:

Clump	X, YY	Description
Twin trawl	P, SD	Port trawl, starboard door
Triple trawl, starboard clump	M, SD	Middle trawl, starboard door
Triple trawl, port clump	P, SD	Port trawl, starboard door

Sensor data types and values

TTT, u, VV.VVV contains the type, unit and value of sensor data.

- **TTT**: 3 letter code corresponding to the type of data.
- **u**: acronym of the unit.
- **VV.VVV**: decimal value.

Data type	TTT	Unit	u	Description
Depth	DPT	meters	m	Depth of sensor (distance from surface)

Data type	TTT	Unit	u	Description
Catch	CAT	%		Currently 0 (sensor OFF) or 100 (sensor ON), unit field is empty
Pitch	PIT	degrees	d	From -90 to 90
Roll	ROL	degrees	d	From -180 to 180
Temperature	TMP	Celsius degrees	c	
Spread starboard	XST	meters	m	Distance between the master spread sensor and the slave. If the field is empty, it means "slave lost".
Spread clump	XCL			
Spread port	XPT			
Battery	BAT	%		From 0 to 100. Unit field is empty.
Speed along	SPL	m/s	ms	
Speed across	SPX	m/s	ms	
Distance to bottom	DTB	meters	m	Distance from the sensor to the sea floor
Opening	OPN	meters	m	Distance from the headrope to the footrope or from the top to the bottom of the trawl body
Clearance	CLR	meters	m	Distance from the footrope or the bottom of the trawl body to the sea floor
Slant Distance	SLD	meters	m	Distance from the sensor to the hydrophone
Relative Bearing	RBR	degrees	d	Angle from the ownship to the sensor relative to ownship heading
True Bearing	TBR	degrees	d	Angle from the ownship to the sensor relative to True North

Spread data comes from the master sensor.

Type of gear	X, YY, ZZZ, TTT	
Single (the master is on the port door)	P,PD,23,XST	Distance between doors
Twin trawl (the master is on the port door)	P,PD,23,XST	Distance between doors
	P,PD,23,XCL	Distance between port door and clump

Type of gear	X, YY, ZZZ, TTT	
Triple trawl (the masters are on the port doors)	P,PD,23,XST	Distance between port door and starboard clump
	P,PD,23,XCL	Distance between port door and port clump
	S,SD,223,XST	Distance between starboard door and starboard clump
Triple trawl with port (the master is on the port clump)	P,SD,78,XST	Distance between port clump and starboard door
	P,SD,78,XCL	Distance between port clump and starboard clump
	P,SD,78,XPT	Distance between port clump and port door

Positioning sentences

Scala can output NMEA data for trawl door positioning with the following sentences:

- Scala 01.06.06 and later: $PSIMS (Olex), $PTSAL (MaxSea version 12), $PMPT (TimeZero)
- Scala 01.06.14 and later: adding $IIGLL (MaxSea version 12, single position sentence), $IITPT (Simrad)
- Scala 01.06.23 and later: adding $PTSAL (SeaPix)

These are examples of PSMIS, PTSAL and IITPT sentences:

$PSIMSn,aaa,M,bbb,M,ccc.c,T,ddd.d,M, hhmmss*hh<cr><lf>

- **$PSIMS**: talker identifier + sentence formatter
- **n**: 1 = Spread1 (port trawl door when Twin Rig) / 2 = Spread2 (starboard trawl door when Twin Rig).
- **aaa,M**: slant range to sensor, in meters (filtered values, no decimals).
- **bbb,M**: horizontal range to sensor, in meters (unfiltered values, no decimals). Transmits null fields if depth-sensor is not activated (will calculate horizontal range with manual set depth).
- **ccc.c,T**: true bearing (deg.rel.north) to sensor. Requires gyro input for reliable data.
- **ddd.d,M**: spread measurement in meters (door to door or door to clump). Transmits null fields if invalid values. Filtered values if sensor's filter is on.
- **hhmmss**: time of transmission (time of Spread interrogation). Requires ZDA input from GPS for accurate timestamp.
- ***hh**: checksum

$PTSAL,aaa.a,bbb.b,ccc.c, ddd.d,eee.e,fff.f*hh <cr><lf>

- **$PTSAL**: talker identifier + sentence formatter
- **aaa.a**: horizontal range in meters to sensor 1

- **bbb.b**: horizontal range in meters to sensor 2
- **ccc.c**: bearing to sensor 1 relative to stern line
- **ddd.d**: bearing to sensor 2 relative to stern line
- **eee.e**: depth in meters of sensor 1
- **fff.f**: depth in meters of sensor 2
- ***hh**: checksum

$PMPT,POS,AA,bbb.b,M,ccc.c,T, ddd.d,M,eee.e,M,hhmmss*<chk><cr><lf>

- **$PMPT**: talker identifier + sentence formatter
- **POS**: position
- **AA**: 2 letters code that specifies the part of the gear (SD = starboard door / PD = port door / CL = clump on twin trawl / SC = starboard clump on triple trawl / PC = Port Clump on triple trawl).
- **bbb.b,M**: horizontal distance in meters
- **ccc.c,T**: true bearing (deg.rel.north) to sensor
- **ddd.d,M**: depth below surface distance in meters
- **eee.e,M**: distance to bottom in meters if available, or empty
- **hhmmss**: time of data (hour-minutes-seconds)
- ***hh**: checksum

@IITPT,aaa,M,bbb,P,ccc.c,M<cr><lf>

- **@IITPT**: talker identifier + sentence formatter. (TPT = Trawl position true vessel)
- **aaa,M**: horizontal range in meters to the target (0 - 4000 m). Requires an active depth sensor on the trawl or manual set depth, if not the slant range will be presented.
- **bbb,P**: true bearing to the target (i.e. relative to north). Requires gyro input for reliable data.
- **ccc.c,M** is the depth in meters of trawl below the surface (0 -2000 m). Requires an active depth sensor on the trawl or manual set depth, if not the depth field will be empty

Index

L

M

N

O

P

R

S

T

U

V

W