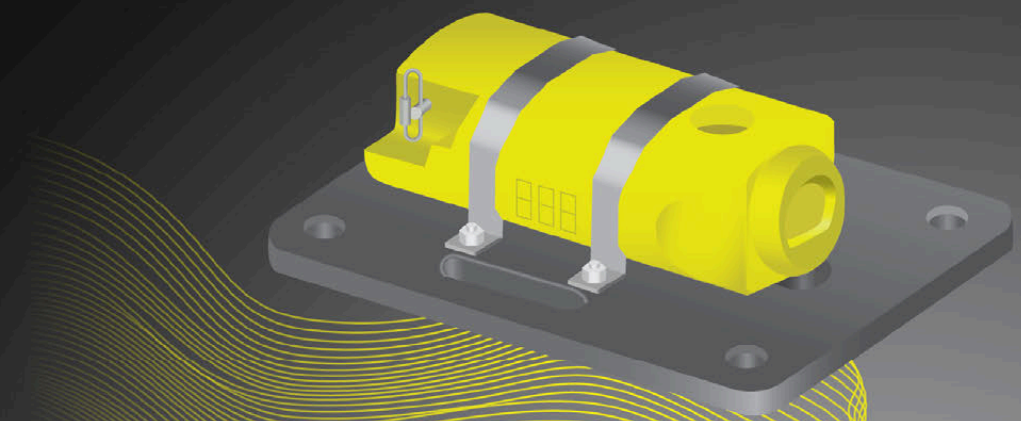
MARPORT | PRO

FLOW SPEED NAVIGATOR

NX

2026

USER MANUAL



PUBLISHED 22ND JULY 2026

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History

V1	01/09/26	First release
V2	07/22/26	• Updated display options in Scala2 in **Configuring Data Display in Scala2 (on page 45)**. • Updated features and options in **Sensor Features (on page 10)**. • Updated technical specifications in **Technical Specifications (on page 12)**.

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Disclaimer

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Introduction & Presentation

Introduction and Presentation

Get a basic knowledge of the sensor.

Introduction

Marport's Flow Speed Navigator is a high-definition net sounder, combined with a speed profiler providing water flow measurements in the water column below the sensor. The water flow measurements along the direction of the trawl are visually represented by a flowgram.

The range and direction of the water flow measurements depend from the sensor application:

- **1-axis** application: the water flow measurements can go up to 10 meters or 30 meters if the long-range option is activated. Only the speed of the water flow along the direction of the trawl is sent.
- **2-axis** application: The speeds of the water flow along and across the direction of the trawl are sent. The along water flow measurements can go up to 10 meters, while the across water flow measurements are measured at a short distance below the sensor.

The Flow Speed Navigator can be installed on the headline or tunnel. It is available in two different housings: one with a board, suitable for a headline installation, and a hydrodynamic version, suitable for a tunnel installation.

The high-definition echogram images allow you to see fish passing through the trawl and have an overview of the trawl opening.

In order to efficiently follow the trawl descent, echogram ranges are configurable from 5 to 160 meters. Moreover, the sensor includes an automatic range mode: the sensor can automatically switch to lower ranges of 20, 10 and 5 meters to get sharper pictures, proving to be particularly useful when fishing close to the bottom.

Optionally, the sensor can also measure temperature, depth, pitch and roll.



Fishing Applications

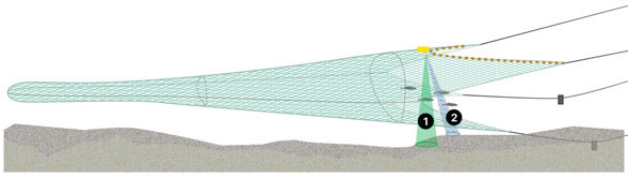
The Flow Speed Navigator can be configured to work for specific fishing applications.

You can install the sensor on the headline or tunnel of the trawl gear.

The sensor can be configured in short or long range mode, depending on what you need to see under the sensor:

- In long range mode, the forward echogram and the flowgram covers a distance of up to 30 meters (depending on environmental conditions).
- In short range mode, the forward echogram and the flowgram covers a distance of up to 10 meters (depending on environmental conditions). The images are in better resolution than the long range mode, because the distance being shorter, data are sent more often.

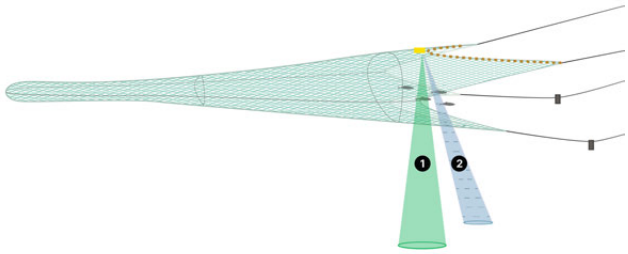
In both modes, the downward echogram covers a depth of up to 160 meters, and the speed measures are sent in digital data.



- **Location**: headline
- **Mode:** short range

  ❶ Downward echogram: 5 to 160 m.

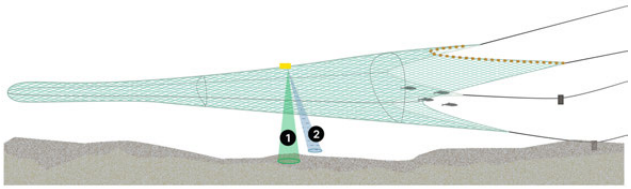
  ❷ Forward echogram and flowgram: 10 m. Along and across flow speed.
- **Fishing application**: semi-pelagic and bottom trawling. Displays a view of the trawl opening and the seabed in higher resolution.



- **Location**: headline
- **Mode:** long range

  ❶ Downward echogram: 5 to 160 m.

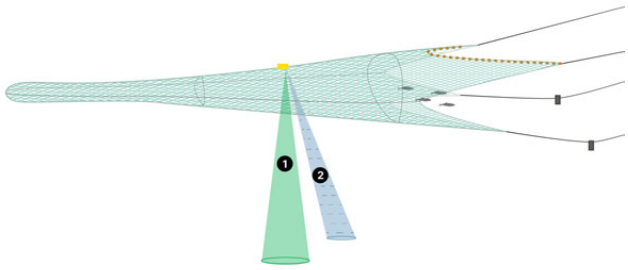
  ❷ Forward echogram and flowgram: 30 m. Along flow speed only.
- **Fishing application**: pelagic trawling. Displays a view of the trawl opening and area below the trawl.



- **Location**: tunnel
- **Mode:** short range

  ❶ Downward echogram: 5 to 160 m.

  ❷ Forward echogram and flowgram: 10 m. Along and across flow speed.
- **Fishing application**:
  - Semi-pelagic and bottom trawling. Displays a view of the inside of the tunnel and of the seabed in higher resolution.
  - Pelagic, according to the vertical opening.

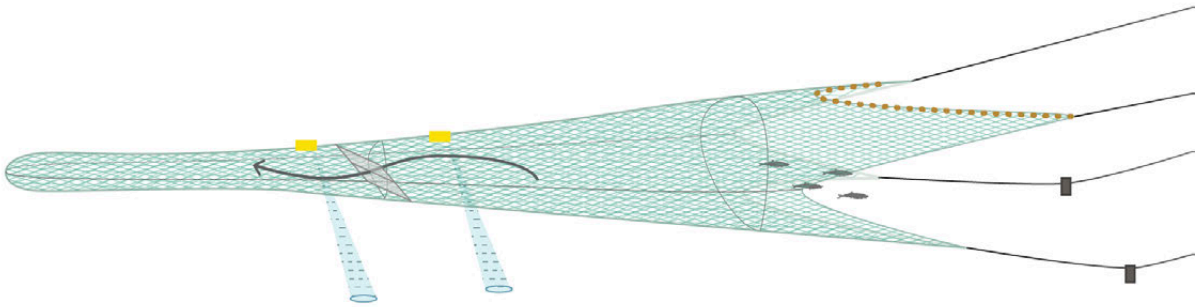


- **Location**: tunnel
- **Mode:** long range

  ❶ Downward echogram: 5 to 160 m.

  ❷ Forward echogram and flowgram: 30 m. Along flow speed only.
- **Fishing application**: pelagic trawling. Displays a view of the inside of the tunnel, and area below the trawl.

The Flow Speed Navigator can also be installed on a grid to monitor the flow passing through the grid. This way you can check it is not twisted or blocked.



Safety Guidelines

Important: To ensure proper and safe use of this equipment, carefully read and follow the instructions in this manual.

Description

System Compatibility

The Flow Speed Navigator is compatible with the following versions of Marport's software and equipment.

Mosa2	02.15.01 or later
Scala2	02.16.09 or later
Mx receiver firmware	08.06.00 or later
Dock	01.02.02 or later

Sensor Features

This section describes the features available for the sensor.

Features and Options

The features and options are configurable according to the type of hardware and customer's choices.

2-axis Flow Speed Navigator (also Reversed mode)

Sounding Options	• Down (always activated)
Misc. options	• **Memory Card Log**: records a log of the sensor activity. This option is useful for troubleshooting support. • Legacy Charger Compat.*
Measures	• Battery (always activated) • Pressure • Temperature • Pitch • Roll • Along Speed (always activated) • Across Speed

1-axis Flow Speed Navigator

Sounding Options	• Down (always activated)
Misc. options	• **Memory Card Log**: records a log of the sensor activity. This option is useful for troubleshooting support. • Speed Long Range • Legacy Charger Compat.*
Measures	• Battery (always activated) • Pressure • Temperature • Pitch • Roll • Along Speed (always activated)

*Legacy Charger Compatibility option: compatible only with sensor firmware version **F450-02.03.01 or later**. The sensors can be charged but the LED status color cannot indicate the charging level.

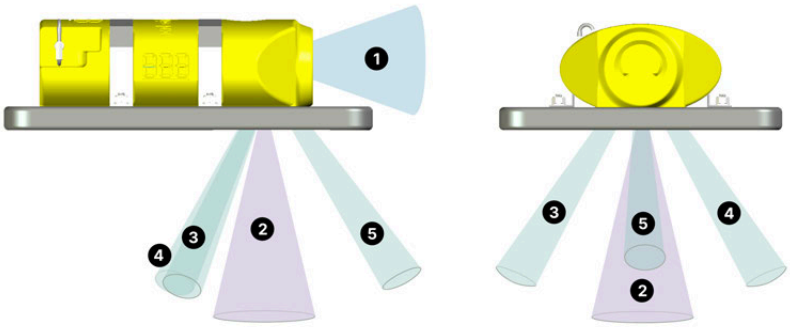
Technical Specifications

Uplink frequency	30 to 60 kHz (optimum bandwidth: 38 to 46kHz)
Range to vessel	up to 2500 m[1]
Data update rate (log option deactivated)	Short range* (10-meters Doppler speed profiler) • 5-meter range: Down echogram @0.3 s - temperature, depth, pitch, roll, battery level @8.2 s - along/across speeds @4.1 s - Fore echogram/ flowgram @2 s • 10-meter range: Down echogram @0.5 s - temperature, depth, pitch, roll, battery level @8.7 s - along/across speeds @4.4 s - Fore echogram/ flowgram @2.2 s • 20-meter range: Down echogram @1 s - temperature, depth, pitch, roll, battery level @8.7 s - along/across speeds @4.4 s - Fore echogram/ flowgram @2.2 s • 40-meter range: Down echogram @1.8 s - temperature, depth, pitch, roll, battery level @7 s - along/across speeds @3.5 s - Fore echogram/flowgram @1.75 s • 80-meter range: Down echogram @1.9 s - temperature, depth, pitch, roll, battery level @7.7 s - along/across speeds @3.8 s - Fore echogram/ flowgram @1.9 s • 160-meter range: Down echogram @2.3 s - temperature, depth, pitch, roll, battery level @9 s - along/across speeds @4.5 s - Fore echogram/flowgram @2.2 s. *No across speed measurement with 1-axis application. Long range* (30-meters Doppler speed profiler) • 5-meter range: Down echogram @0.4 s - temperature, depth, pitch, roll, battery level @11.8 s - along speeds @5.9 s - Fore echogram/flowgram @2.9 s • 10-meter range: Down echogram @0.7 s - temperature, depth, pitch, roll, battery level @12.3 s - along speeds @6.2 s - Fore echogram/flowgram @3.1 s • 20-meter range: Down echogram @1.5 s - temperature, depth, pitch, roll, battery level @12.3 s - along speeds @6.2 s - Fore echogram/flowgram @3.1 s • 40-meter range: Down echogram @2.6 s - temperature, depth, pitch, roll, battery level @10.6 - along speeds @5.3 s - Fore echogram/flowgram @2.6 s

	• 80-meter range: Down echogram @2.8 s - temperature, depth, pitch, roll, battery level @11.3 s - along speeds @5.6 s - Fore echogram/flowgram @2.8 s • 160-meter range: Down echogram @3.1 s - temperature, depth, pitch, roll, battery level @12.6 s - along speeds @6.3 s - Fore echogram/flowgram @3.1 s *1-axis application only.
Speed profiler	• Measurement range[2]: from 35 cm to up to 30 m • Speed value range: +/- 6 knts (configurable) • Resolution: max. 0.35 knot (depends on speed range)
Depth	• Range: up to 1200 m • Resolution: 0.1 m with 0.1% full scale accuracy
Pitch and roll	• Range: -64° to +63° • Accuracy: +/- 1°
Temperature	• Range: -5° C to +45°C • Accuracy: ±0.15°C
Weight with board-mounted housing	• In air: 14.8 kg • In water: 3.1 kg
Weight with hydrodynamic housing	• In air: 8.1 kg • In water: 2.5 kg
Warranty	2 years (Sensor & Battery)[5]

1. Reference only, depends on functions enabled. / 2. Depends on measurement environmental conditions. / 3. Depends on sensor uplink power, frequency and options. / 4. Based on average charging time. / 5. Marport Standard Marine Limited Warranty

Beam Specifications



1. Uplink signal (toward vessel)

2. Echogram downward signal

3-4-5. Speed profilers

Beamwidths for Uplink pings:

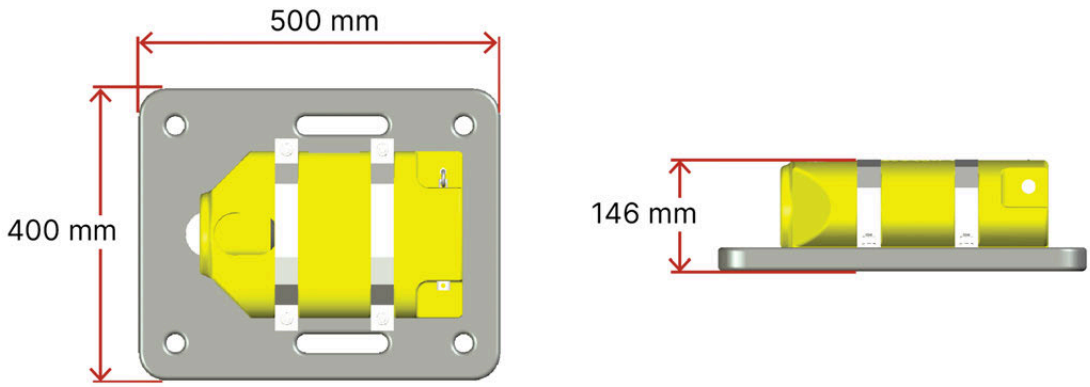
Beamwidth	@ 35 kHz	@ 50 kHz	@ 60 kHz
-3dB	46°	40°	30°

Beamwidths for Down pings:

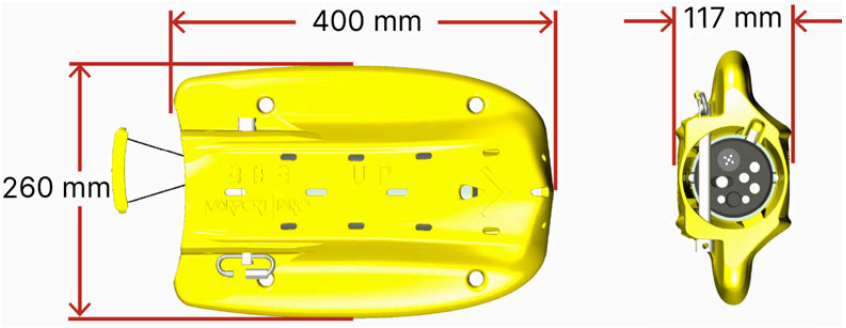
Beamwidth	@ 125 kHz	@ 160 kHz	@ 200 kHz
-3dB	26°	24°	22°

Dimensions

Housing with board:

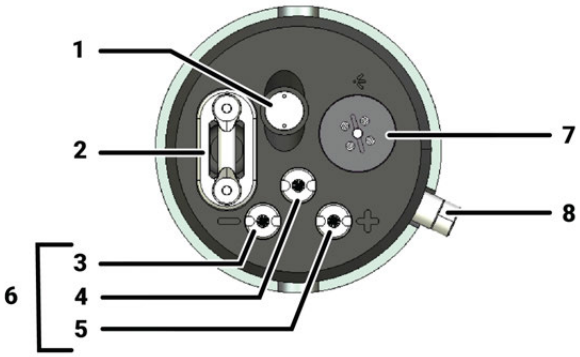


Hydrodynamic housing:



Main Parts

External View



1. Temperature sensor

2. Pull handle

3. Negative charge

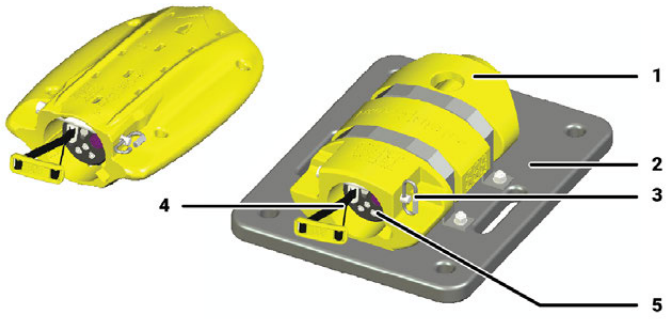
4. Water switch

5. Positive charge

6. Shoulder bolts

7. Pressure sensor

8. Alignment screw



1. Transducer
2. Stabilization board
3. Locking pin
4. Pull handle
5. End cap

CAUTION:

- Do not put foreign objects into pressure sensor opening or try to open it.
- Do not remove the shoulder bolts from the outside of the sensor.

It may damage the components.

Operational Mode Indicator

A LED on the sensor's transducer indicates the operational mode of the sensor.

State	Situation	LED
Starting	• Sensor has been switched on in water or with water switch.	1 s. • Startup sequence: LED blinks green/off/red/off/green/red. • Then, fixed green for 1 sec.
Running	• Sensor is in water. • Water switch is on.	• For 1 min.: LED blinks red at the beginning of each uplink communication cycle. • Or, LED blinks green / red if the product configuration is not valid.
Configuring	• Sensor is out of water. • User is testing and configuring using a Configuration Cable. • Sensor turns off after 30 sec. without test or configuration operation.	LED blinks green.

State	Situation	LED
Charging	• Charger plug is connected. • User is configuring at the same time via the Dock.	 • LED blinks red. • If connected to an incompatible charger and not charging, the LED stops blinking after approx. 10 sec.
On deck	• Sensor has been hauled on deck. • The virtual water switch is on. • The sensor is locked in a low power state to not switch into running mode.	 LED blinks green every 4 sec.

Sensor Configuration

Sensor Configuration

Learn how to configure the sensor settings.

Connecting the Sensor to Mosa2

To configure the sensor, you need to connect it to Mosa2 application, using either the Dock or the Configuration Cable.

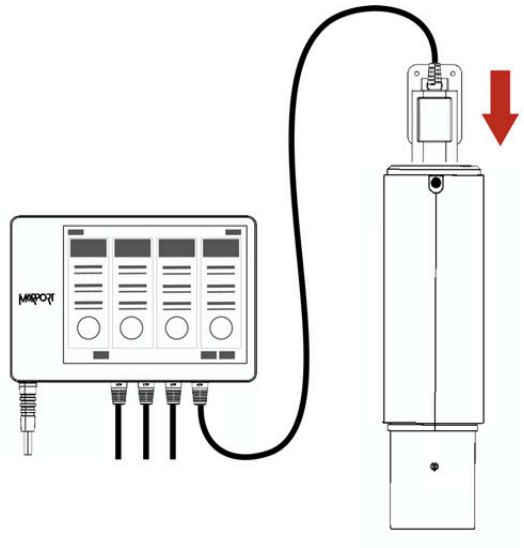
Using a Dock Charger Plug

About this task

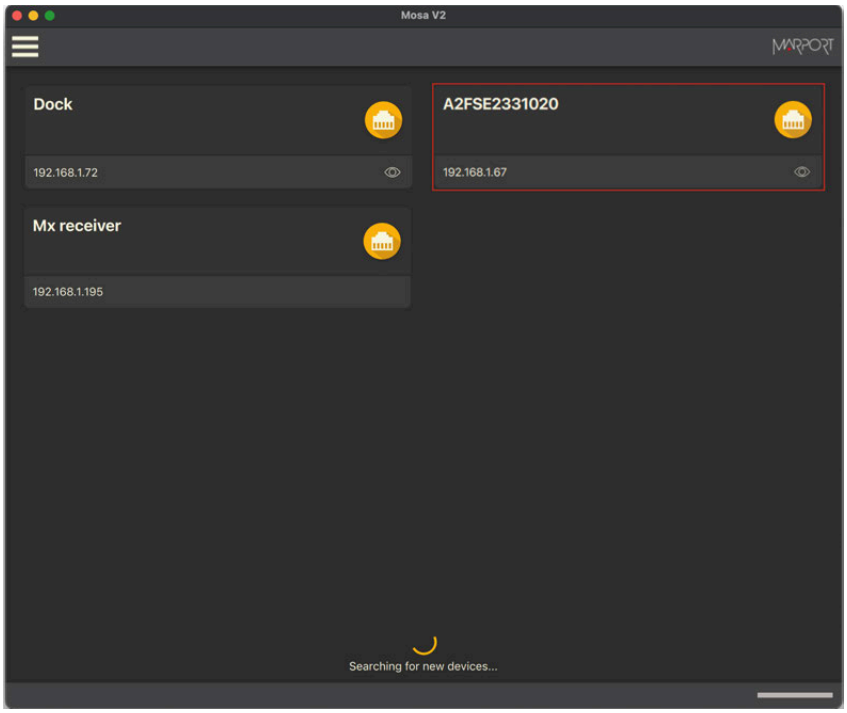
Tip: Refer to Dock user manual to have more details about the use of this product.

Procedure

1. Connect one Dock charging plug to the sensor's endcap.



2. Mosa2 discovery page opens. The sensor is displayed.



- Click  to open the sensor configuration page.
- Click  to show the deploy animation on the charger plug for 30 seconds.

Using the Configuration Cable

Connect the Configuration Cable from the computer to the sensor to display the sensor configuration page on Mosa2.

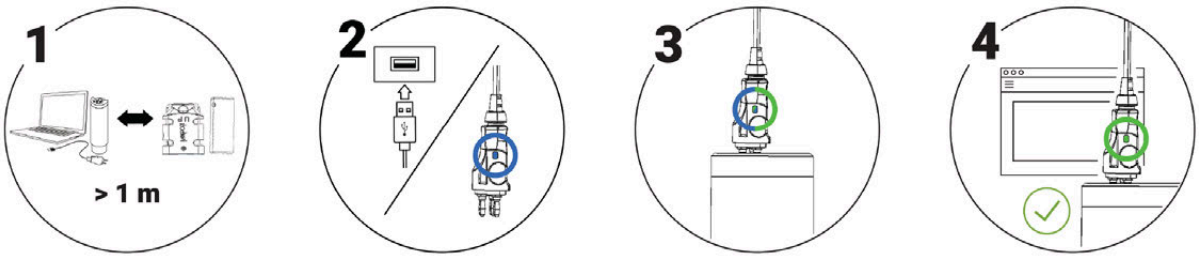
About this task

Tip: Refer to the Configuration Cable Quick Reference Guide available on our website for more details about the use of this product.

Procedure

1. Move other electrical devices minimum 1 m away from the computer.
2. Connect the USB connector directly to the computer.
   Mosa2 opens automatically and the startup wizard is displayed. The LED on the plug is solid blue.
3. Connect the three-pin plug to the sensor.
   The LED on the plug blinks alternatively blue and green.
4. Wait a few seconds. The configuration page of the sensor is displayed on Mosa2.
   The LED on the plug is solid green.

Example



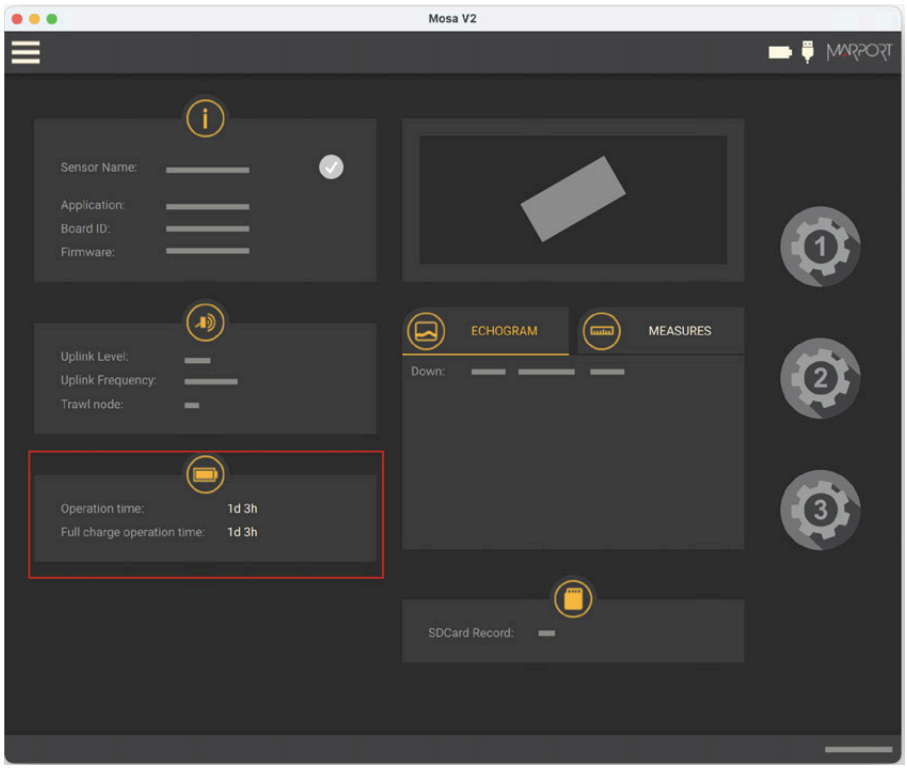
What to do next

You can now configure the sensor.

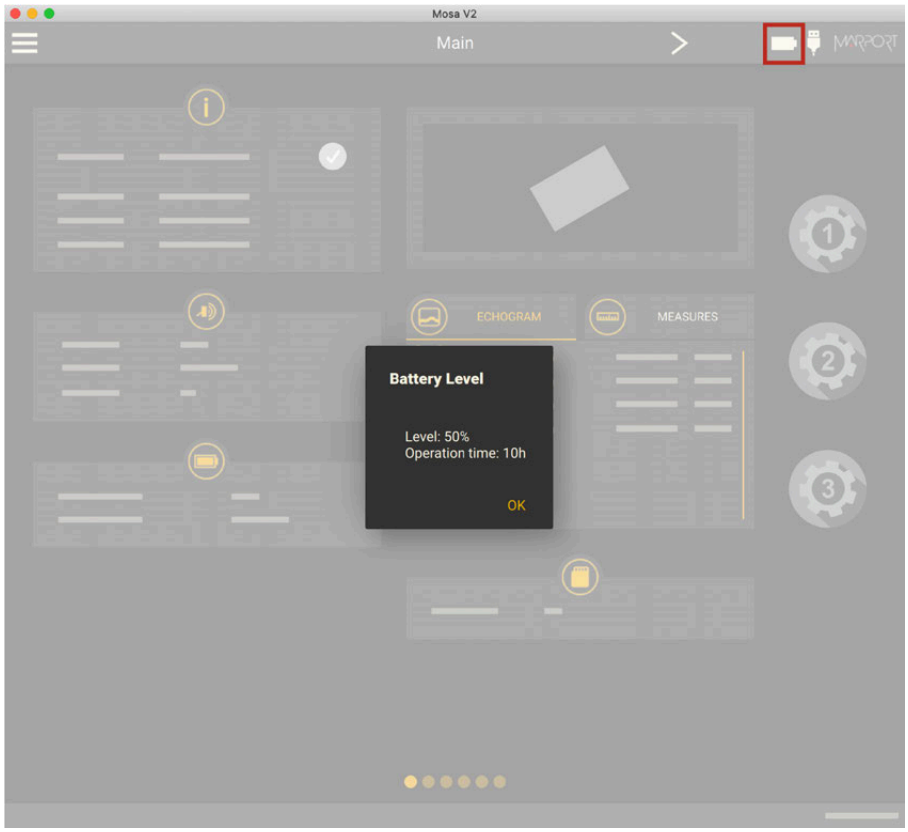
Note: You can keep the Configuration Cable continuously connected by USB, and virtually eject or connect it. When no sensor is connected to the Configuration Cable, click **Menu** ☰ **> Eject Config Plug** or **Connect Config Plug**. When ejected, you come back to the discovery page. It stays disconnected until you virtually connect to it or manually disconnect then connect it.

Battery Information

The battery lifetime is displayed on the first page.



You can also check the battery level at anytime from the top bar:

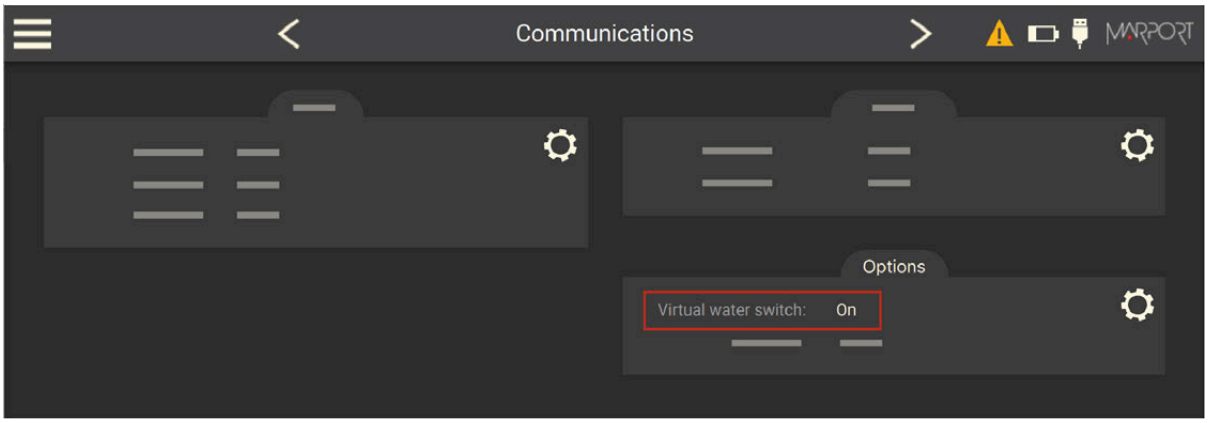


Note: When you change settings such as the uplink power or sounding range, it affects the battery consumption and remaining lifetime. The battery information will update after the sensor has been switched on and operating for 10 minutes.

About the Virtual Water Switch Option

Mosa2 has a virtual water switch option that changes the conditions under which the sensor is running.

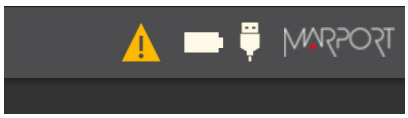
Note: The virtual water switch is available only for the **Pro** line of sensors, including the NX range (PCBA A2S Gen 2 and later, and all A2H and A2F versions). It is activated by default.



- When the virtual water switch is activated: the sensor runs when the depth is more than 2 meters and the water switch is in contact with water.

  We recommend to activate it to prevent the sensor from running outside water. For example, if the sensor is hauled on deck and stays inside the net, the water switch remains wet and keeps emitting. This will significantly reduce the battery lifetime.

  Note: When activated, an orange warning icon is displayed in the top bar.

- When the virtual water switch is deactivated: the sensor runs only when the water switch is in contact with water. The depth is not taken into account.

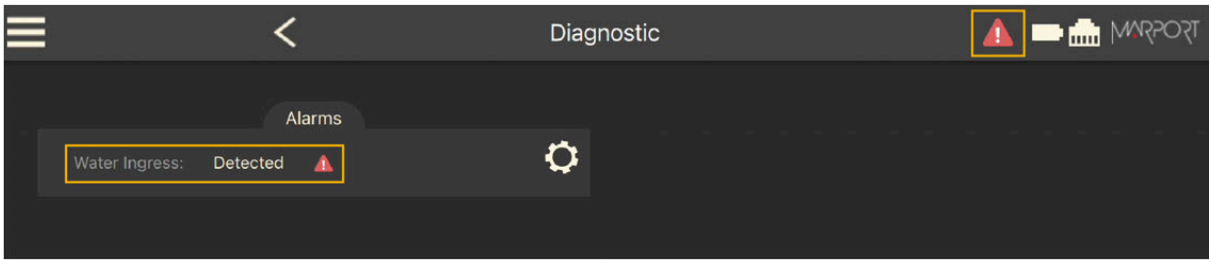
  We recommend to deactivate it if the sensor is operating close to the surface or if you need to test the sensor in the office.

Diagnostic Information

Scala2 and Mosa2 applications warn the user in case of water ingress in the sensor.

In case of water ingress in the sensor, alarms are displayed in Scala2 Virtual Charger Room, in Mosa2 and on the charger plug when connected to the sensor.

- In **Expert** mode, Mosa2 displays a dialog at the start of the application and warning icon in the toolbar and diagnostic page:



- The charger plug displays a warning icon:



When the alarm appears, take the sensor out of water immediately and contact Marport support.

WARNING: In case of water ingress in the product, do not charge it: battery may vent or rupture, causing product or physical damage.

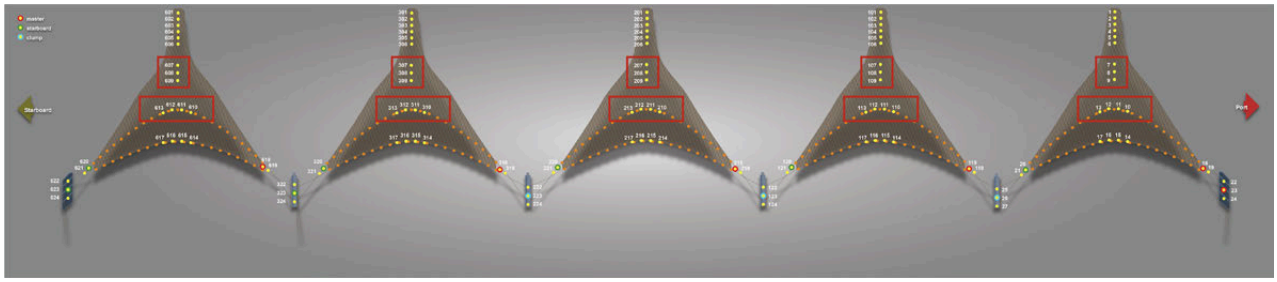
Configuring the Trawl Node

You need to give a trawl node to the sensor. It is the number corresponding to the position of the sensor on the trawl.

About this task

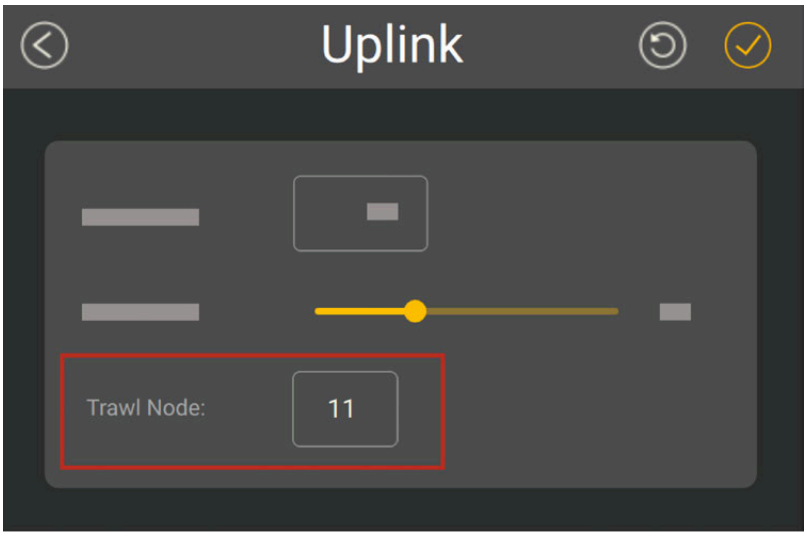
The trawl nodes corresponding to the positions on the headline and tunnel are the following:

Trawl number	Node numbers - Headline	Node numbers - Tunnel
Trawl 1	10 to 13	7 to 9
Trawl 2	110 to 113	107 to 109
Trawl 3	210 to 213	207 to 209
Trawl 4	310 to 313	307 to 309
Trawl 5	610 to 613	607 to 609



Procedure

1. Go to the **Communications** page, then click ⚙ in **Uplink**.
2. Enter a node according to the position of the sensor on the trawl.



> **Important:** Make sure to put the same number when **adding the sensor to Scala2 receiver page (on page 42)**. If not, change it accordingly.

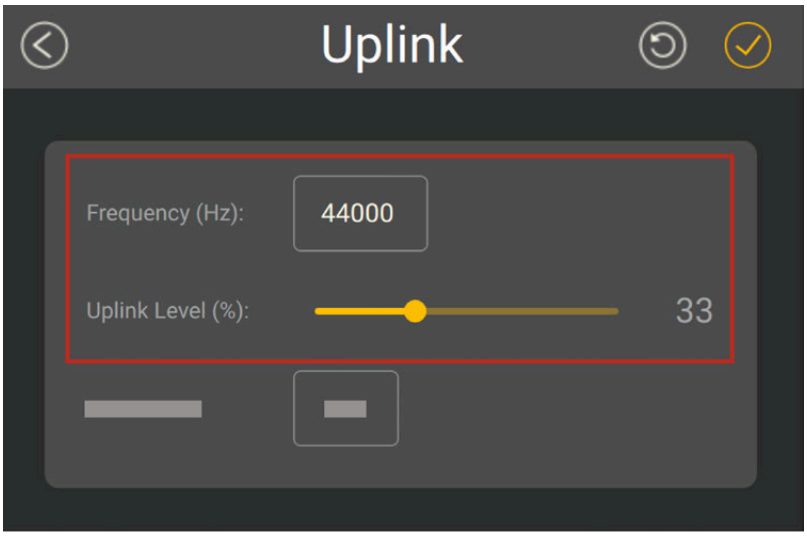
3. Click ✓.

Configuring the Uplink Frequency and Power

Configure the settings of the communication link between the sensor and the vessel.

Procedure

1. Go to the **Communications** page, then click ⚙ in **Uplink**.



2. Enter a frequency for the communication with the vessel. Default is 44,000 Hz.
3. Drag the slider to change the power of the uplink signal.

Note: A higher level of uplink power reduces the battery lifetime.

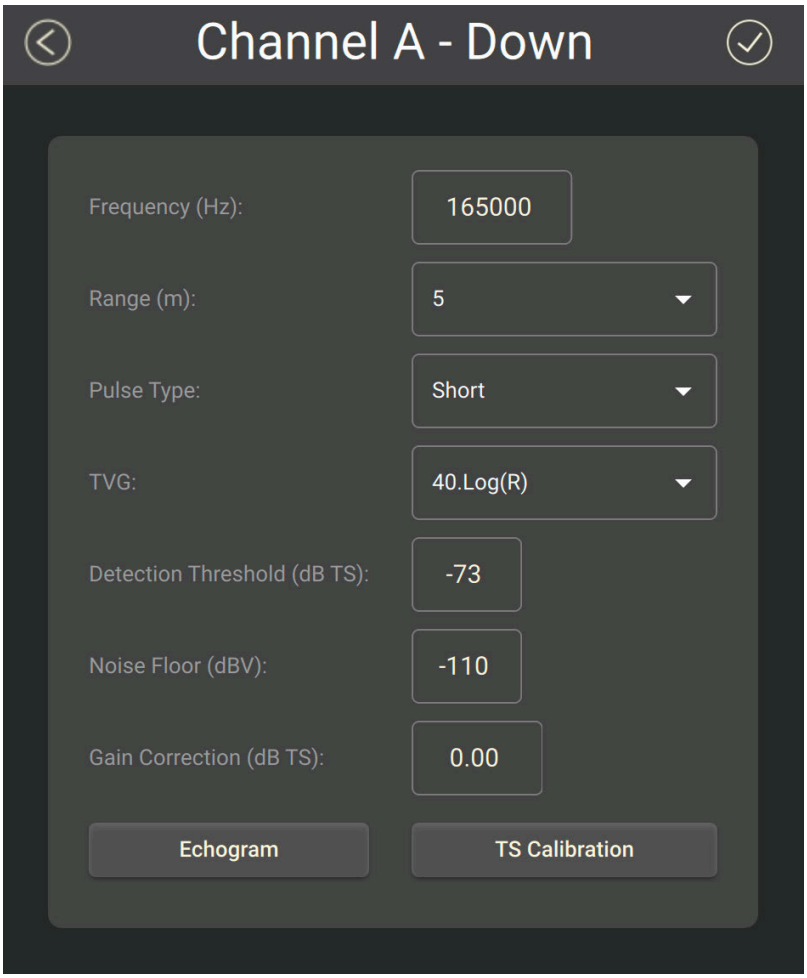
Recommended Levels	Conditions
25%	Works for most conditions. **Note:** Enter this level by default.
80%	◦ Sensor is far from vessel - e.g. more than 800 m depending on conditions, high depth ◦ High level of interferences ◦ Issues receiving data ◦ Low SNR

Configuring the Echo Sounder

Configure the echo sounder settings of the Flow Speed Navigator.

Procedure

1. Go to the **Echo Sounder** page.
2. Click ⚙ next to **Down Sounding**. You can leave the frequency at 165 kHz.



3. Set the **Range (m)** of the sounding according to the maximum distance at which targets and bottom can be detected.

   Note: We recommend to set the maximum range value when using the automatic range in order to see the sea bottom as soon as possible.

   Note: Range influences the display of echogram images. The smaller the range, the shorter the listening time and the better the quality of images. But if you set a bigger range, data arrives slower which results in poorer image quality.

4. The **Pulse Type** is automatically set, depending on the echogram range:
   - 5 to 20 m: 100 µs
   - 40 m: 200 µs

- 80 m: 300 µs
- 160 m: 500 µs

5. Select a **TVG** setting to compensate the signal loss in water and have targets or sea bottom displayed in the same color on the echogram, whatever the distance from the sensor:
   - 20 log: focus on the bottom, footrope or a school of fish.
   - 40 log: focus on individual targets.
   - 30 log: compromise between the two others.

6. Set the **Detection Threshold (dB TS)** to -79 if you want to detect small targets. Otherwise, leave the default settings at -73 dB.

7. Do not change the other echo sounder settings.

About the Automatic Range Mode

The sensor has an automatic range mode that is useful to get better quality echograms when the trawl is close to the bottom.

Principle

Range influences the display of echogram images. The smaller the range, the shorter the listening time and the better the quality of images. But if you set a bigger range, data arrives slower which results in poorer image quality.

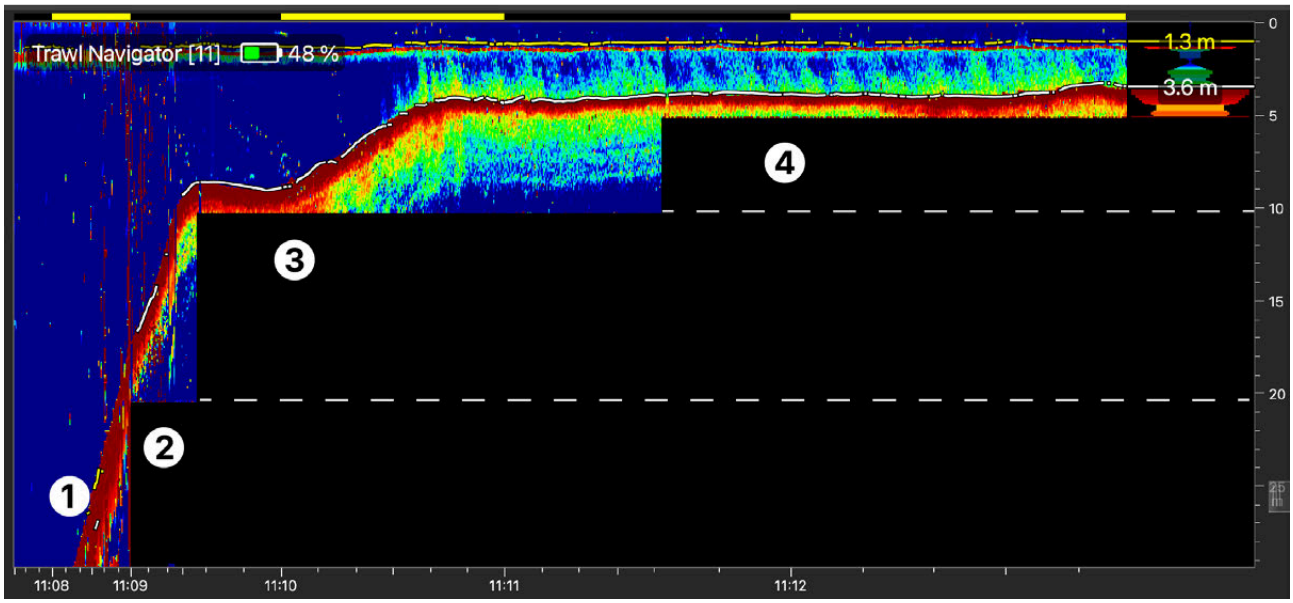
You can activate the automatic range mode if you need to get better quality echograms when the trawl is close to the bottom. This mode is recommended when bottom trawling.

The echogram can automatically switch to a 20-meter range when the distance to the bottom is less than 20 meters, to a 10-meter range when the distance is less than 10 meters and to a 5-meter range when less than 5 meters.

The change of range depends on the settings configured on Mosa2.

Note: The sensor requires pitch and roll angles within -25° to 25° for automatic range operation.

The image below shows the range changing as the sensor gets closer to the sea bottom. The sensor is configured with a 40-meter sounding range and 1.5-meter trawl opening.



1. Maximum range / **2.** Switch to a 20-meter range / **3.** Switch to a 10-meter range / **4.** Switch to a 5-meter range

Mosa2 settings

The following **Sounding Mode** options must be set in Mosa2:

- The **Mode** must be set to **Down only**.
- The **Refresh Rate** must be set to **Fast**.
- **Automatic Range** must be activated.
- The **Trawl Opening**:
  - must be lower than 19 meters to be able to switch to a 20-meter range.
  - must be lower than 9 meters to be able to switch to a 10-meter range.
  - must be lower than 4 meters to be able to switch to a 5-meter range.

Note: The trawl opening value sets the minimum distance to see inside the trawl. As a result, if the trawl opening distance is equal or higher than 19, 9 or 4 meters, the sensor will not reduce the range respectively to 20, 10 or 5 meters.

See **Configuring the Echo Sounder (on page 27)** for details about Mosa2 settings.

Configuring the Speed Measurements

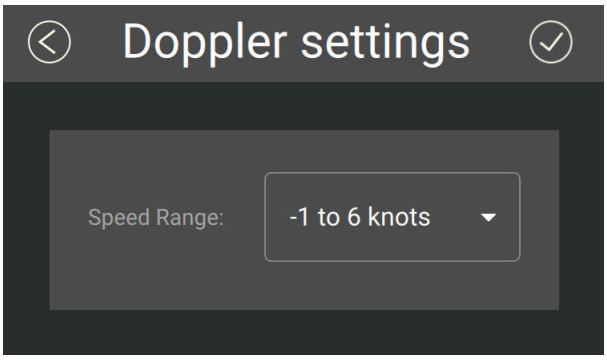
Configure the range of the speed measurement values.

About this task

The speed range is the range of the speed measured underneath the sensor. The smaller the range of values, the better the resolution when displaying the flowgram in Scala2.

Procedure

1. Go to the **Measurements** page.
2. To configure the speed range, click ⚙ in **Doppler** and choose between:



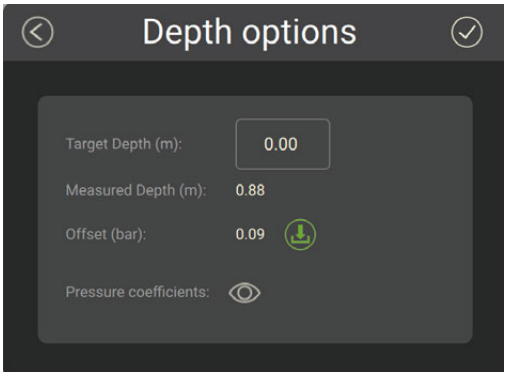
Speed Range	Flowgram resolution
0 to 6 knots	0,3 knots
-3 to 3 knots	0,3 knots
-1 to 6 knots	**0,35** (default, recommended)
2 to 6 knots	0,2 knots

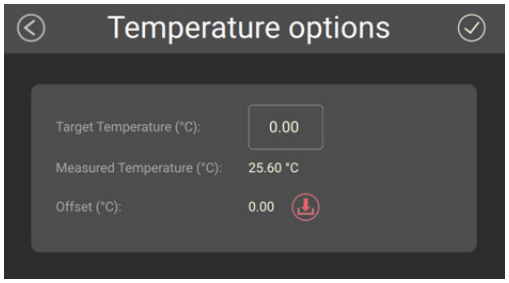
Applying Offsets to Measurements

You can apply offsets to temperature and depth measurements if the measured values do not correspond to the environment of the sensor.

Procedure

1. Go to **Measurements** page and click ⚙ next to depth or temperature to apply offsets.
2. Enter a target value. Click ✓.
   The measured value becomes the same as the target value. The value of the offset is displayed.





3. If you need to reuse offsets from a previous configuration, click then select the configuration file (*.A2C).

Testing Measures

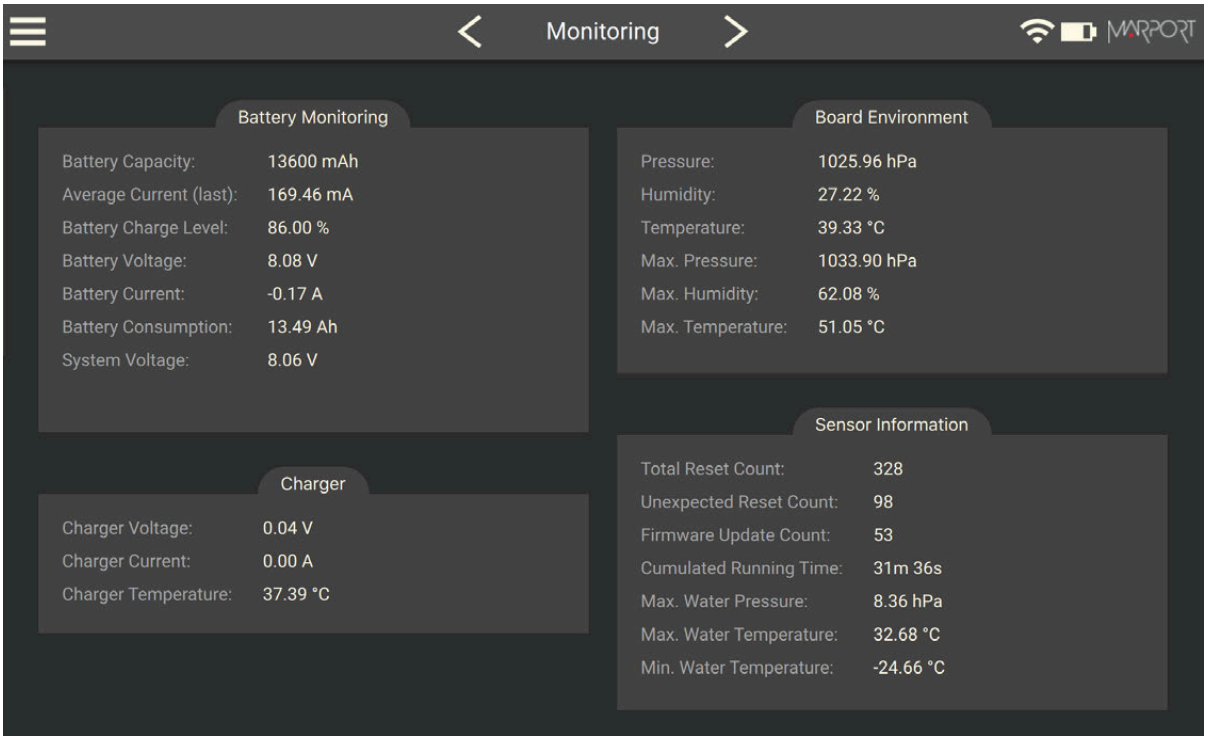
You can test the measures taken by the sensor (e.g. battery level, temperature, depth) to check that there are no faults.

About this task

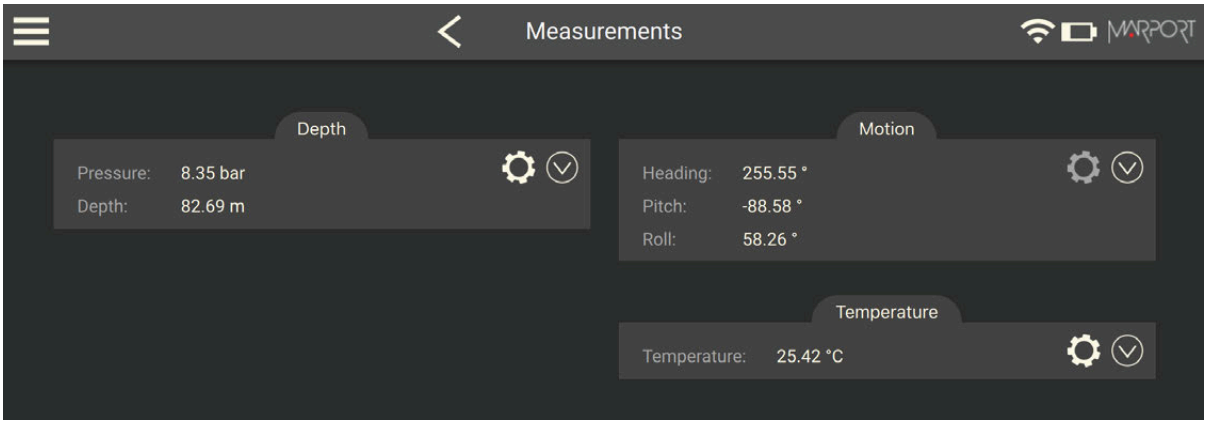
You can test the sensor in water or in air. In air, the following measures will be wrong: height, conductivity.

Procedure

1. Press command + A or click **Menu** and click **User Mode > Advanced**.
2. Go to the **Monitoring** page.
   You can check information about the battery, board and sensor.



3. Go to the **Measurements** page.
   You can see the values of the activated measures, such as depth, temperature. If the sensor is working correctly, measures are updating.



4. Click ⚙ to check and, if necessary, adjust data measured by the sensor:
   - **Depth**: place your sensor on a desk or on the ground and enter 0 in **Target Depth**.
   - **Temperature**: enter the estimated temperature of your environment.
   - **Doppler**: see **Configuring the Speed Measurements (on page 30)**.

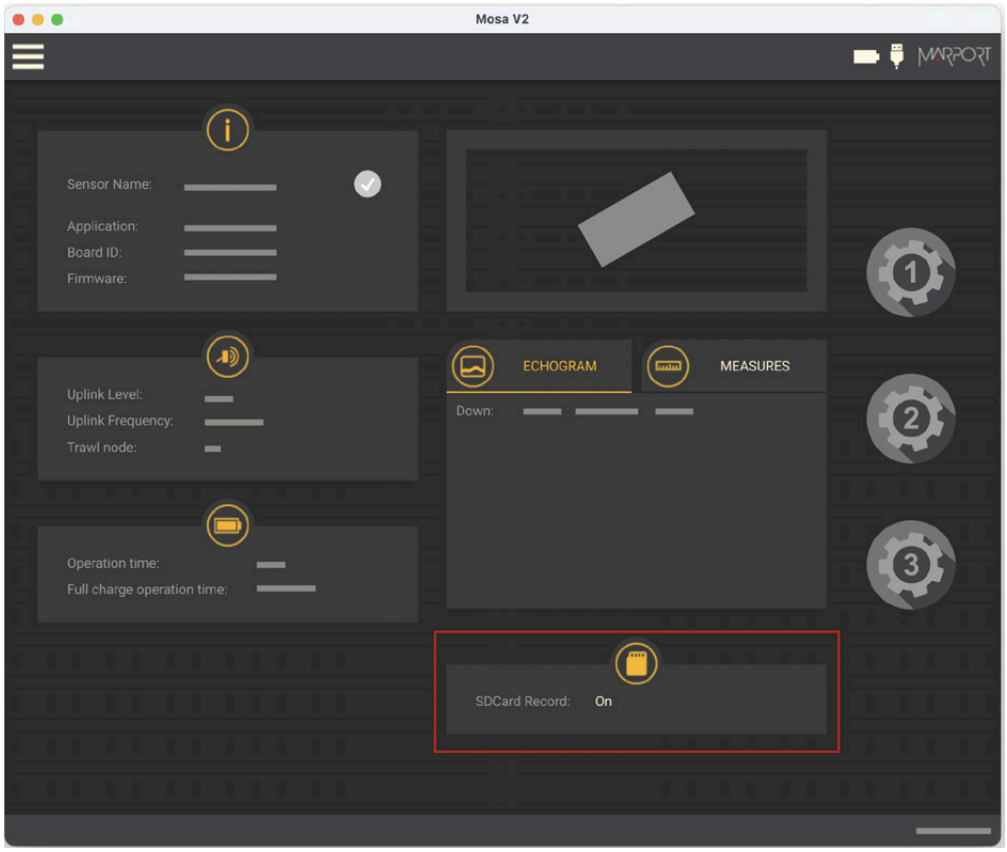
Memory Card Recording

This topic explains the memory card recording feature (this feature is optional).

Overview

Data recorded on the sensor memory card are in higher resolution, with a higher refreshing rate. For sensors with echograms, you can see target strength values without uplink sound transmission loss.

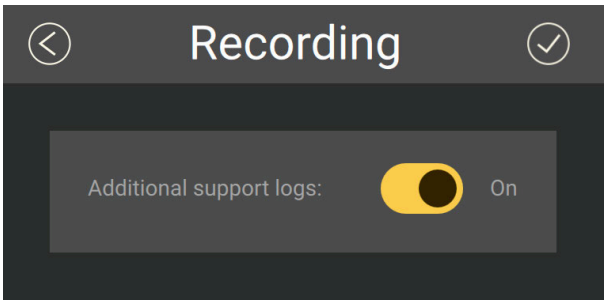
You can see on Mosa2 main page if the memory card recording feature is activated:



Additional settings

We recommend to activate the support logs to help support teams for error diagnosis.

1. Go to the **Communications** page, then click in **Recording**.
2. Activate **Additional support Log**.



Getting data from the memory card

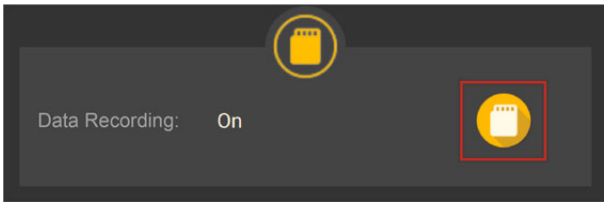
The last 99 recorded sensor data files and last 99 battery files are displayed. Two types of files are on the memory card:

- Files containing measures recorded by the sensor. Their name begins by "450". These data are more precise and recorded more often than data received on the receiver. One file corresponds to a tow (time between entering and leaving water). The recording date displayed in the second column is synchronized with your computer time.
- BATT = Files created when the sensor is charging (1 file per charging cycle). They are useful for support teams for troubleshooting.

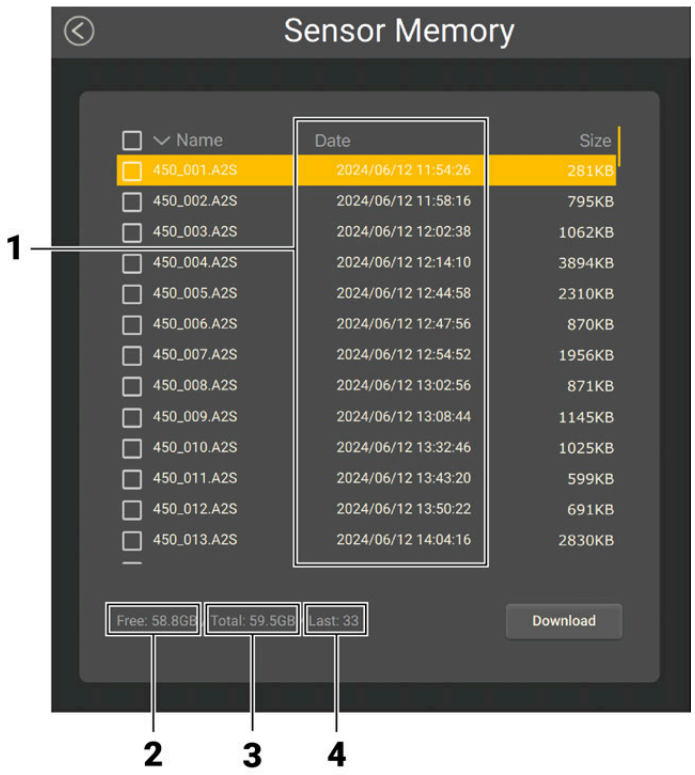
Note: The first time the sensor connects to Mosa2 or if the sensor desynchronizes, a clock with a warning icon is displayed in the top toolbar. Click it to synchronize the time of the memory card with the computer's time.

Note: When downloading the files, we recommend to connect the sensor to Mosa2 using the Dock or the Configuration Cable for a better transfer of data.

1. Press command + E or click **Menu** and click **User Mode > Expert**.
2. On the first page, click in **Data Recording**.



Recorded files are displayed. Click the title of the columns to sort them by their name, date or size.



1. Time of end of towing

2. Free memory

3. Total memory size

4. Index of the last file written

See **Replaying Data Recorded on a Memory Card (on page 61)** to learn how to replay these data in Scala2.

Saving a Configuration on Mosa2

You can save different configurations of the sensor to be able to quickly change the configuration when you change your fishing method.

Before you begin

- You have finished configuring the sensor.

About this task

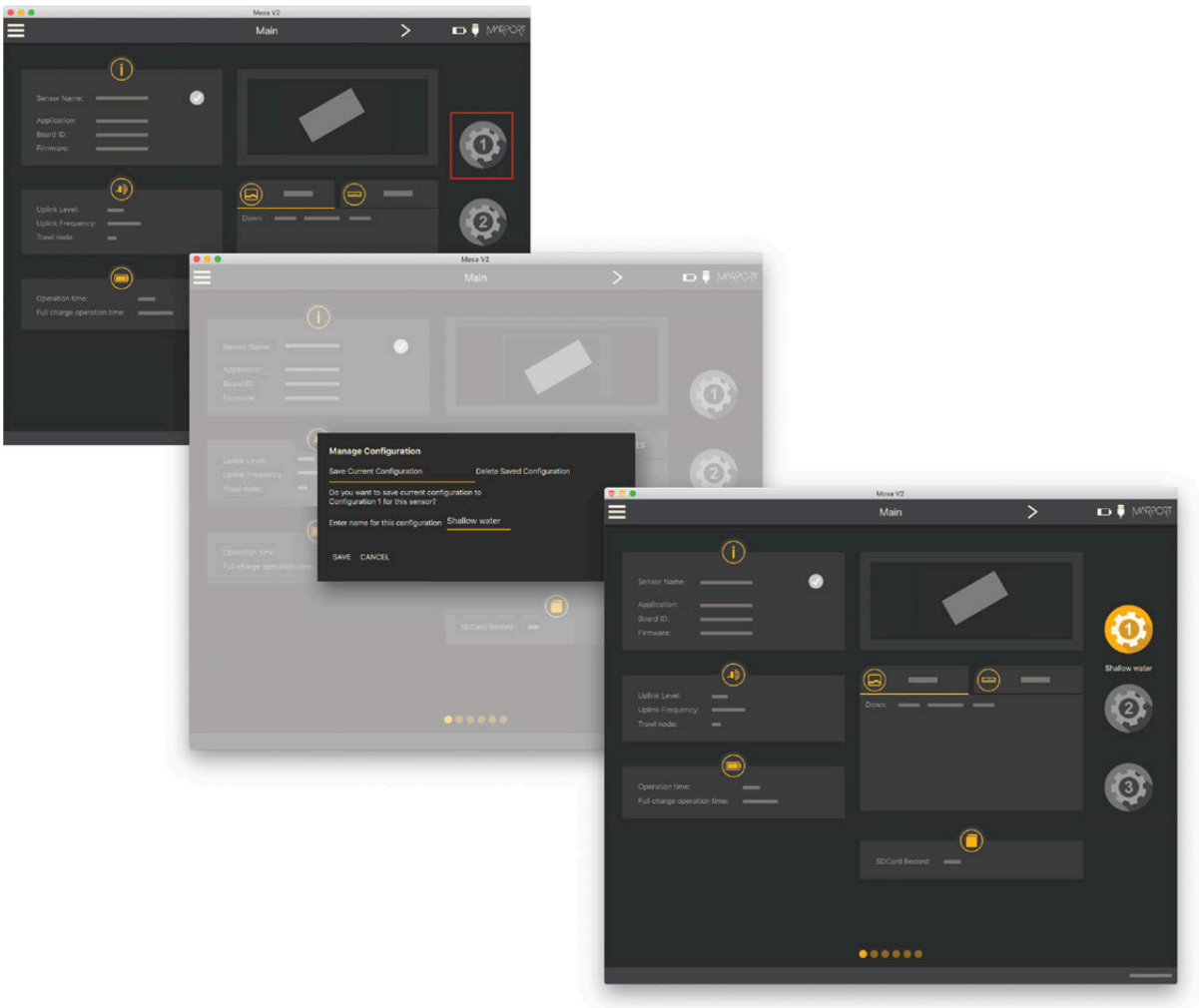
You can have up to three different configurations for the sensor. When you change your fishing method, you can apply a corresponding configuration in one click. For example:

- If fishing in shallow water, you can use a configuration with an uplink level of 33%, a short pulse and a short range.
- If fishing in greater depths, you can change for a configuration with an uplink level of 100%, a long pulse and a long range.

Procedure

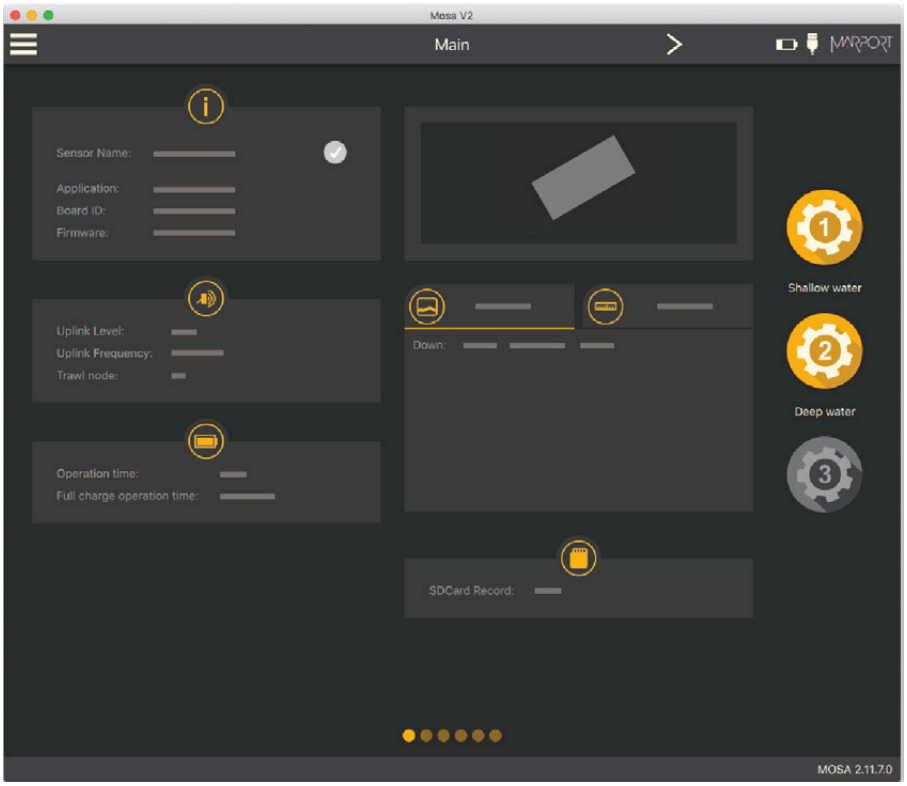
1. When you are finished configuring the sensor, for example to use the sensor in shallow water, click one of the wheel icon on the first page of Mosa2.

2. In the window that appears, enter a name for the configuration and save it.
   The wheel icon becomes orange and the name of the configuration is displayed underneath.



3. To create another configuration, for example this time to use the sensor in deep waters, change the settings of the sensor on Mosa2.

4. When you are finished, click the second wheel icon and save the configuration.



5. If you need to change the sensor configuration back to the first configuration (shallow water), click the corresponding wheel.
   The configuration is applied.

6. If you need to make changes to a configuration:
   a. Change settings.
   b. Maintain the click on the corresponding wheel until the **Manage Configuration** window appears.
   c. Click **OK** in **Save Current Configuration**.

7. To delete a configuration:
   a. Maintain the click on the corresponding wheel until the **Manage Configuration** window appears.
   b. Click **OK** in **Delete Saved Configuration**.

Exporting Sensor Configuration

You can export the sensor settings you configured on Mosa2 on a file. You can afterward use this file when configuring a similar sensor.

Before you begin

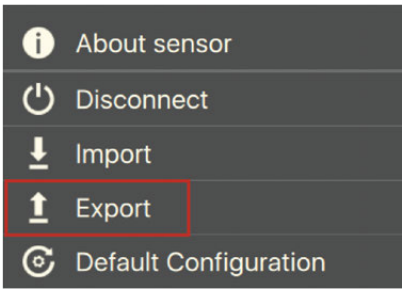
- You are finished configuring the sensor.

About this task

If you have issues with your sensor, send this file to support teams.

Procedure

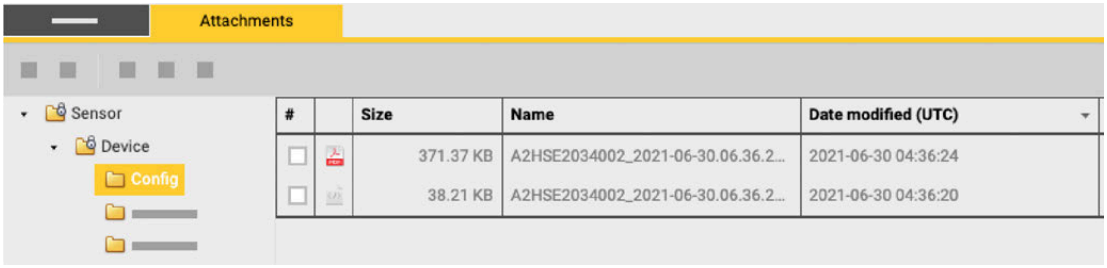
1. Click **Menu** ☰ **> Export**.



2. From the window that appears, choose a folder on your computer to save the file and click **Open**.

Results

The configuration file is exported and saved on your computer as an A2C file. If you are connected to the internet, it is also automatically sent to MASP in XML and PDF files.



Importing a Sensor Configuration

You can apply to a sensor a configuration that has already been made on another sensor.

Before you begin

- You have exported a configuration (see **Exporting Sensor Configuration (on page 38)**) and have the *.A2C or XML configuration file.

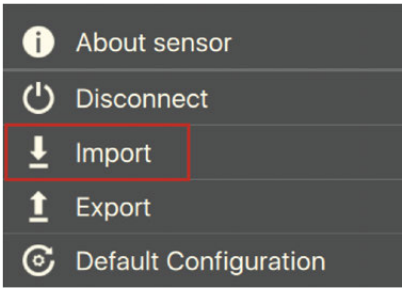
About this task

Only the following settings are imported: trawl node, recording settings (SD card, support logs), communication options (virtual water switch, simulation mode), uplink level and frequency, echo sounder settings.

Important: If the new configuration changes the echo sounder settings, you must re-calibrate the sensor for target strength value.

Procedure

1. Press command + A or click **Menu** ☰ and click **User Mode > Advanced**
2. Click **Menu** ☰ **> Import**.



3. From the window that appears, select the *.A2C or XML configuration file.

Results

The configuration is loaded into the sensor.

System Configuration & Display

System Configuration and Display

Learn how to configure the receiver and display the sensor data in Scala2 application.

Adding the Sensor to the Receiver

You need to add the sensors to the receiver in order to display their data on Scala2.

For compatibility details, see **System Compatibility (on page 10)**.

Adding the Sensor to the Receiver

You need to add the sensors to the receiver using the system web page.

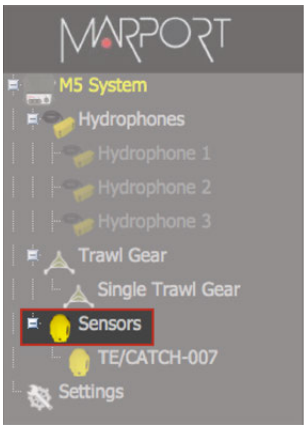
About this task

Important: To be able to add your sensor to the receiver, make sure your receiver version is compatible. Check **System Compatibility (on page 10)**.

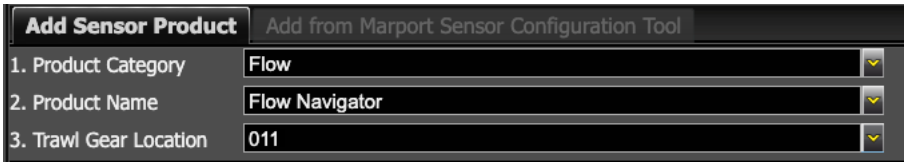
Note: Marport systems are limited to a fixed number of channels, and the sensors use a specific number of channels based on the type of data they send. The Flow Speed Navigator uses 1 sounder channel and 1 PPM channel per measure (e.g. depth, temperature,…).

Procedure

1. From Scala2, click **Menu** ☰ **> Expert Mode** and enter the password `copernic`.
2. Right-click the IP address of the receiver at the bottom of the page, then click **Configure Receiver**.
3. From the left side of the receiver page, click **Sensors**.



4. From the page **Add Sensor Product**, select the options corresponding to your type of sensor:
    - **Product Category**: Flow
    - **Product Name**: Flow Navigator
    - **Trawl Gear Location**: same as defined in Mosa2 (see **Configuring the Trawl Node (on page 25)**).



5. Click **Add Sensor**.
   The sensor is added to the receiver and displayed on the left side of the screen. The configuration page is displayed.

Configuring the Sensor Settings

You need to complete communication settings when you add the sensor to the receiver.

Important: Make sure the settings you enter here are the same as in Mosa2.



1	Sensor name displayed in Scala2 and its features.
2	Enter the same frequency as the one entered for the uplink frequency in Mosa2.
3	Click **Configure** to change filters applied on incoming data. Filters are particularly useful to reduce interferences on the echogram data. **Note:** Be aware that echogram filters such as **Echosounder and Interference Reduction** may remove small targets on the echogram.

	Tip: Please refer to Scala2 user guide for more information about the filters.
4-5	Select the same echosounder sounding direction and range as those set in Mosa2.
6	Select the same settings as the sensor firmware. A 10-meter range corresponds to the short range mode, and 30-meter range to the long range mode.
7	Select the same speed range as the one set in Mosa2.

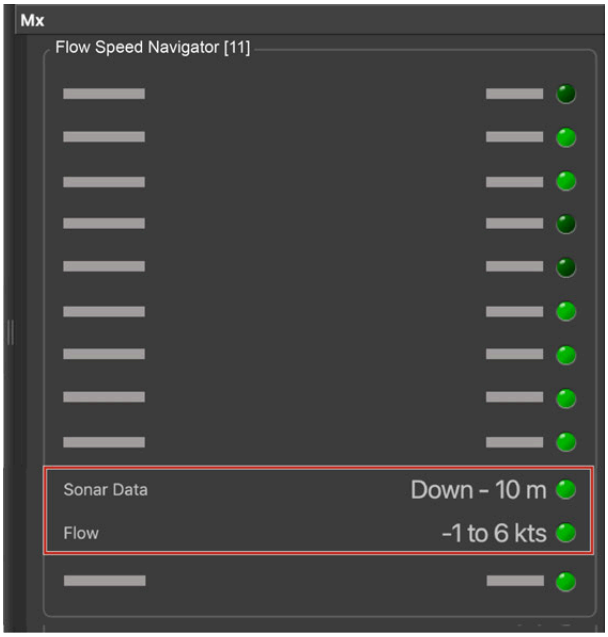
Click **Apply** when you have finished.

Configuring Data Display in Scala2

You can display the sensor's measurements and echograms on Scala2 pages.

Flow and Target Display Options

Flow Speed Navigator **Sonar Data** and **Flow** measurements are displayed in the **Mx** control panel on the right side of the screen.

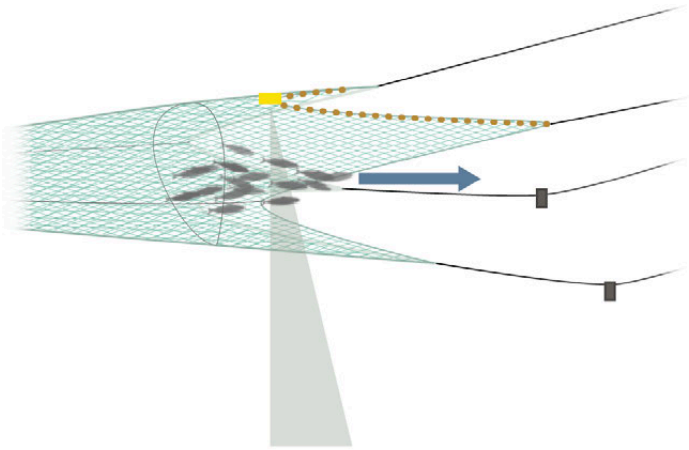


Sonar Data	Echogram from the Flow Speed Navigator, shows the acoustics detections of the area below the sensor.
Flow > Echogram for Mx Flow data	Representation of the flow speed measurements sent by the speed profiler. The palette defines the range of the speed values that are colorized on the echogram.
Flow > Plot of flow navigator speeds	Displays one or several curves of the flow speed measurements below the sensor. Different heights can be set.

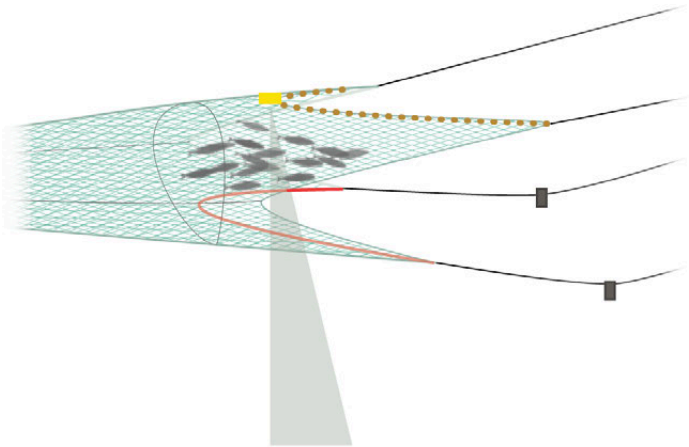
Flow > Flow label	Displays the flow speed measurement in a label. The height is configurable.
Speed 3D	Displays a 3D view of the sensor. It updates in real-time and shows colored arrows representing the flow speed measurements.

The speed of the flow and of the targets is measured relative to the moving sensor. The flow and targets are shown with colors that depends from the speed values and direction:

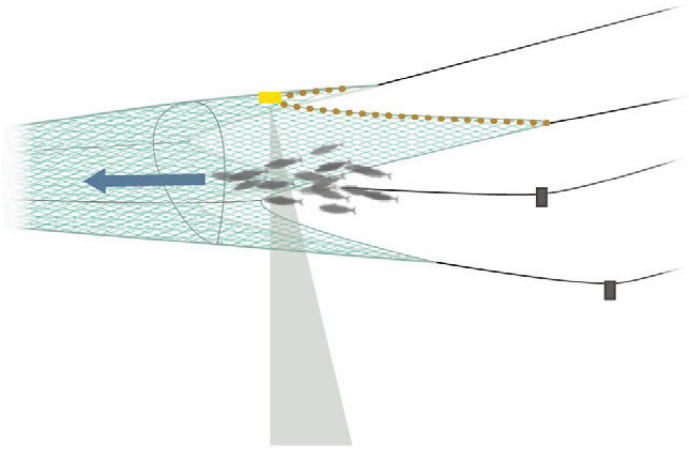
- Negative values: the water flow or targets go in the same direction as the sensor, but faster. For example, fish going out of the trawl.



- Around zero: the speed of the water flow or targets is the same as the sensor's. For example, fish moving at the same speed, bottom of the net.



- Positive values: the water flow or targets go in the opposite direction from the sensor. For example, fish entering the trawl, water particles.



The colors representing the flow and target speeds and directions are customizable using the palettes (colors and range of values). See **Displaying the Flow Speed Navigator Data (on page 47)** for examples.

Displaying the Flow Speed Navigator Data

Before you begin

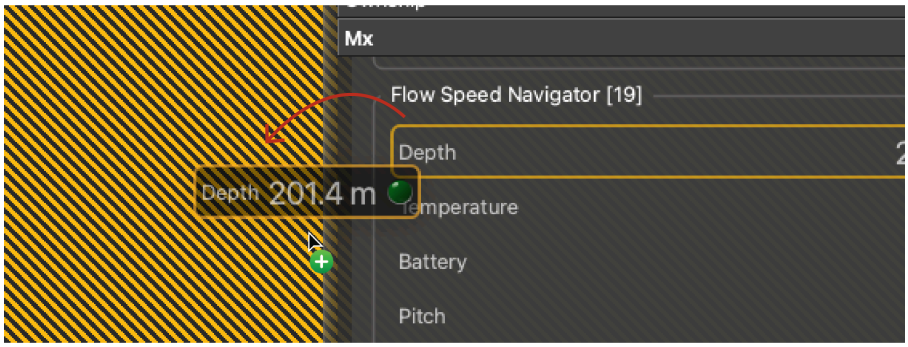
You must be in **Customize** mode to do this task.

Procedure

1. From the top left corner of the screen, click **Menu** ☰ **> Customize** and enter the password `eureka`.
2. Open the control panel to access Flow Speed Navigator incoming data.



3. To add measurements to a page, click + hold data, such as depth, pitch, roll, and drag it to the page display.



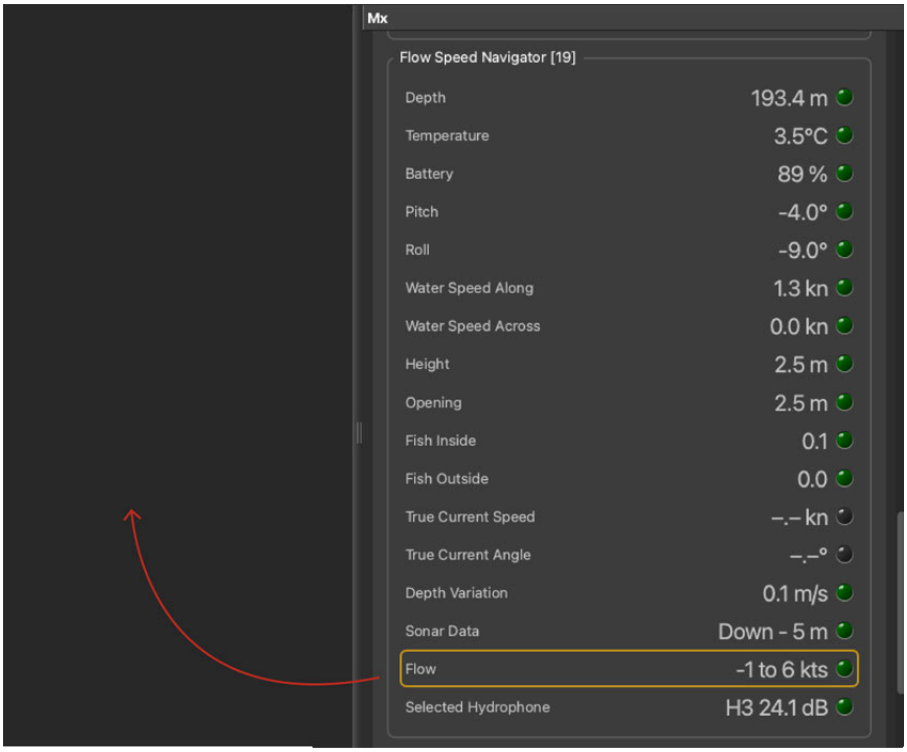
Remember: Deactivate the Customize mode when you have finished customizing pages: click **Menu** ☰ **> Customize** again.

Displaying the Flow Speed Echogram

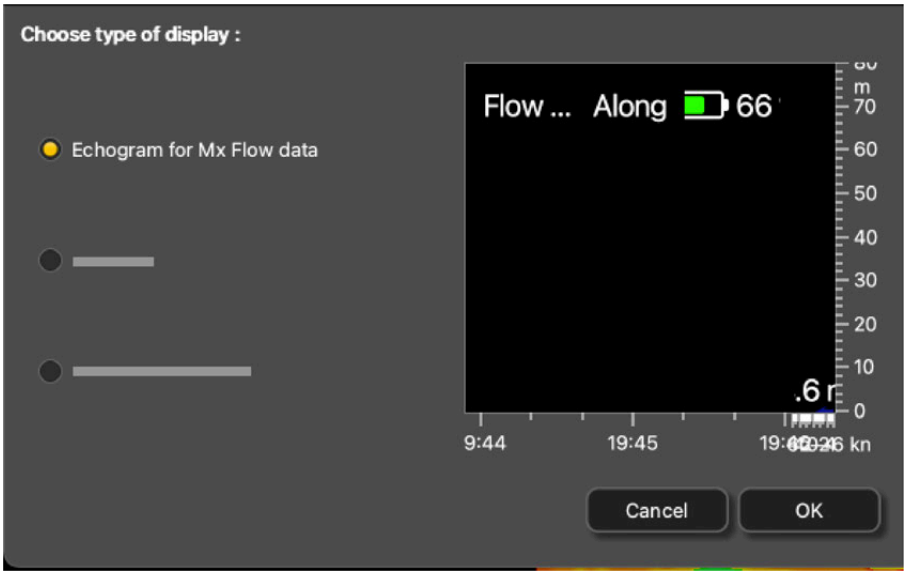
Use the flow data echogram to identify flow speed and variations.

Procedure

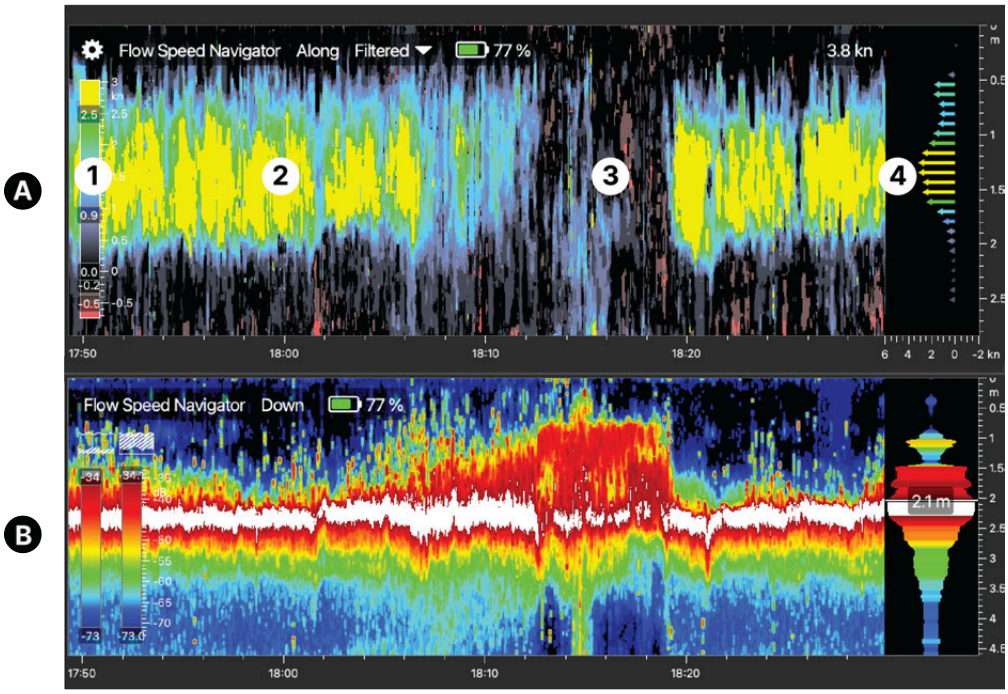
1. Open the control panels and drag **Flow** data to a page.



2. Select **Echogram for Mx Flow data**.



The image below shows an example of display. You can combine this view (**A**) with sonar data echogram images (**B**) to see target detections.



A. Mx Flow data echogram / **B**. Sonar data echogram

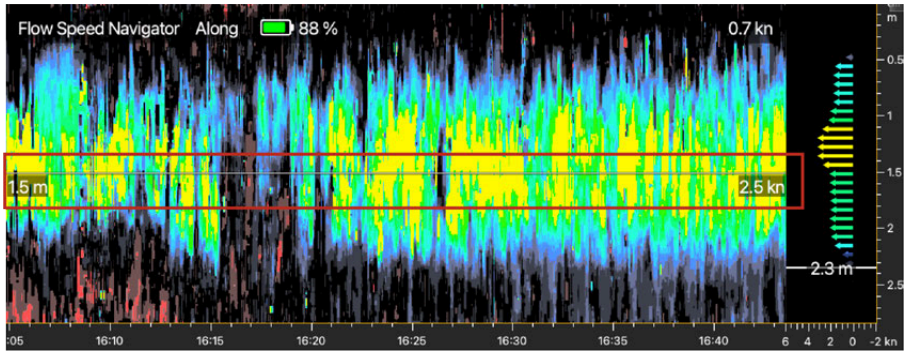
1. Color palette: set colors to specific ranges of flow speeds.

2. Example of flow entering inside the trawl.

3. Example of targets moving at the same speed as the sensor and trawl, probably trying to escape.

4. These arrows show the flow and target direction. In this example, towards the inside of the trawl.

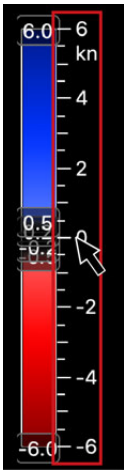
3. You can set a VRM line on the **Echogram for Mx Flow data** to see the speed at a given range:
    a. Open **Settings** and click **Display > VRM**.
    b. Click and drag the VRM line to change its location.



About the speed values: a positive speed value means a flow or targets entering inside the trawl. A negative value means targets going out.

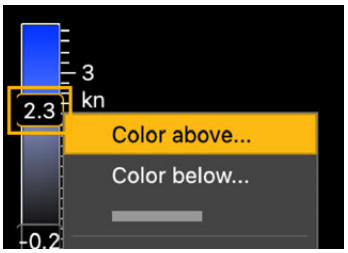
You can customize the color palettes the following way:

4. To zoom in and out of the flow speed scale, place the mouse cursor over the scale and scroll.

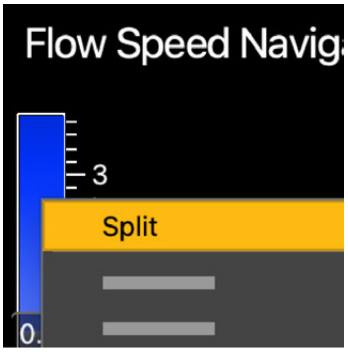


5. Click and drag a handle to adjust the ranges of flow speed colors.

6. To change colors corresponding to ranges of flow speed:
    a. Click one handle.
    b. Click **Color above** or **Color below** and select a color.

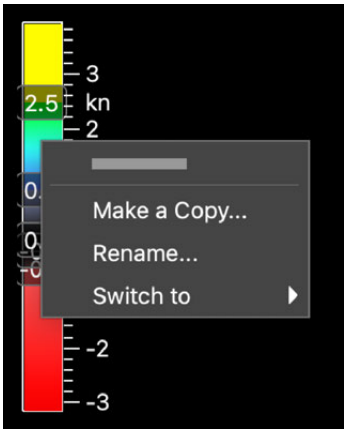


7. Split the palette into different areas to assign colors to specific ranges of flow speeds:
    a. Right-click the bar and click **Split**.



    b. A new handle appears. You can give colors to the area above or below.
    c. To remove a handle, right-click the bar and click **Remove Split**.

8. To manage the palettes, right-click the palette, then:



a. Click **Make a Copy** to save your customized palette.
b. Click **Rename** to change its name.
c. Click **Switch to** to switch to a default or previously saved palette.

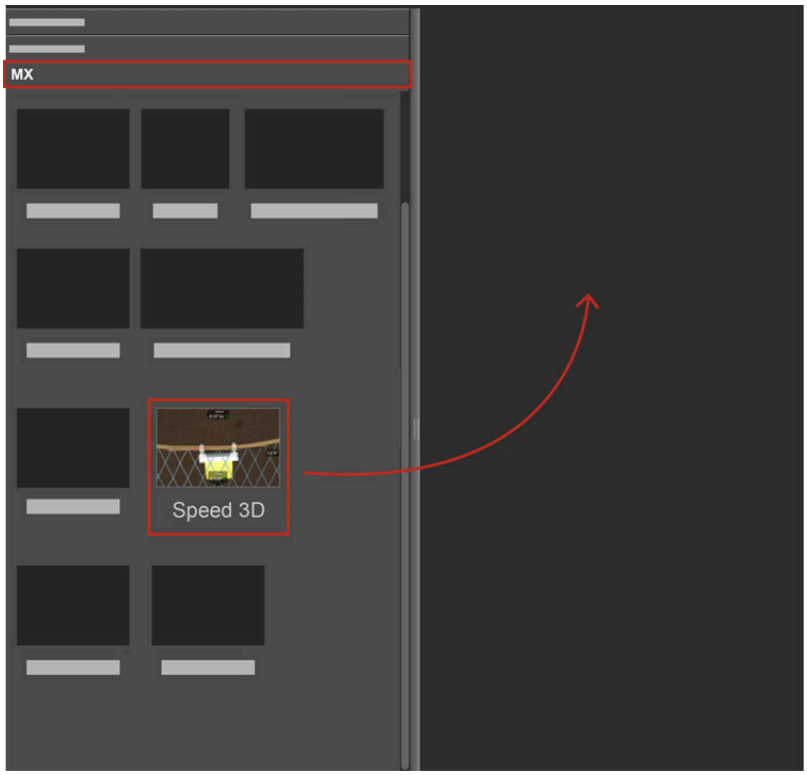
Displaying the Speed 3D View

Display a 3D view of the sensor to monitor the movements of the trawl, the along and across water speeds, as well as flow behaviour inside the trawl.

Procedure

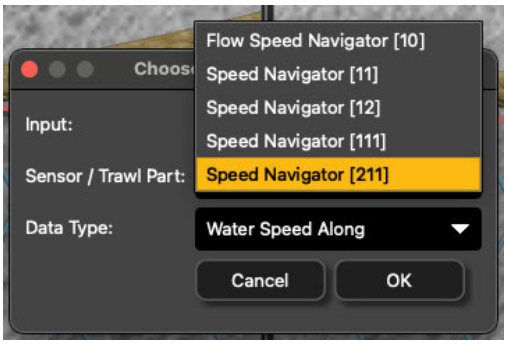
1. Open the customization panel and go to the **MX** panel.

2. Click + drag **Speed 3D** to the page.



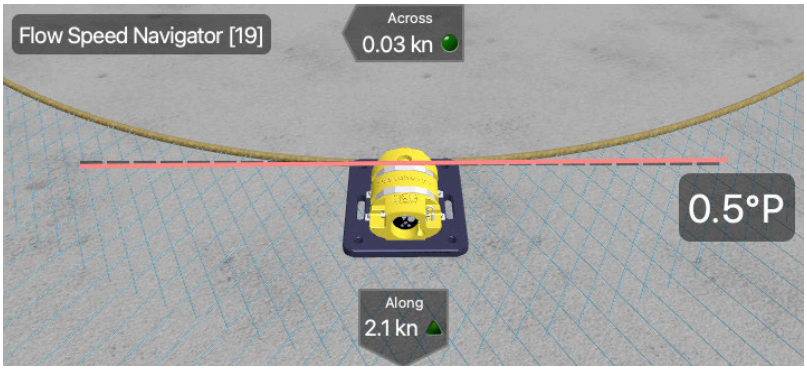
3. Drop it in a yellow area.

4. In the dialog box that appears, select the type of sensor in **Sensor / Trawl Part**.



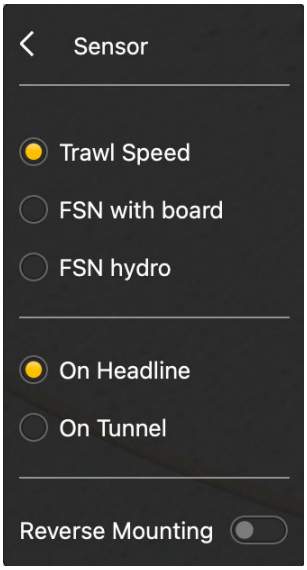
The 3D view of the speed sensor is displayed. You can see the along and across speeds and the positioning angle of the trawl.

Tip: Click and drag to tilt the viewing angle. Scroll to zoom in and out.



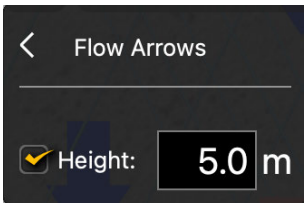
5. Click **Settings** on the top left corner of the view to show the display options.

Sensor



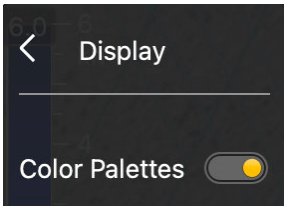
Choose the type of sensor and location on the trawl to display the corresponding 3D image.

Flow Arrows



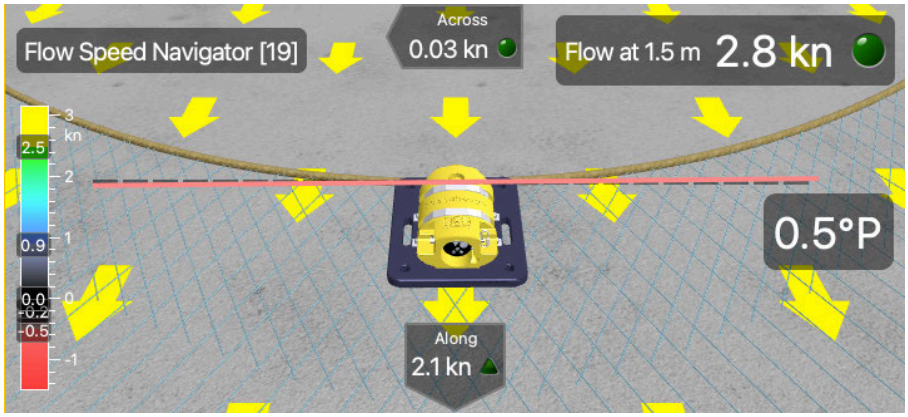
- Select to display arrows showing the water flow direction and speed.
- Choose a depth below the sensor at which to display flow speed measurements.

Display



Set colors to the arrows according to the flow speed. We recommend to set the same palette as the echogram for flow data.

Results

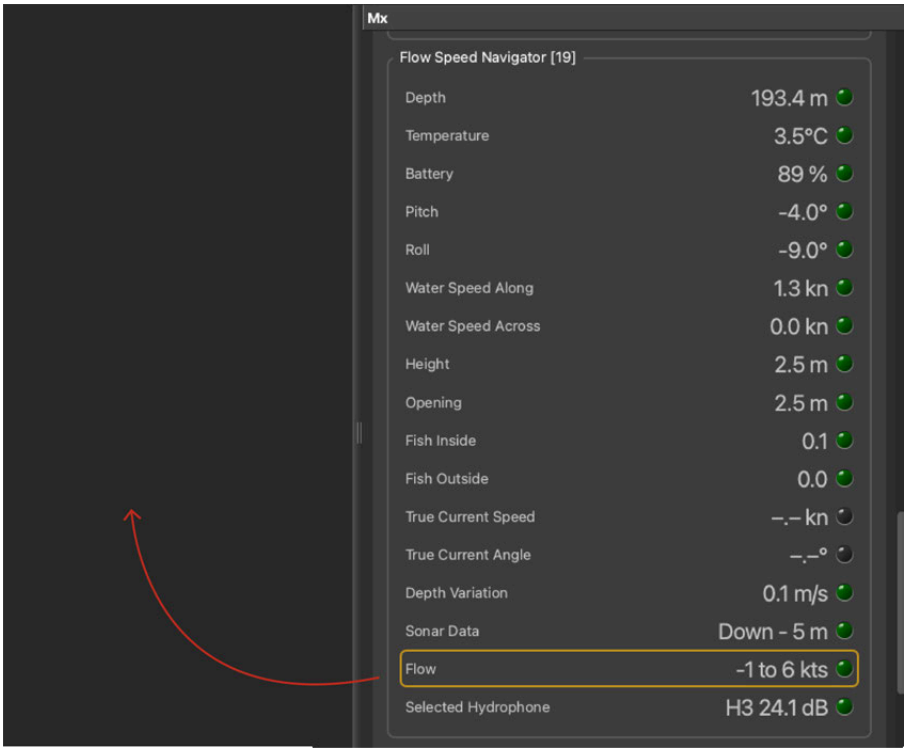


Displaying the Flow Speed Plot

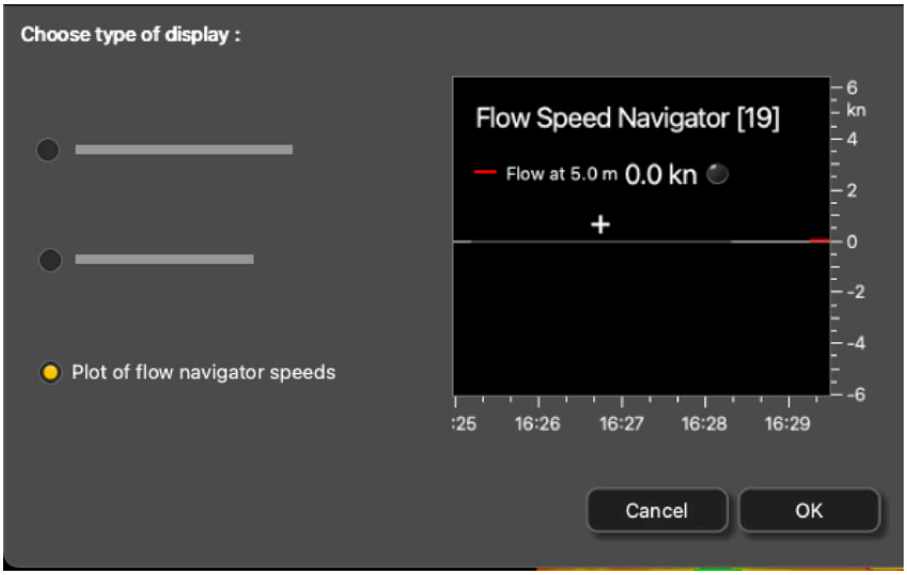
You can display flow speed data in a plot, and set measures at different depth.

Procedure

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

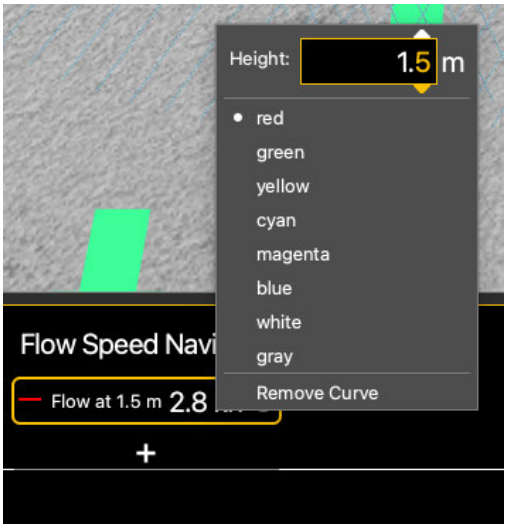


2. Select **Plot of flow navigator speeds**.

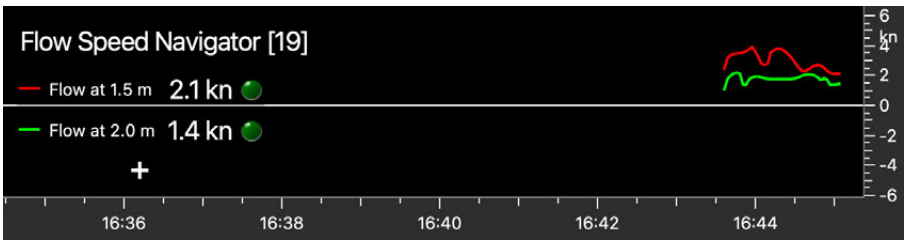


   The plot displays one flow curve.

3. Right-click the label to set a depth below the sensor at which to display flow speed measurements.



4. Click **+** below the label to add a new curve and set a different depth.

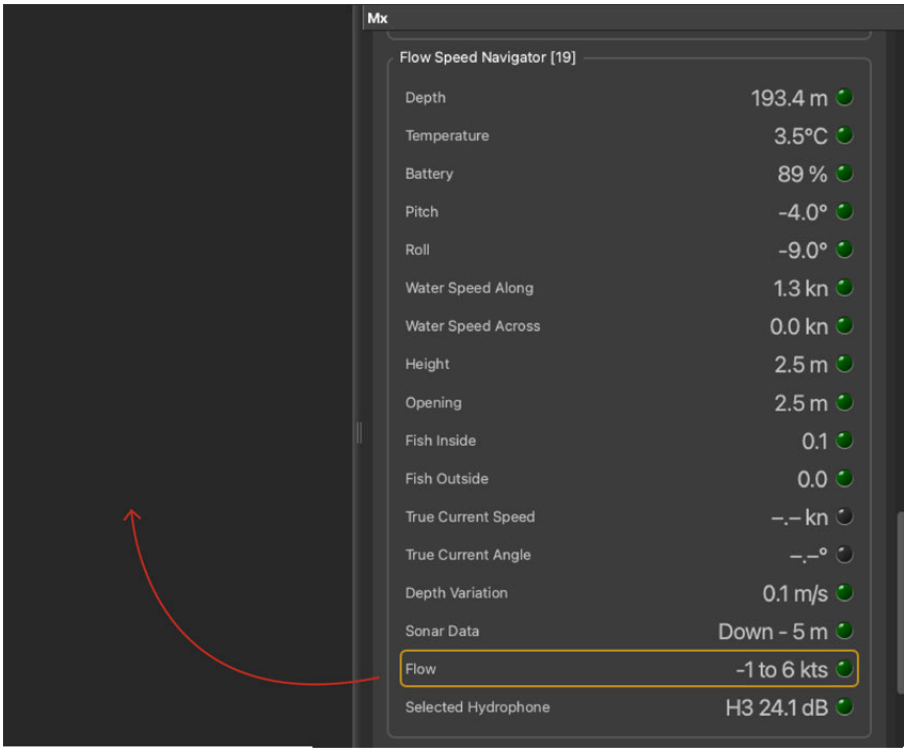


Displaying the Flow Label

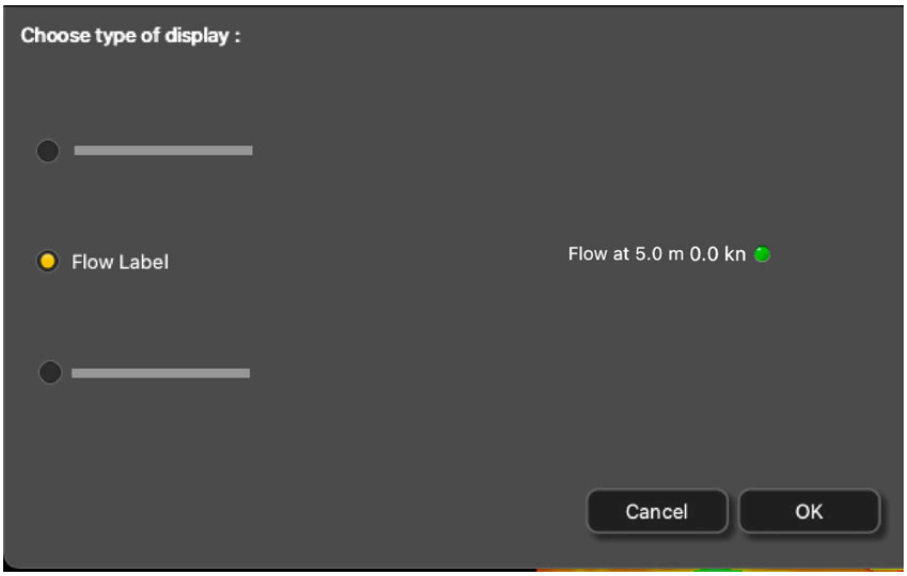
Display a written label with a flow value at a given depth.

Procedure

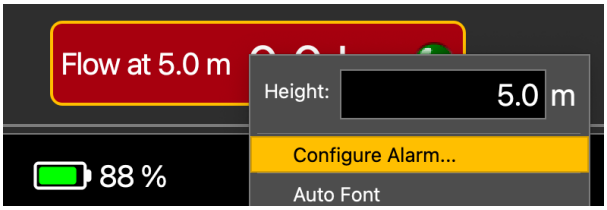
1. Open the control panels and drag **Flow** data to a page.



2. Select **Flow label**.



3. The label is displayed. Right-click to set a height and alarm. When the alarm is triggered, the label becomes red.

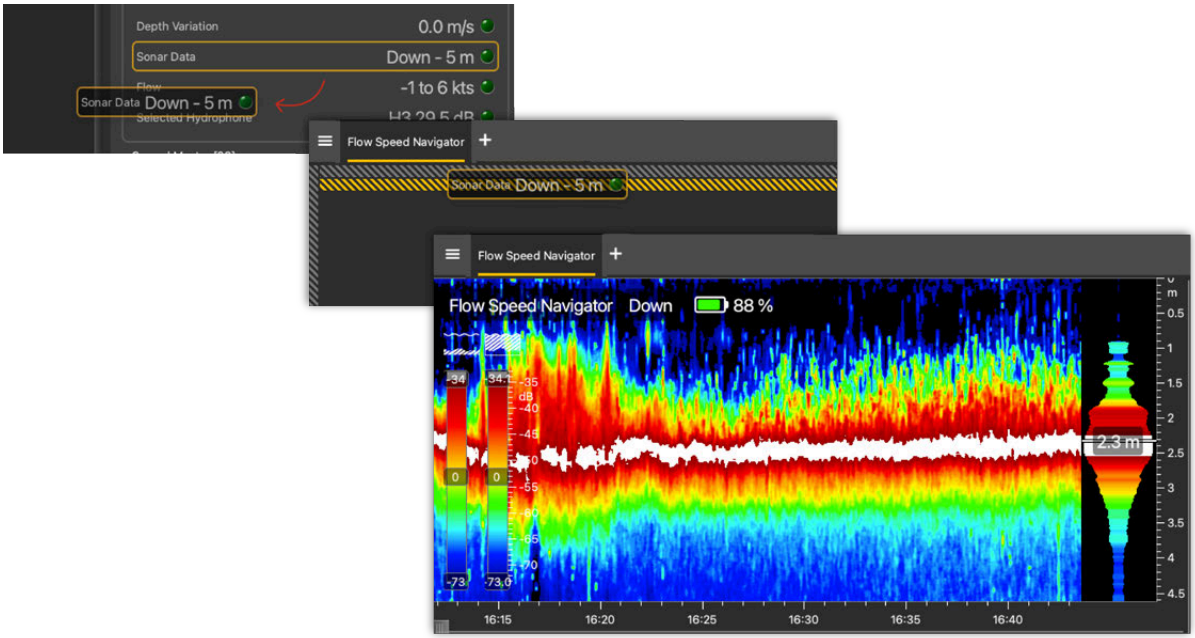


Displaying the Echogram

Add an echogram to show the acoustics detections of the area below the sensor.

Procedure

1. To display the echogram, click + hold **Sonar Data** and drag it to the page display.



2. Click **Settings** to access display options, such as the color palettes.

Outputting Scala2 Symmetry Data to Scantrol

You can output across speed data from Scala2 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.

About this task

Important: Scala2 2.10.x and later: If the system is configured to operate on a twin trawl with one speed sensor on each trawl, but only one trawl is put in water: **make sure that the speed sensor in water is the one from the first trawl, configured with a node between 10 and 13**. If not, Scala2 will not send any speed measurements.

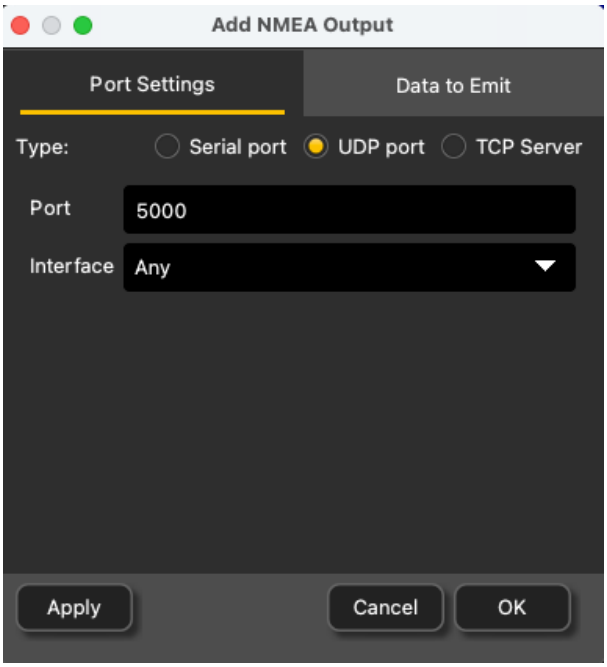
Procedure

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 Scala2, go to **Settings > NMEA Outputs**.

3. In **Port Settings**, select **UDP port**.

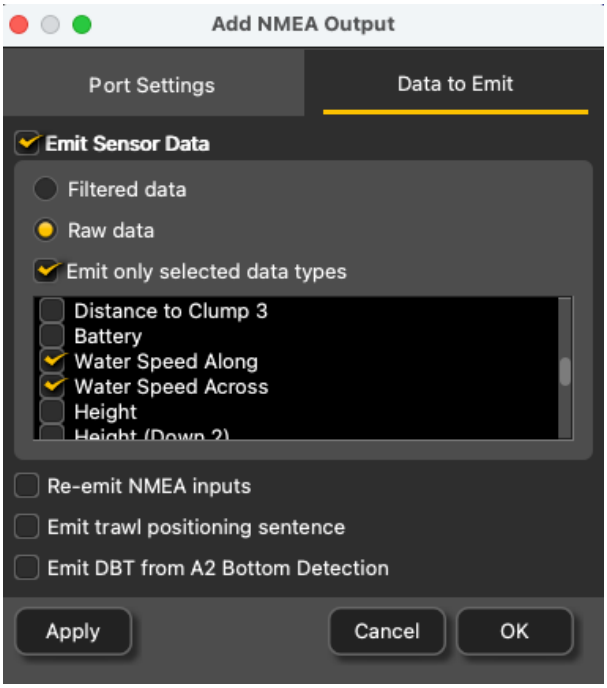
4. Enter a port number, for example `5000`, and leave **Interface** at **Any**.



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

5. In **Data to Emit**,

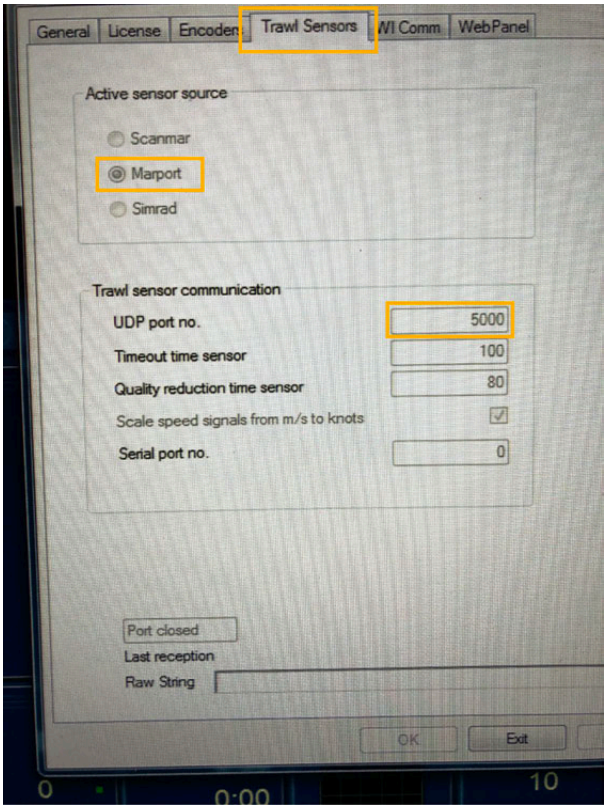
a. Select **Emit Sensor Data > Raw data**.
b. Select **Emit only selected data types**, then select **Water Speed Along** and **Water Speed Across**.



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 Scala2.



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 ScalaReplay2, then replay SDS files containing data.

Replaying Data Recorded on a Memory Card

In Scala2, you can replay data that has been recorded in high definition on the sensor memory card.

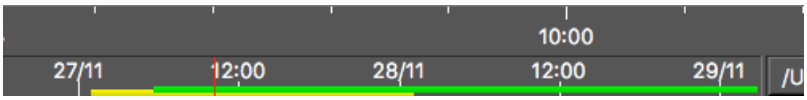
About this task

Note: Data in high definition is available only when downloading it from the sensor memory (A2S files). Data received in Scala2 will have a lower definition (SDS files).

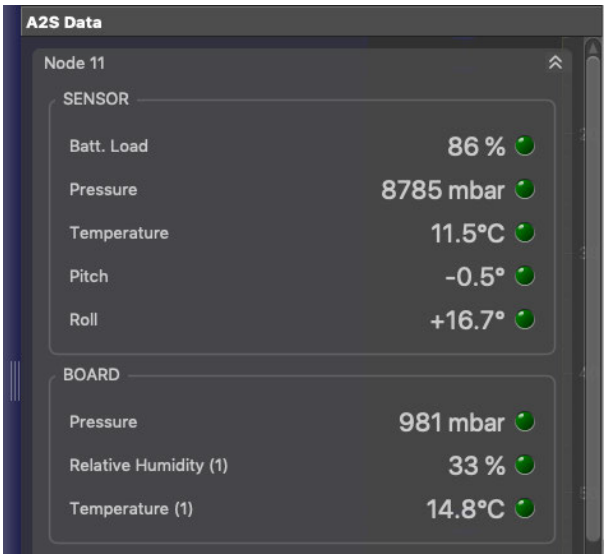
Procedure

1. Download from Mosa2 the files recorded on the sensor memory.

2. Right-click the timeline and click **Change Directory** to choose the source directory where the files are stored.
   In the replay bar, the recording period of the files in high definition is displayed in green.



   In the control panels, data that was received in live is displayed in the **Mx** panel and data recorded on the SD card is displayed in the **A2S Data** panel.



3. Go to the control panels, then click and drag data from the **A2S Data** panel to a page.

Installation

Installation

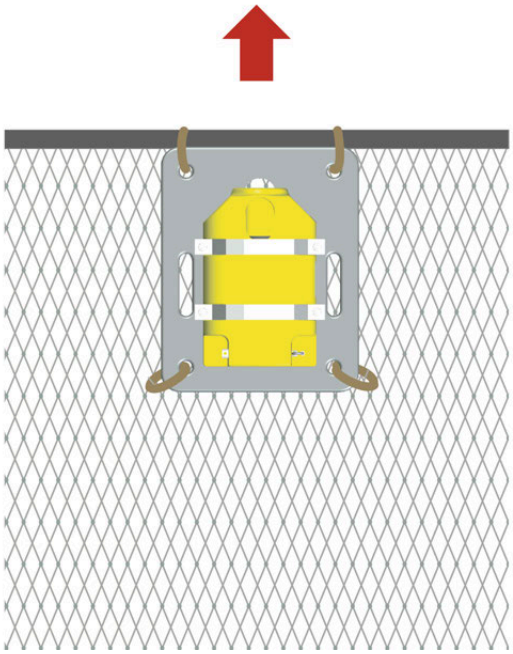
Learn how to install the sensor on the trawl gear.

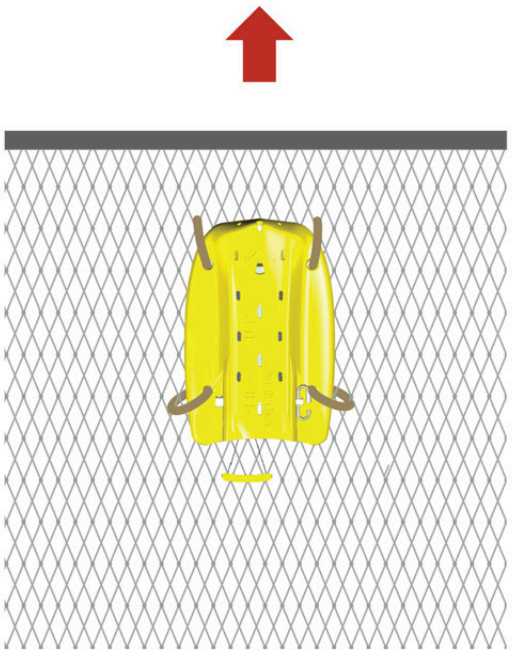
Installing the Flow Speed Navigator on the Trawl

You can install the Flow Speed Navigator on the headline or tunnel.

Procedure

1. Attach the stabilization board with rope to prevent rapid wear on the board. Use the four attachment lugs on board or hydrodynamic housing.





2. We recommend to cut a hole in the net below the sensor. If the trawl meshes are too thick or if there is any rope in front of the down signals, this would impede the signals.

Important: Make sure the area beneath the transducer is completely clear.

Maintenance & Troubleshooting

Maintenance and Troubleshooting

Read this section for troubleshooting and maintenance information.

Important: Only an approved Marport dealer can access the internal unit. Warranty will become void if anyone other than an approved dealer tries to do internal maintenance duties on the product.

Charging the Sensor with the Dock

Connect a sensor to one of the 4 charging connectors of the Dock to display its level of charge.

Before you begin

- Make sure the Dock is connected to a power supply and turned on.

About this task

WARNING: In case of water ingress in the product, do not charge it: battery may vent or rupture, causing product or physical damage.

Note: For Dock products with serial number before DOC2400000: Do not leave the sensors connected on a charger that is switched off. If the charger is not connected to the mains voltage, the sensor switches on and this will drain the battery.

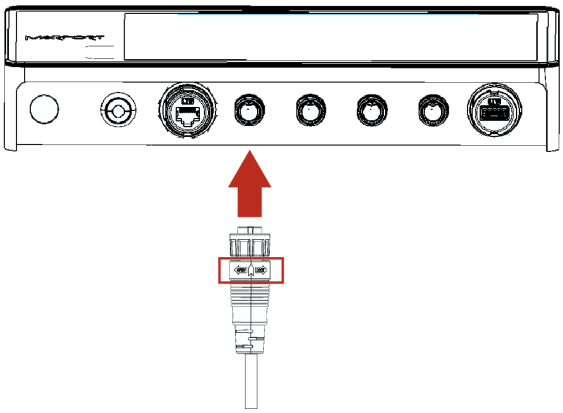
Note: Avoid full discharges and charge the battery whenever possible, at any battery level. Lithium-ion batteries do not have a charge memory, so they do not need full discharge cycles.

Procedure

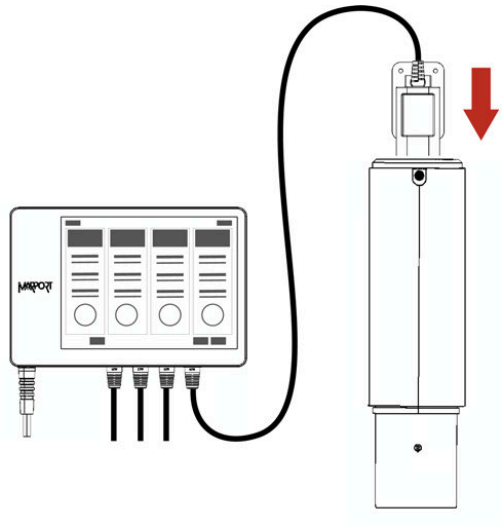
1. Before charging the sensor: wash with fresh water and dry the sensor. This prevents corrosion of the charging pins.

   Important: Check that the charging pins are not damaged. If they are, contact you local Marport dealer for replacement.

2. Connect the charger plug to one of the 4 charging ports.



3. Connect the 3-pin charging connector to the sensor charging pins.



Results

The Dock screen and Virtual Charger Room display the state of charge of the sensor.

Cleaning the Sensor

You need to regularly clean the sensor for proper performance.

Wash the sensor with fresh water and dry it before you charge or store it.

Regularly check that the sensor is clean. If not:

- Wash away mud or debris with warm water.
- Use Isopropyl alcohol to clean the end cap and transducer. Use a steel wool pencil to clean the shoulder bolts, and very fine sandpaper (180 grit) to clean between them.

⚠ **CAUTION:** Do not use highly abrasive materials or jet wash.

⚠ **CAUTION:** Special care should be taken with sensors and components sensitive to mechanical shock or contamination.

Maintenance Checklist

We recommend you to follow this maintenance schedule for better performance and to avoid any trouble with the equipment.

Before use	• Check that all attachment equipment are not worn or torn. Replace when appropriate. • Check that the sensor is clean. See **Cleaning the Sensor (on page 67)** for cleaning procedures. • Check the battery level 24 hours before use and recharge if necessary.
After use	Wash the sensor with fresh water.
Between uses	When the sensor is not in use, store in a dry area, without humidity, at a temperature between -10° and 70 °C (14 to 158 °F).
Not used for more than 3 months	• Do not leave the batteries at full charge or discharged for a long period of time or they will wear out. • Every 6 months, put the sensor in charge for less than an hour.
Every 2 years	The sensor must be returned to an approved Marport dealer for inspection and maintenance.

If the sensor has not been not used for more than 3 months, we highly recommend to check the following points before using it:

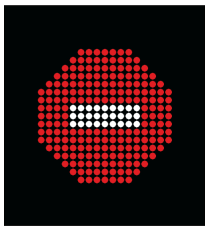
- Make sure the sensors on the end cap are in good condition and clean.
- Connect the sensor to a charger and check the charging status.
- Switch on the sensor by activating the water-switch, then listen for a ping noise and check if you see the LED switched on.
- Test the sensor measures with Mosa2: depth, temperature, pitch, roll, and if applicable: spread distance, echogram, catch status, speed measures.
- If you have a test hydrophone, check the reception in the wheelhouse with Scala2.

Troubleshooting

Learn how to solve common problems.

Warning icon on the Dock charger plug

The sensor is not detected by the Dock and there is a warning icon on the Dock charger plug.

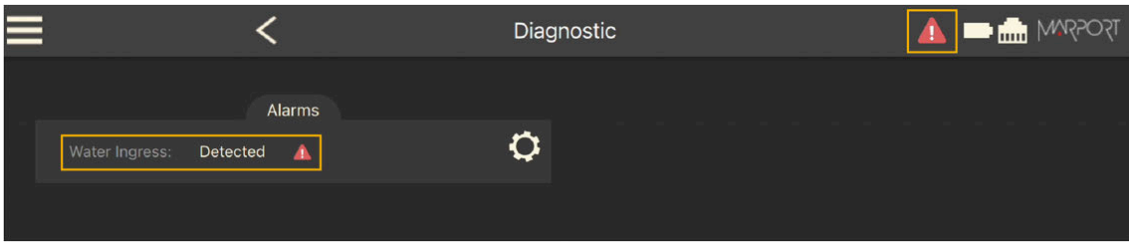


➜ The shoulder bolts are dirty or damaged.

- Clean them using a swab or Q-tip with Isopropyl alcohol.
- Fully clean the surface from debris and inspect the surface for burrs or pitting.
- If not taken care of, there is a risk of short circuit.

➜ If you have inspected the shoulder bolts and the problem persists, it means water may have leaked into the sensor.

- Connect the sensor to Mosa2 to check if there is a diagnostic alarm:
    1. Connect the sensor to a Dock charger plug or connect a Configuration Cable from the computer to the sensor, and open Mosa2.
    2. From Mosa2, go to the **Diagnostic** page and check the alarms.



- If there is an alarm or if the sensor is not detected by Mosa2, disconnect it from the Dock and do not charge it until it is inspected by a technician.
- Send the sensor back for servicing to a Marport office.

Important: Only Marport technicians can open the sensor to access the internal components.

WARNING: In case of water ingress into the sensor, battery may vent or rupture, causing product or physical damage.

Mosa2 does not open due to error message

bgeon saying it Mosa2 is

➜ Your Mac security preferences do not allow you to open applications not downloaded from the App Store.

1. From the upper left corner of the screen, click **Apple menu > System Preferences > Security & Privacy**.
2. Click the lock icon and enter the password, if applicable.
3. At **Allow apps downloaded from**, select **Anywhere**, then close the dialog box.
4. **macOS Sierra or later: Anywhere** option is not displayed by default. To display **Anywhere**:
    a. Click the magnifying glass from the top right corner of your screen and type `Terminal`.
    b. Click **Terminal** from the results.
    c. Enter in the terminal: `sudo spctl --master-disable`.
    d. Press Enter.

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

Sensor does not connect correctly with Mosa2 when using the Configuration Cable

Remember: If the sensor does not connect correctly with Mosa2, always:

- Disconnect both USB connector and three-pin plug.
- Connect again the Configuration Cable.
- Make sure the three pins are fully inserted inside the sensor.

➜ Mosa2 does not automatically open when connecting the Configuration Cable.

- Check that you see Marport Captain icon in the desktop taskbar. If you do not see it: close, then open Mosa2. The icon should appear in the taskbar.

  Note: Marport Captain is a program running in the background. It allows Mosa2 automatic opening and displays shortcuts to Mosa2 and Scala2 applications installed on the computer. It should not be closed.

- If the problem persists, install Mosa2 again.

➜ At the end of step 2 of the startup wizard, the sensor does not respond. Mosa2 displays a red cross and the Configuration Cable LED is red.

- Check that no other instance of Mosa2 application is already running on the computer. If this is the case, close both applications, then open only one.
- Or else, connect the sensor to a charger and wait until it is fully charged.

➜ The sensor has been disconnected from Mosa2.

- Check that the Configuration Cable is not connected to a USB hub. The Configuration Cable must be connected directly to the computer.
- If the computer goes to sleep mode, the sensor may be disconnected. Change the settings on your computer to increase the time before sleep mode.
- If the problem persists, connect the sensor to a charger and wait until it is fully charged. Then try again to connect.

➜ Mosa2 displays a critical error message.

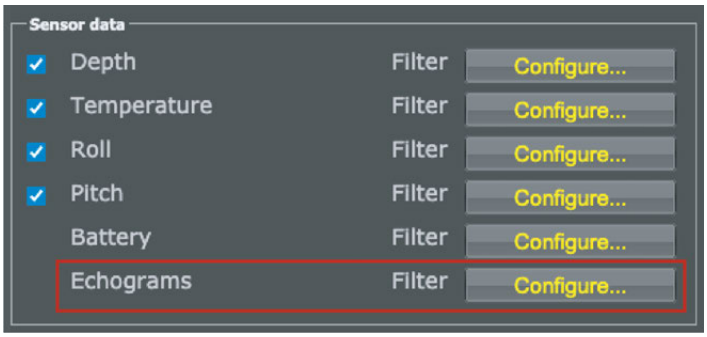
- Disconnect both USB connector and three-pin plug. Then, connect again the Configuration Cable. If the message is still displayed, it means there is an issue with the sensor's components. Contact Marport support.

The echogram has a lot of interference

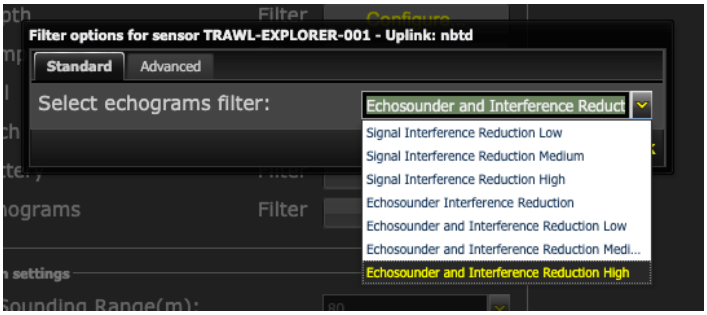
➜ There is interference from environmental noise or other equipment such as echosounders. You need to increase the level of the echogram filter in Scala2.

Important: Increase the level of the echogram filter only if the echogram has a lot of interference. Be aware that this filter will remove small targets.

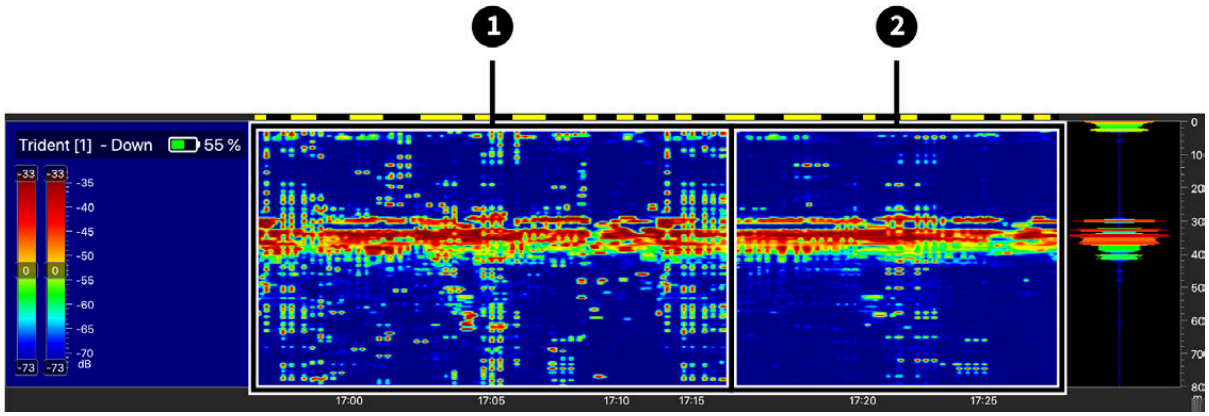
1. From Scala2, click **Menu** ☰ **> Expert Mode** and enter the password `copernic`.
2. Right-click the IP address of the receiver at the bottom of the page, then click **Configure Receiver**.
3. Click the name of the sensor in the system tree view.
4. In **Sensor Options**, click **Configure** in front of **Echograms**.



5. In **NBTE Echograms Filter**, select **Echosounder and Interference Reduction Medium** or **Echosounder and Interference Reduction High**.



Here is an example of result when applying this filter:

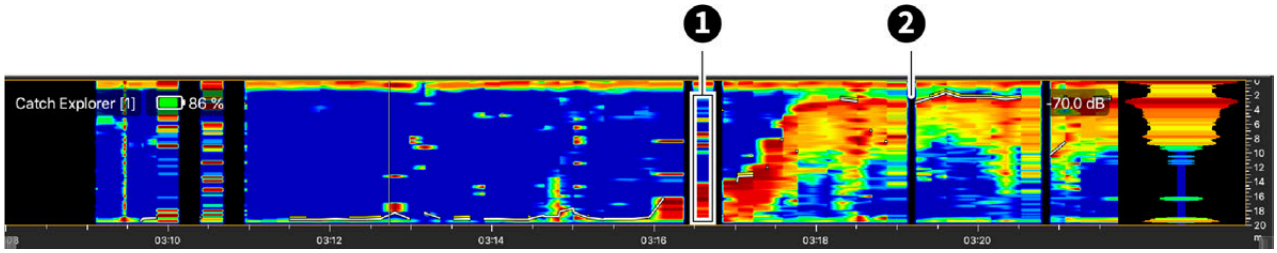


1. Noisy echogram with default filter (**Echosounder and Interference Reduction Low**)

2. With **Echosounder and Interference Reduction High** filter applied.

The echogram display is interrupted

➜ There is a loss of communication between the sensor and the boat. If the acoustic signal from the sensor is not received, the last sonar data is repeated for a few seconds, then stopped. This will show black lines on the echogram.



1. Repeated sonar data / **2**. Loss of reception

Do the following actions to diagnose the issue:

1. Check the frequencies of the other sensors and make sure there is enough distance between them.
2. Check the noise on the spectrum (see). If the frequency where the sensor is placed is too noisy, change for a less noisy frequency.

   Important: Do not forget to also change the frequency on the system web page in Scala2.

3. You can change the echogram filter settings on the system web page:
   a. From Scala2, click **Menu** ☰ **> Expert Mode** and enter the password `copernic`.
   b. Right-click the IP address of the receiver at the bottom of the page, then click **Configure Receiver**.
   c. From the left side of the page, click the name of the sensor.
   d. From the sensor configuration page, click **Configure** next to **Filter**.
   e. From NBTE Echograms Filter, select **Echosounder and Interference Reduction Medium** or **High**.

The sensor is not running when testing out of water

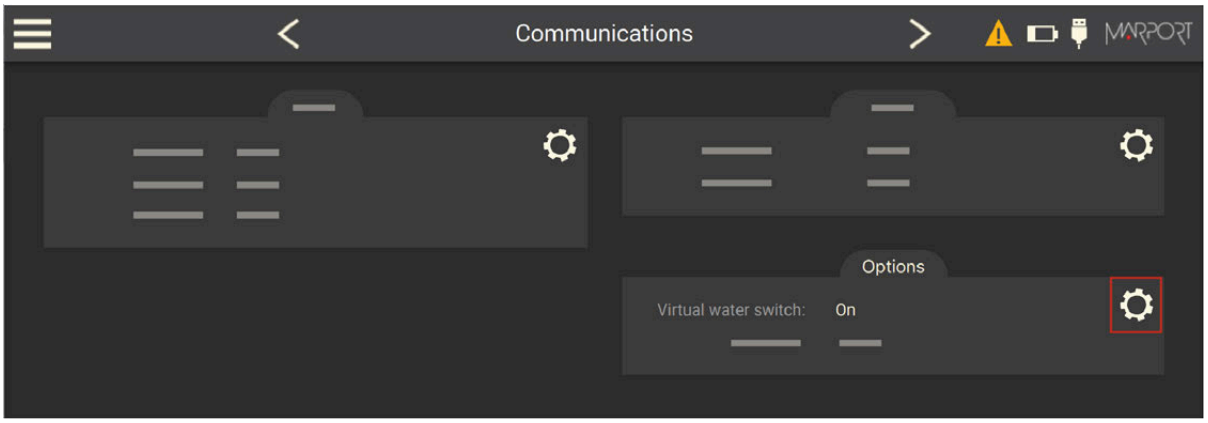
[illegible] the se

➜ The virtual water switch option may be activated in Mosa2. When this option is activated, the sensor runs only at a depth more than 2 meters. For more details, read **About the Virtual Water Switch Option (on page 24)**.

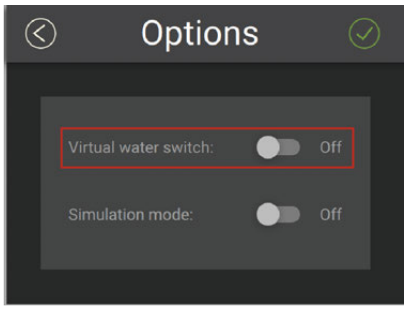
1. Connect the sensor to Mosa2 and check if there is an orange warning sign at the top of the window. If yes, it means the virtual water switch is on.



2. Go to **Communications** page, then in **Options**, click ⚙.



3. Deactivate the **Virtual water switch** option.



Sensor is not charging with the Medusa or Basic Marport legacy charger

Tip: When connecting the sensor to a Medusa or Basic Marport legacy charger, look at the sensor transducer LED to know if it is charging or not.

- LED is blinking red when compatible and charging.
- LED is blinking red for 10 sec. then stops, when incompatible.

➜ By default, Pro sensors are not compatible with legacy Marport chargers.

- Compatibility with legacy Marport chargers is available as an optional feature. It must be activated by Marport sales offices.

➜ If the feature is activated, but the sensor is not charging, it may be because the sensor firmware is not compatible with this feature. In order to be compatible, the sensor firmware version must be **F450-02.03.01 or later**.

1. You can check the sensor version from Mosa2:



2. If the version is lower, ask your local Marport office for an update.

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

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6018 Ålesund, Norway

supportnorge@marport.com

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george@marport.com

Appendix

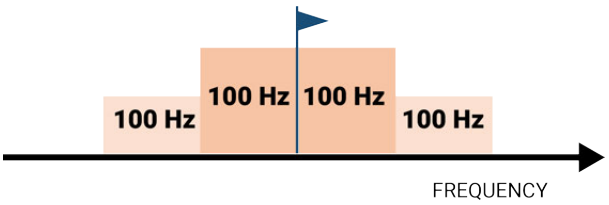
Frequency Plan

It is important to carefully plan the setup of your sensors before adding them to the system. You can create a table with a list of frequencies and complete it when you add sensors.

Frequencies and intervals

The diagrams below show the bandwidth of the different types of Marport sensors and intervals you must respect when adding other sensors.

Figure 1. PRP sensors (e.g. Catch sensor, Trawl Speed, Spread sensor...)



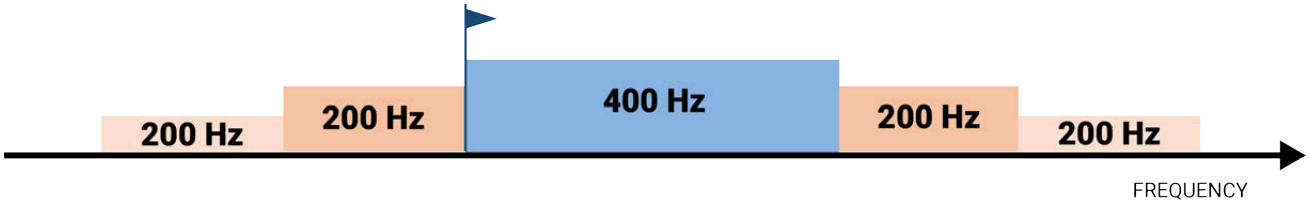
Example: If the frequency of the sensor is 40kHz, there should be no sensors between 39.9 and 40.1kHz.

Figure 2. Marport Pro sensors (e.g. Trident Pro, Door Explorer Pro, all Navigator range except Catch)



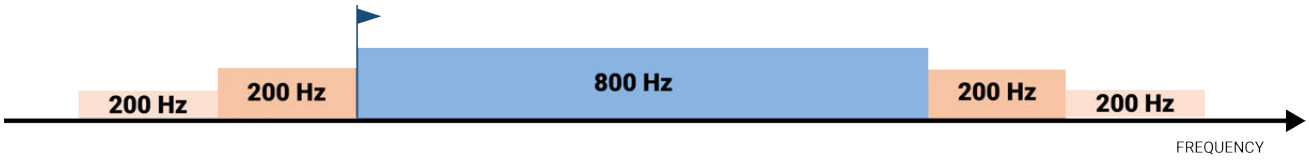
Example: If the frequency of the sensor is 40kHz, there should be no sensors between 39.8 and 41.2kHz.

Figure 3. NBTE sensors (e.g. Speed Explorer, Trawl Explorer, Catch Explorer, Catch Navigator Pro NX, Door Sounder)



Example: If the frequency of the sensor is 40kHz, there should be no sensors between 39.8kHz and 40.6kHz.

Figure 4. HDTE narrow band mode



Example: If the frequency of the sensor is 40kHz, there should be no sensors between 39.8kHz and 41kHz.

Figure 5. HDTE wide band mode



Example: If the frequency of the sensor is 40kHz, there should be no sensors between 39.8kHz and 42.6kHz.

Frequency of the sensor

Bandwidth

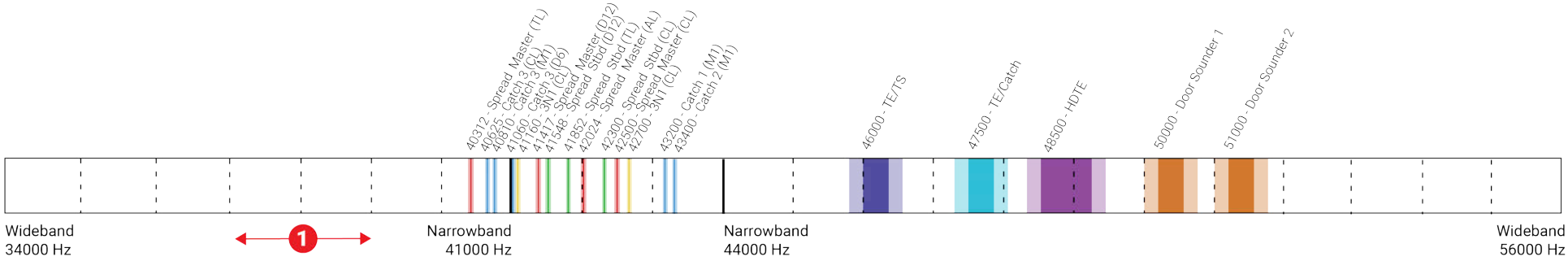
Mandatory distance with other sensors

Recommended distance with other sensors

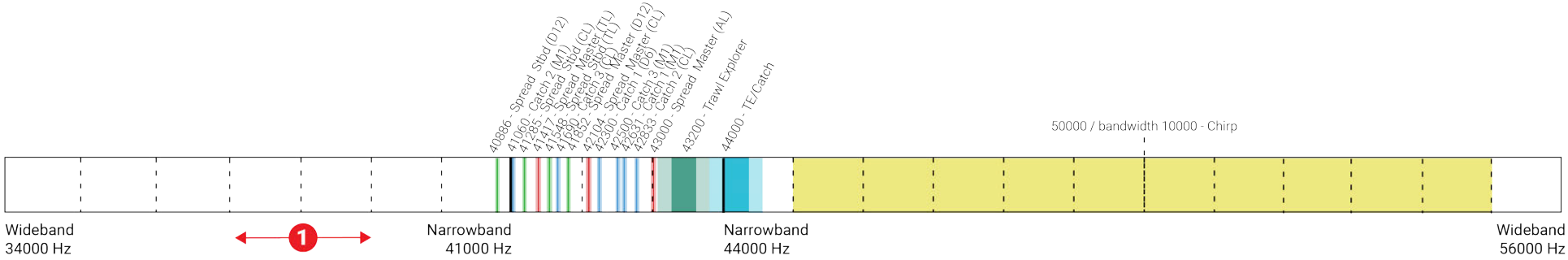
Examples of frequency allocations

- We recommend to allocate frequencies between 34 and 56 kHz for wideband hydrophones and between 41 kHz and 44 kHz for narrowband hydrophones.
- Echosounders are usually placed around 38 kHz, make sure to allow enough distance with them.

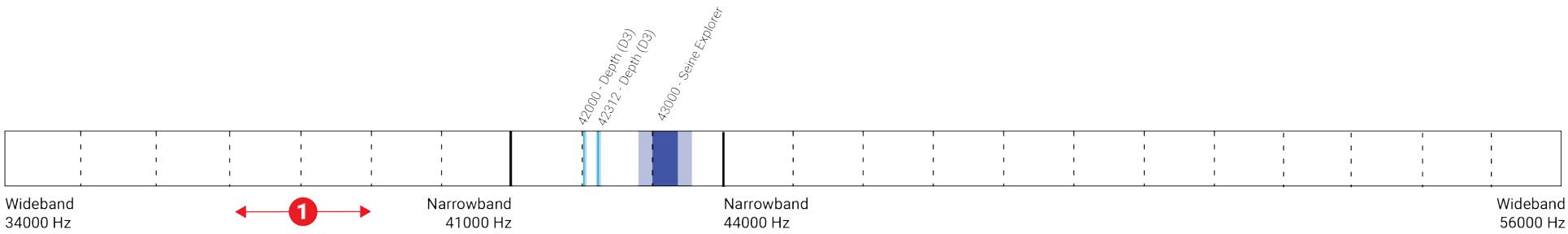
Example of a system with Spread, Catch, Trawl Speed sensors and Speed Explorer, Catch Explorer, HDTE and Door Sounder.



Example of a system with Spread sensors with positioning, Catch sensors, Trawl Explorer and Catch Explorer.



Example of a system for purse seining, with a Seine Explorer and depth Seine sensors.



Bandwidth

Mandatory distance with other sensors

1 Avoid allocating frequencies between 37 and 39 kHz because this range is generally used by echosounders.

Flow Speed Navigator Installation examples

Below are some examples of installation of the sensor on a trawl gear.





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