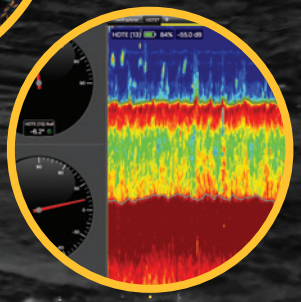
HDTE
User Guide



MARPORT

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Legal

History

V1	03/15/17	First release
V2	03/09/18	New topics: • Appendix A: Frequency Plan on page 57 Improved topics: • Configuring Uplink, Up and Down Settings on page 21: addition of noise cancellation option to improve echogram. • Configuring the Sensor Settings on page 39: now with a clearer layout.
V3	07/06/18	New topic: • Troubleshooting: Sensor cannot connect in wireless connection on page 52 Improved topic: • Interference Check on page 46: more information about **Spectrum** page.
V4	11/30/18	Improved topics: • Appendix A: Frequency Plan on page 57: drawings have been changed, frequencies are now allocated between 34 kHz and 36 kHz and frequency ranges of narrowband and wideband hydrophones are indicated.

Copyright

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:

- **Scala: 01.06.06-01.06.25**
- **Mosa: 01.01.01-01.02.13**

U.S. Patent 9,091,790

Introduction and Presentation

Read this section to get a basic knowledge of your HDTE sensor.

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

Introduction

Marport's High Definition Trawl Explorer is the skipper's eyes under the sea. It can be mounted on the headrope to provide a view of the trawl and seabed. This way, you can see the trawl opening, and see fish passing under the headrope and back into the tunnel.

It can also be mounted on the tunnel to see fish making their way down to the codend.

HDTE employs CHIRP technology, that offers higher resolution than standard sensors. Standard sensors use one frequency at a time to identify targets in the sea. This means there is less information received, so it can be difficult to clearly identify individual fish. Sensors with CHIRP technology use a wider range of frequencies and are efficient under a noisy environment, so images they produce are more accurate and more detailed.

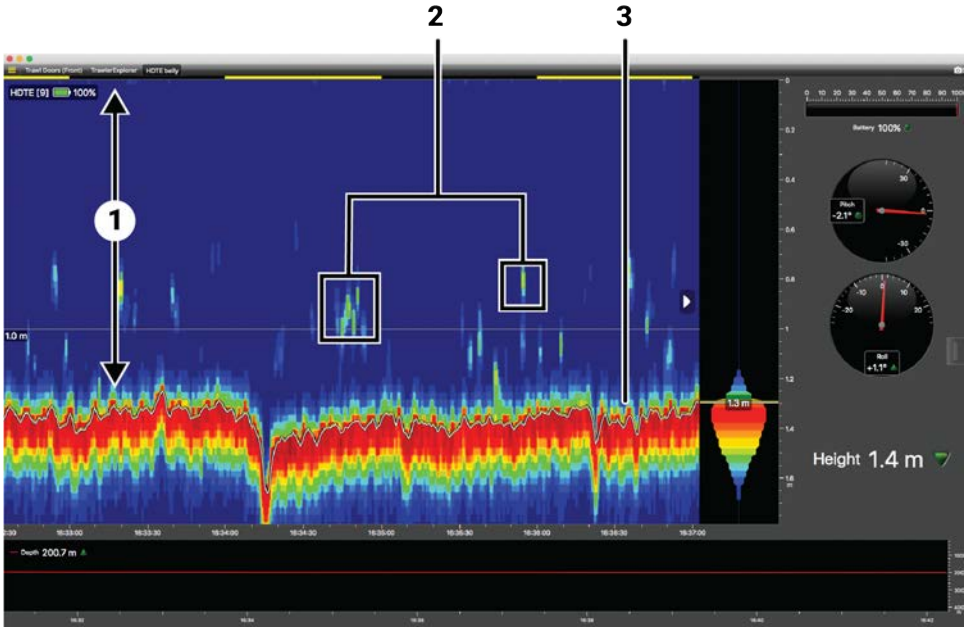
- CHIRP pulse with range of 48kHz for high resolution
- Measures depth, temperature, pitch and roll, distance to bottom, battery level
- Echogram shows target strength value, helpful to identify fish, and is calibrated to provide consistency between all units
- Works with real TVG (Time Variable Gain) to compensate sounding attenuation in the water
- All raw data can be recorded on SD card for post processing
- Wifi capability to configure sensor and download SD card data

Applications

HDTE sensors can be used for different kind of fisheries. Here are some examples of data received from HDTE sensors and displayed in Scala.

Jumbo Shrimp Fishing

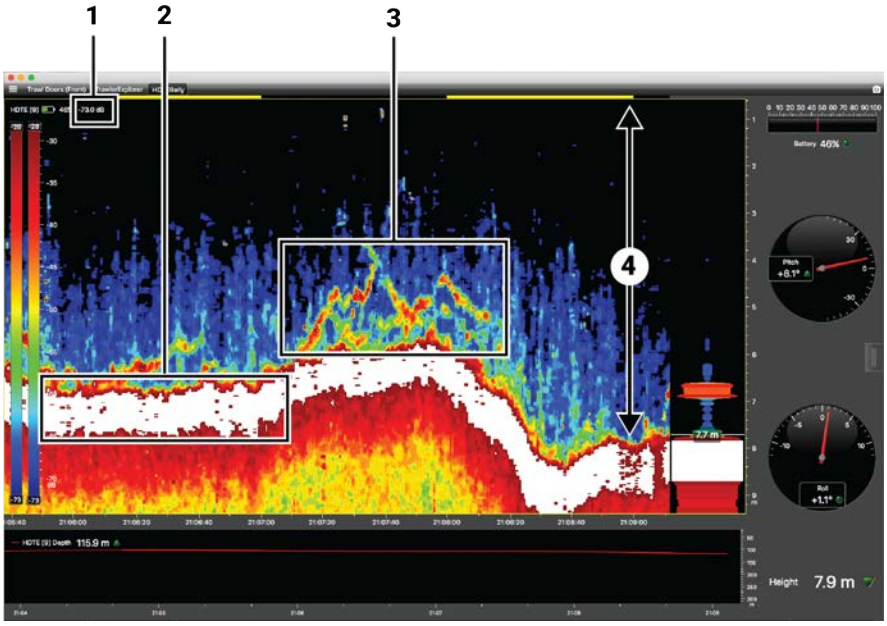
Example of HDTE display from the trawl tunnel. Pulse length: 120 µs



1. Trawl opening / **2.** Shrimps / **3.** Sea bottom

Haddock Fishing

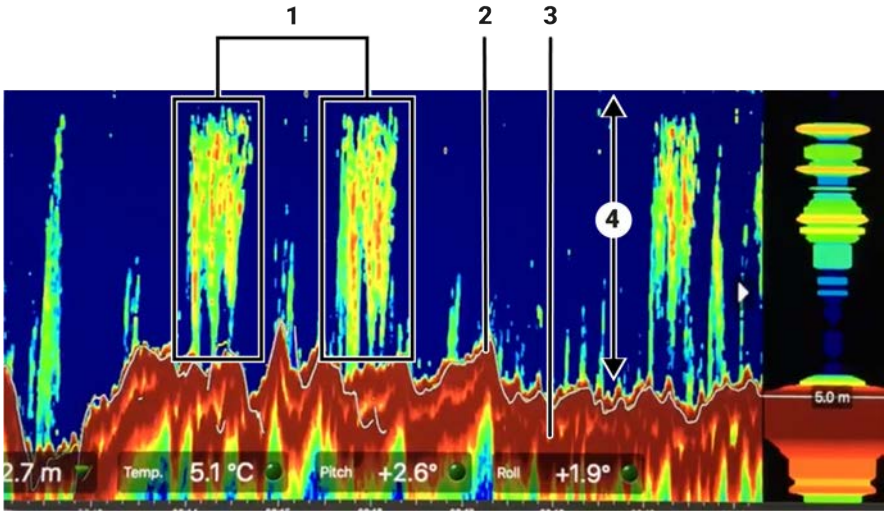
Example of HDTE display from the trawl headrope. Pulse length: 1000 µs



1. Target strength / **2.** Sea bottom / **3.** Haddocks / **4.** Trawl opening

Squid Fishing

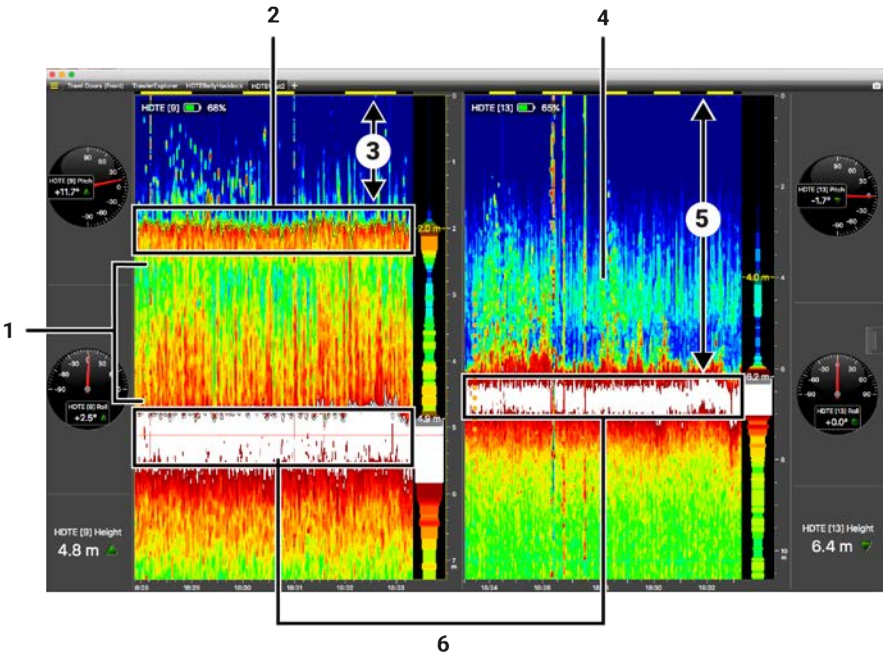
Example of HDTE display from the trawl headrope. Pulse length: 1000 µs



1. Schools of squids / **2.** Footrope / **3.** Sea bottom / **4.** Trawl opening

HDTE displays from belly and headrope

Example of HDTE display from the tunnel (left) and headrope (right). Pulse length: 1000 µs



1. Mud lifted by passage of trawl / **2.** Bottom of the trawl / **3.** Trawl opening / **4.** Fish / **5.** Trawl opening / **6.** Sea bottom

Safety Guidelines

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

Basic good practices

When using the product, be careful: impacts can cause damage to the electronic components inside.

Never place the product in a hazardous and/or flammable atmosphere.

Product installation and use

Install and use this product in accordance with this user manual. Incorrect use of the product may cause damage to the components or void the warranty.

Only qualified Marport dealers can do maintenance and repairs on internal components of the sensors.

Precautions

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

Description

Technical Specifications

Uplink frequency:	30 to 60 kHz
Range to vessel	up to 2500 m*
Sounder broadband frequency	Configurable between 120-220 kHz
Sounder range	5 to 30 m
Data update rate	1-2 sec.
Echogram update rate	up to 3 images/second
Pitch angle	±90°
Roll angle	±180°
Pitch & roll accuracy	±0.1°
Depth resolution	0.1m with 0.1% accuracy
Temp measurement range	-5° C to +25° C
Temp accuracy	±0.1° C
Battery type	Lithium-Ion
Typical battery life:	Up to 15 hours †
Charging time	Standard: 8-12 hours ‡
	Fast Charge: 4 hours
Weight in air (with housing)	16 kg
Weight In water (with housing)	4.1 kg
Warranty	2 years (Sensor & Battery)**

*Reference only. Depends on functions enabled. / † Depends on sensor uplink power. / ‡ Based on average charging time. Refer to Charging the Sensor on page 49 for further information. / **Marport Standard Marine Limited Warranty

Beamwidth

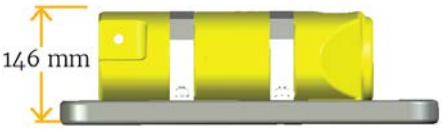
Beamwidths for Uplink pings:

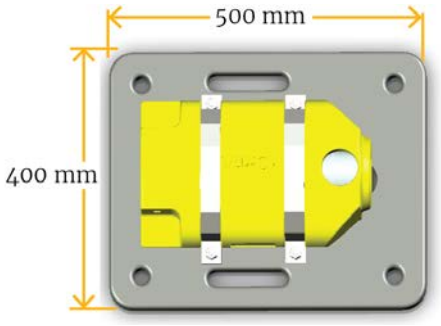
Beamwidth	**@ 35 kHz**	**@ 50 kHz**	**@ 60 kHz**
-3dB	46°	40°	30°

Beamwidths for up and down pings

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

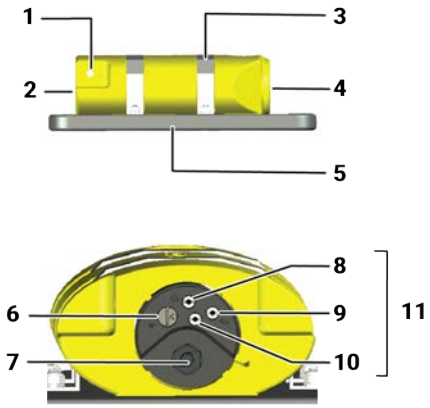
Outline dimensions





Main Parts

External View



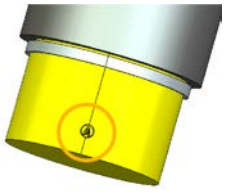
1. Retainer screw
2. Model/serial number
3. Metal strap
4. Transducer
5. Stabilizer board
6. Pressure sensor
7. Temperature sensor
8. Positive charge
9. Negative charge
10. Water switch
11. Shoulder bolts

The serial number may also be written on a plate on the side of the housing.

CAUTION:

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

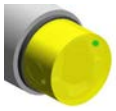
It may damage the components.



On the transducer, up and down sounders are written with the letters A (down) and B (up). On older sensors, down sounder is marked by a circle.

Operational Mode Indicator

Indicators from the transducer

State	Situation	Operation	LED
Charging	Charger plug is connected.	Batteries are charging.	 Flashing red for 10 minutes, then stops if no configuration action.
Running	Sensor is in water or activated with jumper.	After an initialization phase, echo sounder is operating.	 Flashing red
Configuring	Sensor is out of water.	Test and configuration via WiFi. Turns off after 10 minutes without user action.	 Steady green when searching for WiFi network, then flashing green when connected or in access point.
			 Flashing red if charging at the same time.

Resolution Settings

The HDTE sensor can have different resolution settings.

Mode	Vertical resolution	Bandwidth
Live	9 cm	800 Hz
Live with wide band	3 cm	2400 Hz
SD card	1,5 cm	-

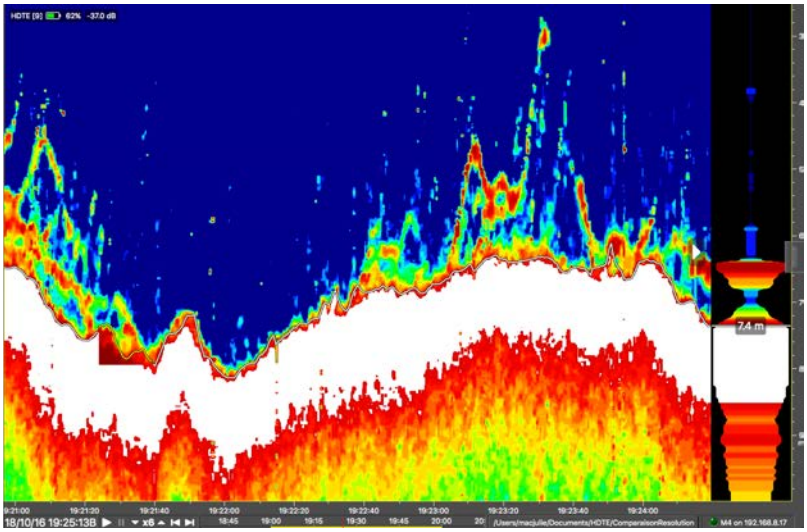


Figure 1: Live mode (narrow band)

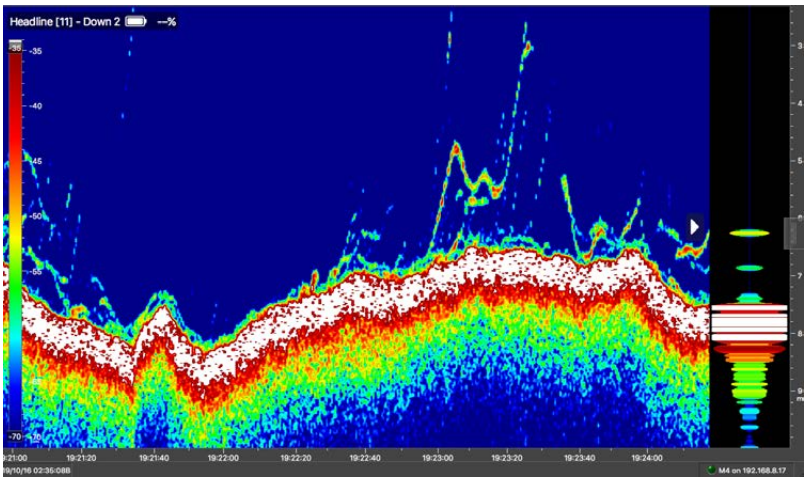
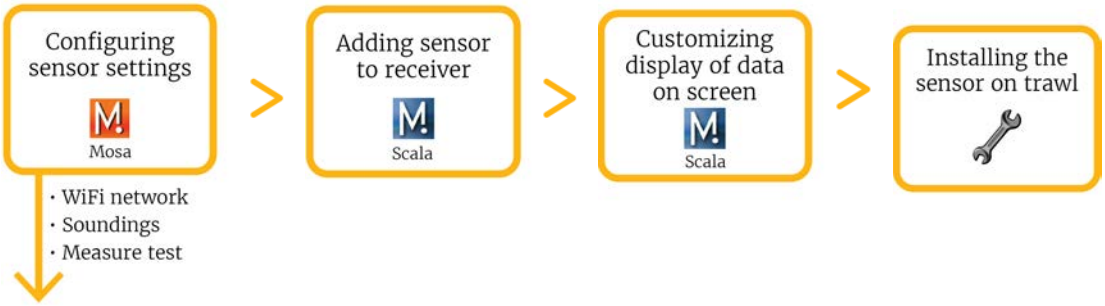


Figure 2: SD card data

Installation Steps

Tip: Click an installation step to jump directly to the corresponding section.



Note: You can customize the display of data on Scala at any time.

Sensor Configuration

Learn how to configure HDTE sensor settings.

Note: This guide refers to the following versions of **Mosa: 01.01.01-01.02.13**. If you use another version, the visual interface and options may vary.

Installing Mosa

If Mosa is not already installed on your computer, you need to install it to configure the sensor.

About this task

Note: On desktop and laptop computers, Mosa can only be installed on a macOS operating system.

Procedure

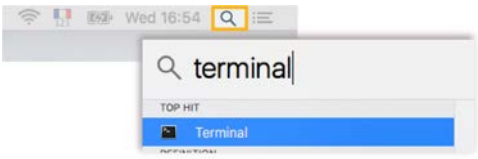
1. Double-click the *.dmg file received from Marport.
2. From the installation window that appears, drag the Mosa icon to the **Applications** icon.

   Mosa is added to the **Launchpad**.
3. From the **Launchpad**, click and drag Mosa icon to the Dock at the bottom of the screen.

   To open Mosa, click its icon on the Dock.

4. If you have an error message when trying to open Mosa, change the **Security & Privacy** settings:
   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 the password, if applicable.
   c) At **Allow apps downloaded from**, select **Anywhere**, then close the dialog box.
   d) If you are under macOS Sierra, **Anywhere** option may not be displayed by default. To display **Anywhere**:

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



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

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

Connecting the Sensor to Mosa

To configure the sensor, you need to connect it to Mosa.

About this task

The sensor can connect to Mosa in two different WiFi modes:

- External WiFi network: the sensor connects to a WiFi network that is defined in the sensor's configuration settings. This WiFi network (such as the vessel internal network) must be set up in DHCP and not manually (fixed IP). Otherwise the sensor cannot connect to it. The sensor will only be able to connect to Mosa as a WiFi access point.
- Access point: the sensor turns itself into a WiFi access point.

  In production, boards are loaded with a default WiFi network setting. If this default network is not changed and sensor cannot find it, the sensor automatically switches to access point mode after 2 minutes. You can configure your sensor to be in access point mode from start up by removing the network preferred SSID in the settings.

Procedure

1. Open Mosa.

2. Put the sensor in WiFi mode to be able to configure it:

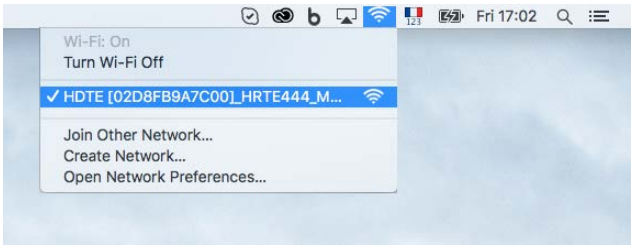
   a) Connect the water-switch. The LEDs flash red.

   b) Disconnect the water-switch. The LED becomes steady green, indicating that it is searching for a WiFi network.

   - If the sensor was already configured to connect to a WiFi network, the LED flashes green, indicating that the sensor is connected to the network.
   - If the WiFi password or SSID was wrong, the sensor becomes a WiFi access point after 2 minutes.
   - If no WiFi network is configured, the LED flashes green, indicating that the sensor is connected as a WiFi access point.

Note: When in WiFi mode, the sensor automatically turns off 10 minutes after the last configuring action. You should keep that in mind when configuring it.

3. From the top toolbar of your computer, click the WiFi icon and:
   - If the sensor is a WiFi access point, select the sensor name:



   - If the sensor is configured to connect to a WiFi network, ensure your computer is connected to this network.

4. From Mosa, click the tab **HDTE Sensors**.

5. Wait a few seconds for the sensor to be recognized, and from the left panel, click **Available Inputs**.

   The sensor name is displayed under **Available Inputs**.

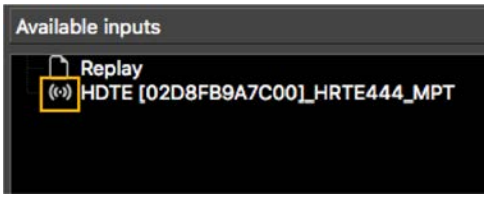


Figure 3: HDTE connected as WiFi access point

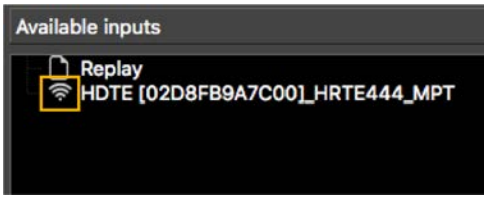


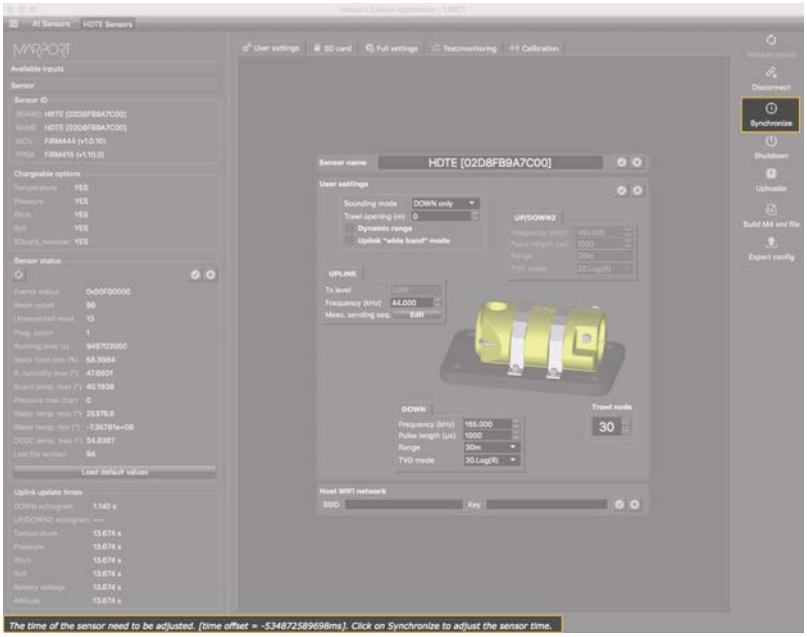
Figure 4: HDTE connected to WiFi network

If the sensor is not displayed click **Refresh inputs** from the right side of the screen.

6. From **Available Inputs**, click the sensor name.

   Sensor data and settings are displayed.

7. If the following message appears at the bottom of the screen, click **Synchronize** from the right side of the screen.



   This synchronizes the HDTE time to your computer time. This way, when you read data coming from the SD card of the HDTE, you will have the correct time.

Configuring a WiFi Network

If you have your own WiFi network, you can configure the HDTE to automatically connect to it. If no WiFi network is configured, the HDTE automatically turns itself into a WiFi access point.

Before you begin

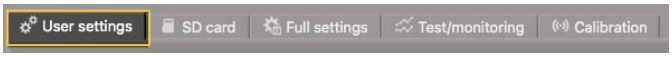
The sensor is connected to Mosa.

About this task

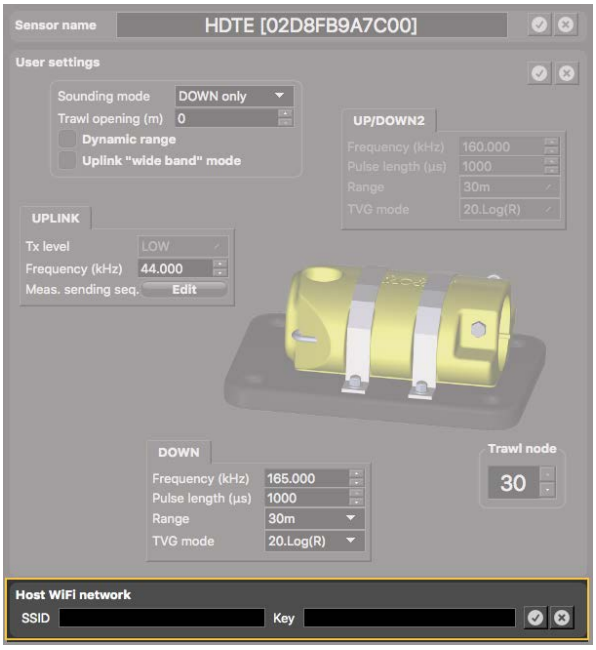
Note: The sensor can only connect to a WiFi network (such as your vessel internal network) set up in DHCP. If the WiFi network is configured manually (fixed IP), the sensor cannot connect to it. The sensor will only be able to connect to Mosa as a WiFi access point. When you are connected to the sensor as WiFi access point, you cannot connect at the same time to another WiFi network.

Procedure

1. From Mosa, click the tab **User settings**.



2. From **Host WiFi network** enter the SSID (name of WiFi network) and key (WiFi network password).



3. Leave these fields empty if you want the sensor to only connect as a WiFi access point.
4. From the right side of **Host WiFi network**, click validate once you have finished.
5. Activate and deactivate the water switch to reboot the sensor in order to save the configuration changes.

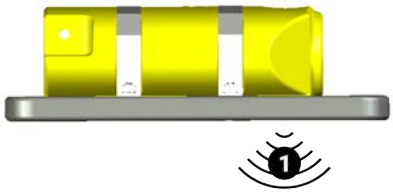
Results

At the next start of the HDTE, it will connect to the configured WiFi network. If your computer is connected to this WiFi network, the sensor will appear in Mosa from **Available Inputs**.

Sounding Modes

The sensor can send pings according to three different sounding modes.

Down 1

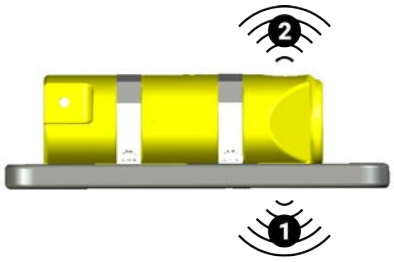


Sensor sends pings towards down direction (**1**) only.

You can see fish going into the trawl.

Pings are sent quicker than with the other modes, so more data is received, which enables a better horizontal resolution. This mode is recommended for better quality echogram images.

Down 1 + Up

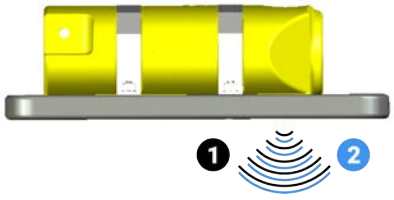


Sensor sends pings towards down (**1**) and up (**2**) directions.

With the down sounding, you can see fish going into the trawl. With the up sounding you can see if fish are missing the trawl and passing above the headline. This way, you can correct the trawl position.

Fewer pings are sent because they are distributed between the 2 directions. As a result, data arrives slower to the receiver and echograms are of lesser quality.

Down 1 + Down 2



Sensor sends 2 consecutive pings towards down direction (**1** and **2**).

This mode is useful if you need to test two different pings towards the down direction. For example, sending one short and one long ping, or sending one low frequency and one higher frequency ping.

Like down + up mode, fewer pings are sent because they are distributed between the two different down soundings. As a result, data arrives slower to the receiver and echograms are of lesser quality.

Configuring Uplink, Up and Down Settings

You can configure different settings for uplink, down and up sounding.

Before you begin

The sensor is connected to Mosa.

About this task

Always click **Apply** after you change settings.

Click the cross sign to come back to the last saved configuration.

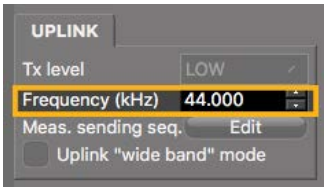
Procedure

From the top of the screen, click the tab **User settings**.

Uplink

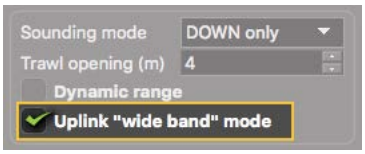
Procedure

1. From **UPLINK** > **Frequency (kHz)**, enter a frequency for the signal toward the vessel.



Important: This parameter must be the same in the sensor settings in Scala.

2. Select **Uplink "wide band" mode** if you want to have higher resolution data.



Note: Wide band mode uses a bandwidth of 2400 Hz instead of 800 Hz for the normal mode. Be sure to allow a frequency interval of min. 200 Hz with other sensors.

3. From **Trawl node** you can define the sensor location on the trawl, according to node numbers (See Installing an HDTE on the Trawl on page 43 to know which nodes are appropriate). Defining a trawl node is not necessary but if you do, make sure it is coherent with the node you will define in Scala. We recommend you to choose: 7, 8 or 9 for a mounting on the tunnel, and 10, 11, 12 or 13 for a mounting on the headrope.

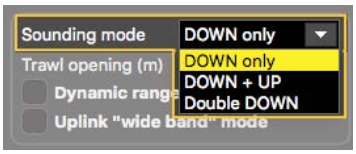
Up / Down Soundings

About this task

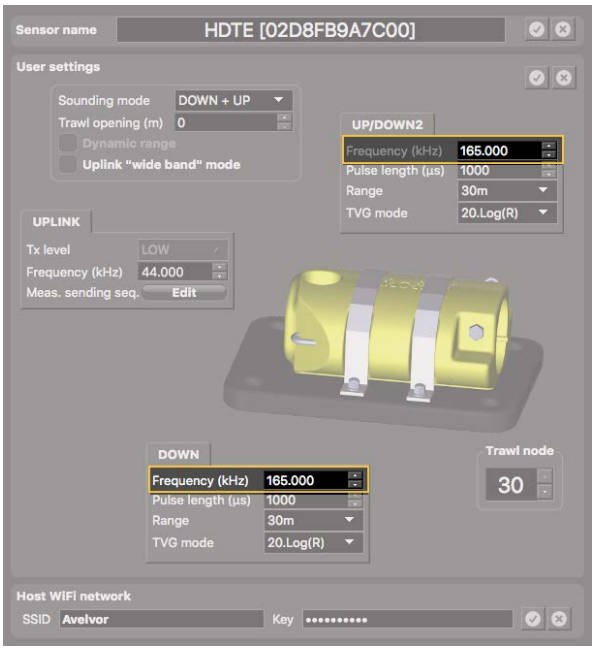
The panel **UP/DOWN 2** allows you to configure the up sounding if the sounding mode is **DOWN + UP** or the second down sounding if the sounding mode is **Double DOWN**.

Procedure

1. Select a sounding mode (see Sounding Modes on page 20 for more information).

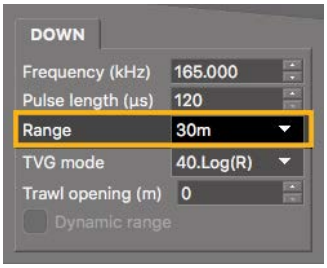


2. To change the down and/or up frequencies, from **UP/DOWN2** and **DOWN**, choose a frequency from **Frequency (kHz)**. You can choose the same frequency for up and down soundings because they do not emit at the same time.



Important: If you change up/down frequencies on a sensor calibrated for target strength, you need to calibrate the sensor again because ping frequency is an important setting for the calibration of the sensor.

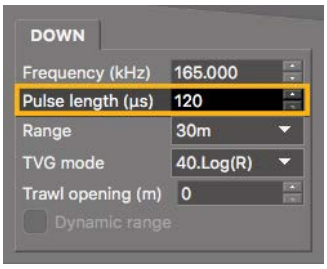
3. From **UP/DOWN2** and **DOWN** > **Range**, select the range according to how many meters you want to see under the sensor.



- If you need to see the bottom and the trawl going down (e.g. bottom trawling), you can put the maximum range: 30 meters.
- If you need to see the trawl opening (e.g. pelagic fishing), you can put a small range, such as 5 meters.
- If you are using **DOWN only** sounding mode and you want the range to adapt automatically to the bottom detected, see Configuring Autorange on page 25 for details.

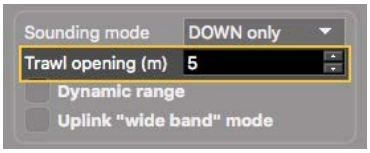
Note: The range influences the display of echogram images. When the range is short, data can arrive quicker, which gives better quality images. But the bigger the range is, the lesser the image quality is, because data arrives slower. If you are using Down 1 + Up or double down sounding, the image quality is even lower, as explained in Sounding Modes.

4. From **UP/DOWN2** and **DOWN** > **Pulse length (µs)**, select a pulse length according to the distance at which you need to detect fish:



- Fish detection between 20 cm and 4 m, enter 120 µs
- Fish detection between 50 cm and 30 m, enter 1000 µs

5. Change the distance in **Trawl opening** only if you use autorange mode (see Configuring Autorange on page 25).

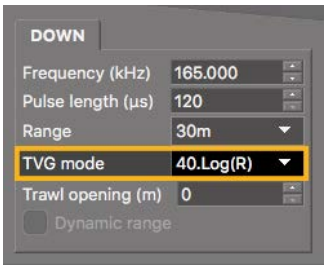


Echogram Settings

Procedure

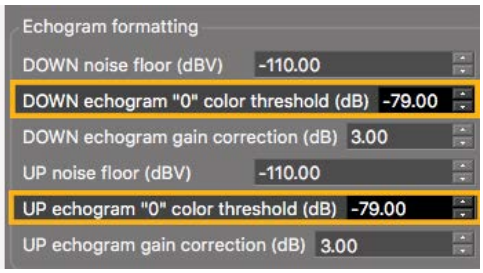
1. To improve the echogram when there is some noise around the sensor, from **SOUNDING** select **Noise Cancelation** (firmware version FIRM444-V01.00.14 and later).

2. Select a TVG mode to have targets or sea bottom displayed in the same color on the echogram, whatever the distance from the sensor. See About Time Variable Gain on page 26 to know which mode you should choose.

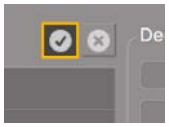


3. If you need to better see small targets on the echogram, you can change the color threshold of the echogram for down or up soundings:

   a) From the tab **Full settings**, click **Advanced settings**.
   b) From **echogram "0" color threshold**, enter -79.



   c) Click validate below **Advanced Settings**.



Results

Activate and deactivate the water switch to reboot the sensor in order to save the configuration changes.

Configuring Autorange

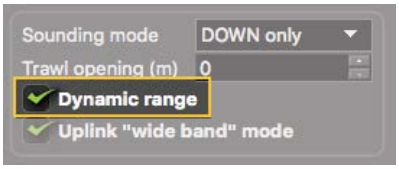
You can configure the sensor so that the range of the sounding adapts automatically to the bottom distance detected. This gives you echogram images with a better quality when at shallow depths, because the range becomes smaller.

About this task

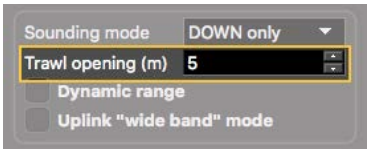
- You can use autorange only when using **DOWN only** sounding mode.
- We do not recommend to use this mode for pelagic fishing because setting a fixed small range will give you better quality images.

Procedure

1. From the panel at the top of the **User settings**, select **Dynamic range**.



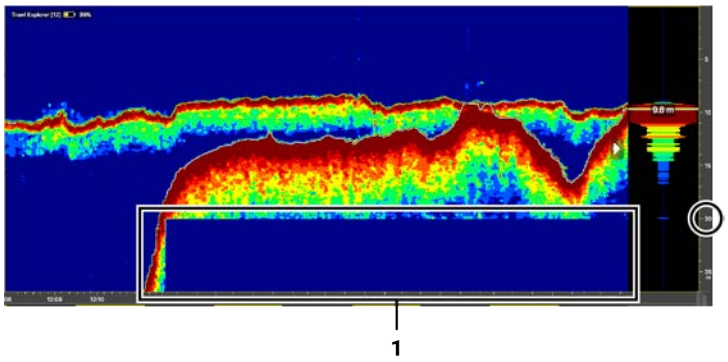
2. From the **DOWN** panel, select the maximum range (30m).
3. From **Trawl opening**, enter a trawl opening distance to be sure the sensor will search for the bottom beginning from a certain distance. This prevent the sensor from confusing the footrope or a school of fish with the bottom. For example, if the footrope is at 4 meters, enter a greater distance, such as 5 meters.



4. The range of the sounding changes according to the distance to the bottom detected.

Distance to bottom	Will emit at a range of...
Beyond 20 m	Range set in Down range.
Between 10 and 20 m	20 m
Between 5 and 10 m	10 m
Less than 5 m	5 m

On Scala, echogram images will be displayed like the example below:



You can see that the range of the sounding adapts to the bottom detected **(1)**. Basically, if the bottom is closer, the image on the echogram is shorter and of better quality, but if the bottom is farther, the image is longer and of lesser quality.

About Time Variable Gain

TVG (Time Variable Gain) is a method that compensate signal loss in the water. Basically, the aim is to have targets or sea bottom displayed in the same color on the echogram, whatever the distance from the sensor.

When the sounder sends pings, the deeper the target is, the more attenuated signals will be received and sent back. As a result, if the signal is too much attenuated, echoes (target strength) received from a target might not be as strong as they should be. TVG is here to compensate this effect. It uses a lower gain level when signals travel toward a target at a small distance and higher gain level when signals travel toward deeper targets. The end result is to compensate sounding attenuation and therefore to show a same target strength for a same target at different depths.

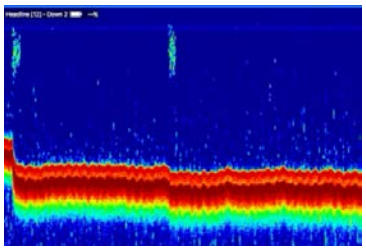
You can choose between three different TVG modes:

- 20 log: use to focus on the bottom, footrope or a school of fish.
- 40 log: use to focus on individual targets.
- 30 log: compromise between the two others.

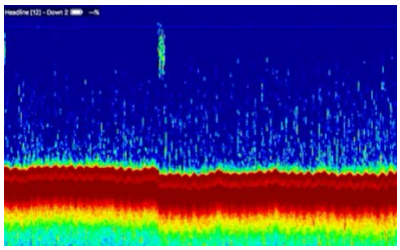
For example, if you want a good view of the footrope, select a TVG mode at 20 or 30 log. You can see on the images below that the footrope is clearer at 20 and 30 log.

If you want a good view of individual targets, you can see that with 40 log, targets in the water column are clearer.

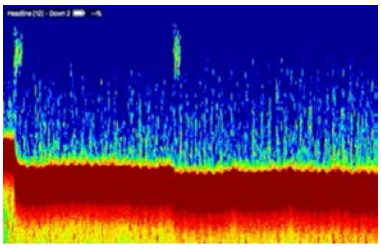
20 log



30 log



40 log



Configuring Measurements Sending Sequence

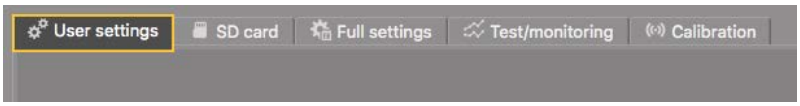
You can configure the order and types of measurements (e.g. temperature, pitch, roll...) sent by the uplink to the receiver.

Before you begin

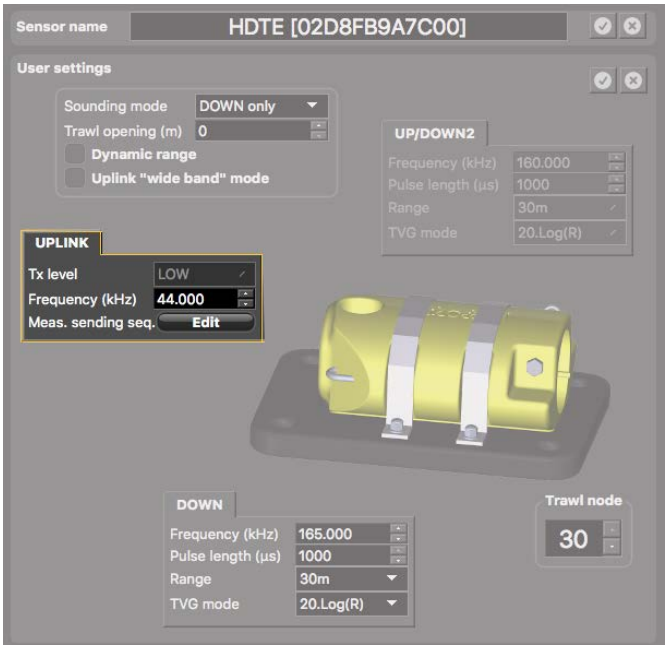
The sensor is connected to Mosa.

Procedure

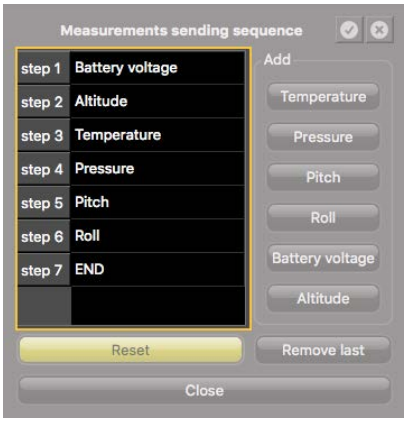
1. From the top of the screen, click the tab **User settings**.



2. From the part **UPLINK**, click **Edit** in front of **Meas. sending seq**.

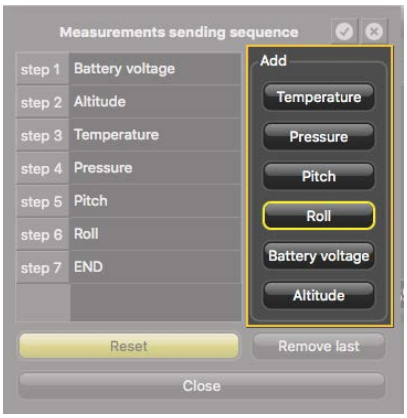


The **Measurements sending sequence** panel appears. You can see an ordered list of types of measurements sent by the uplink.

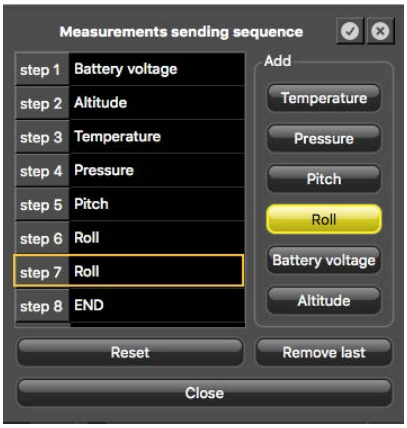


Pressure measurement corresponds to depth.

3. To add a new measurement, from the right side of the panel, click a type of measurement.

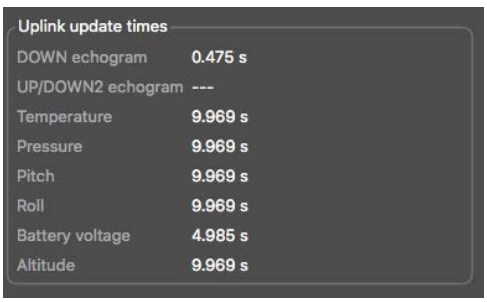


The measurement is added to the bottom of the list:



Tip: You can add a same measurement several times if these data are important. You can also place it at the beginning of the list to receive these data first.

4. To remove a measurement, you can only remove the last item from the list. Click **Remove last** on the bottom right corner of the panel.
5. From the top right corner, click validate once you have finished.
6. Activate and deactivate the water switch to reboot the sensor in order to save the configuration changes.
7. You can check the measurement sending sequence and the refresh time of data according to the sequence configured from the bottom left corner of the screen.



Getting SD Card High Resolution Data

You can download and replay data recorded on the sensor SD card. These data are in higher resolution and you can see target strength values without uplink sound transmission loss.

Before you begin

The sensor is connected to Mosa.

Procedure

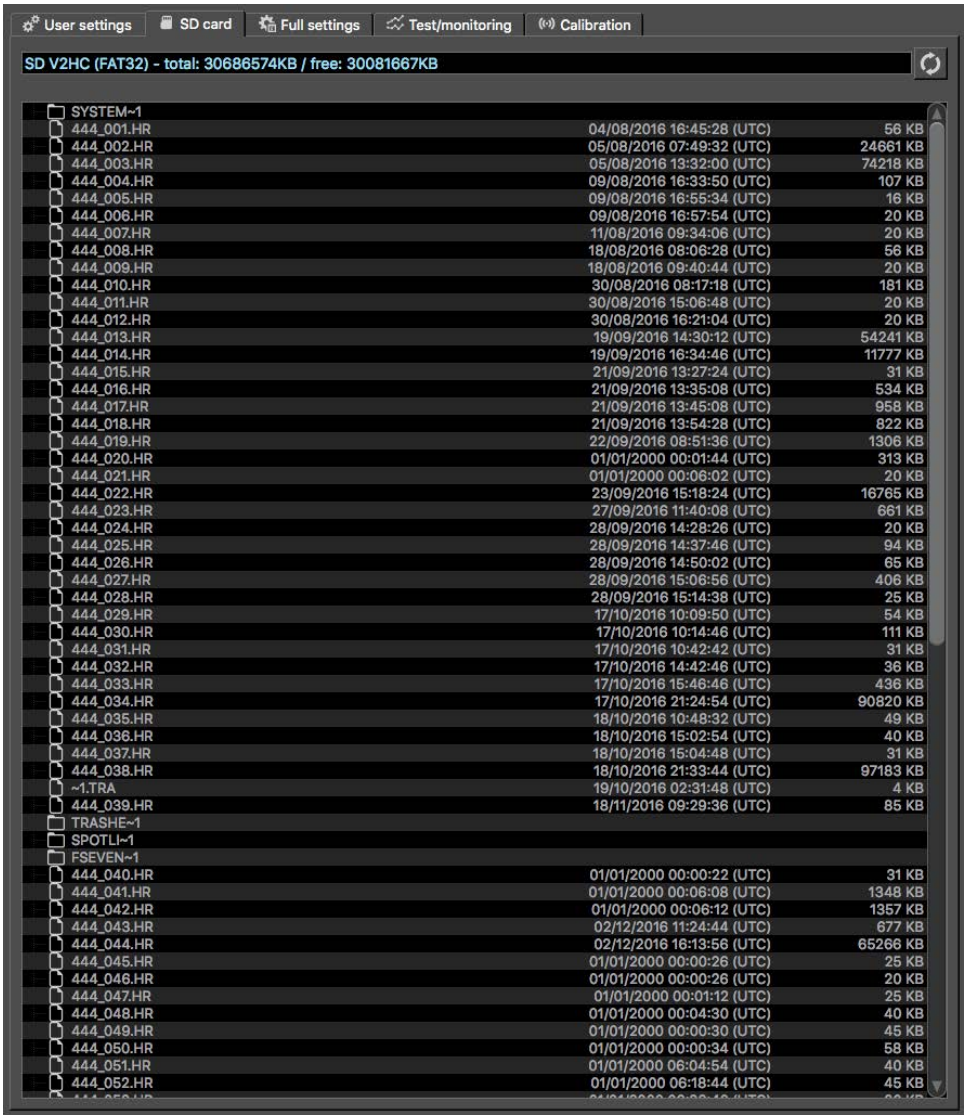
1. From the top of the screen, click the tab **SD card**.

2. Click the refresh icon under the toolbar:

The list of files appears.

One HR file corresponds to the interval of time between the moment the sensor water switch is activated (entering water) and the moment it is deactivated (exiting water). The recording date displayed in the second column is synchronized with your computer time.

There is a maximum of 99 files. Beyond that number, the older files are progressively replaced.



3. Double click files to download them.

   Note: When you download files, their recording date is not written on them, nor on Scala when you replay them. You should take note of the date written in Mosa.

4. To read the files, open Scala and click menu > **Import HRTE files**.

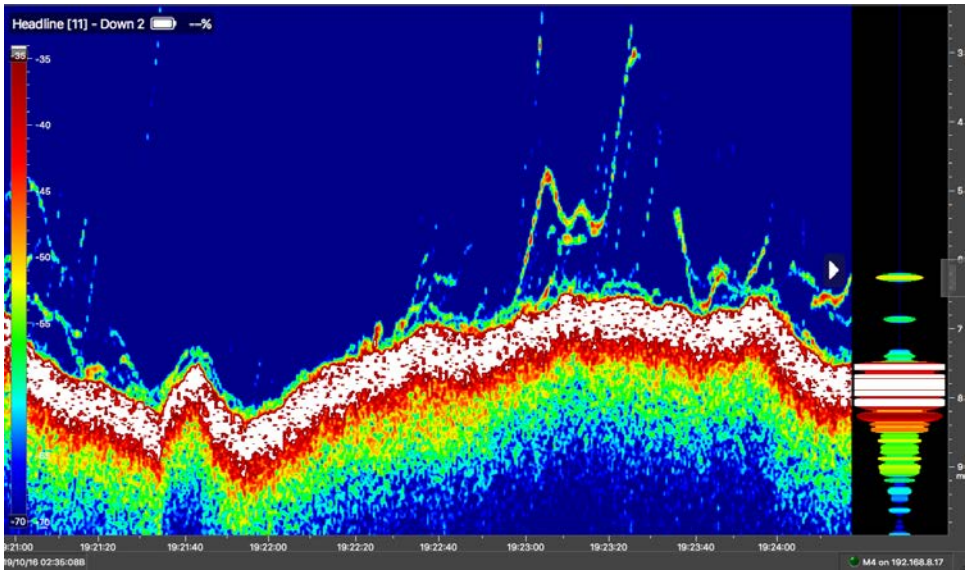


Figure 5: Example of replay of data from the SD card: haddocks seen from headrope

Testing Measures

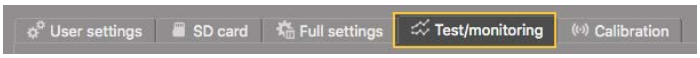
You can test the measures taken by the sensor (e.g. battery level, temperature, depth) to check that there are no faults.

Before you begin

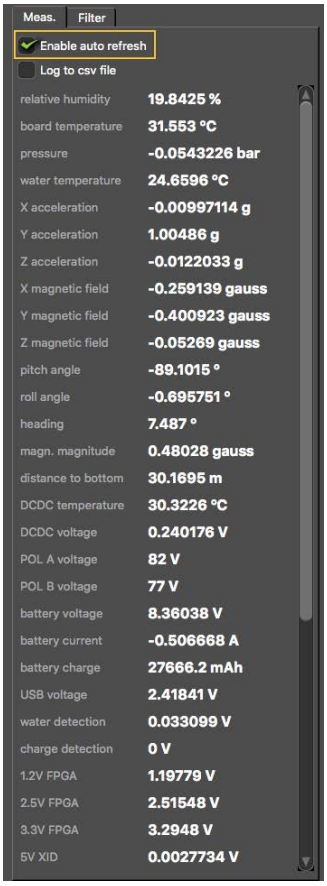
The sensor is connected to Mosa.

Procedure

1. From the top of the screen, click the tab **Test/monitoring**.



2. Select **Enable auto refresh**.
3. If the sensor is working correctly, all data are refreshed:



Note: The pressure data displayed are used to calculate depth.

4. You can test the pitch and roll:
   a) Place the bottle flat on a table.
   b) Make the bottle roll to see if roll data are updated.
   c) Move the bottle up or down to see if pitch data are updated.

Exporting Sensor Configuration for Record Keeping

You can export the sensor settings you configured on Mosa in order to keep track of the sensor configuration settings.

Before you begin

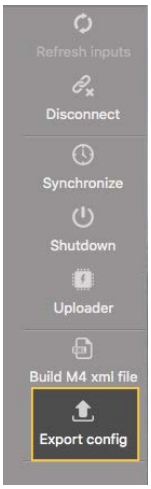
- You have finished configuring the sensor.
- The sensor is connected to Mosa.

About this task

Note: You cannot use this xml file to add the sensor to a receiver on Scala. See Exporting Sensor Configuration for Receiver on page 33.

Procedure

1. From the right side of the screen, click **Export config**.



2. From the dialog box that appears, select a target folder and click **Open**.

   An xml file containing the sensor settings is created at the choosen location.
3. Change the xml file name.

   Note: When you export the sensor settings, the xml file always has the same name. Changing its name will prevent you from overwritting it the next time you download sensor settings.

Exporting Sensor Configuration for Receiver

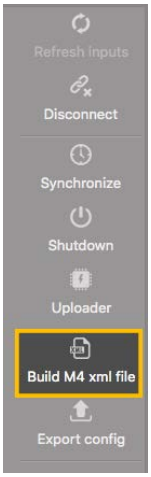
You can export the sensor settings you configured on Mosa in an xml file. You can afterwards use this xml file when adding the sensor to a receiver.

Before you begin

- You have finished configuring the sensor.
- The sensor is connected to Mosa.

Procedure

1. From the right side of the screen, click **Build M4 xml file**.



2. From the dialog box that appears, select a target folder and click **Open**.

   An xml file containing the sensor settings is created at the choosen location.

3. Change the xml file name.

   Note: When you export the sensor settings, the xml file always has the same name. Changing its name will prevent you from overwritting it the next time you download sensor settings.

What to do next

Use this file to add the sensor to the receiver: Adding the Sensor with a Configuration File on page 35.

System Configuration and Display

Learn how to configure the receiver to be able to receive and display HDTE sensor data.

Note: This guide refers to the following versions of **Scala: 01.06.06-01.06.25**. If you use another version, the visual interface and options may vary.

Adding the Sensor to the Receiver

In order to display HDTE sensor data, you need to add it to the receiver.

Note: System requirements:

- M3/M4/M5/M6 receiver version 04.02.23 or later
- Scala version 01.02.05 or later

Adding the Sensor with a Configuration File

You can add the sensor to the receiver with a configuration file that contains the sensor settings you configured on Mosa.

Before you begin

- You have exported an XML file containing the sensor settings (See Exporting Sensor Configuration for Receiver on page 33).

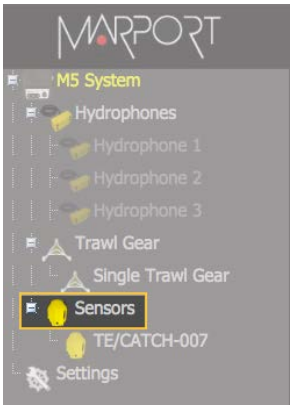
Important: You need to have **Firefox version 22 to 51**.

Procedure

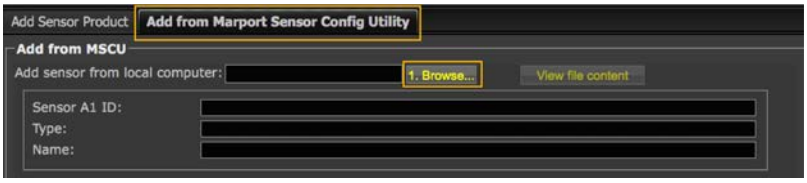
1. Enter your receiver IP address in Firefox web browser to access the system control panel web page.

   Note: Default IP addresses are: 192.168.10.177 for M3 and M6 receivers, 192.168.1.170 for M4 receiver. Add the address as a bookmark in Firefox to easily connect to it.

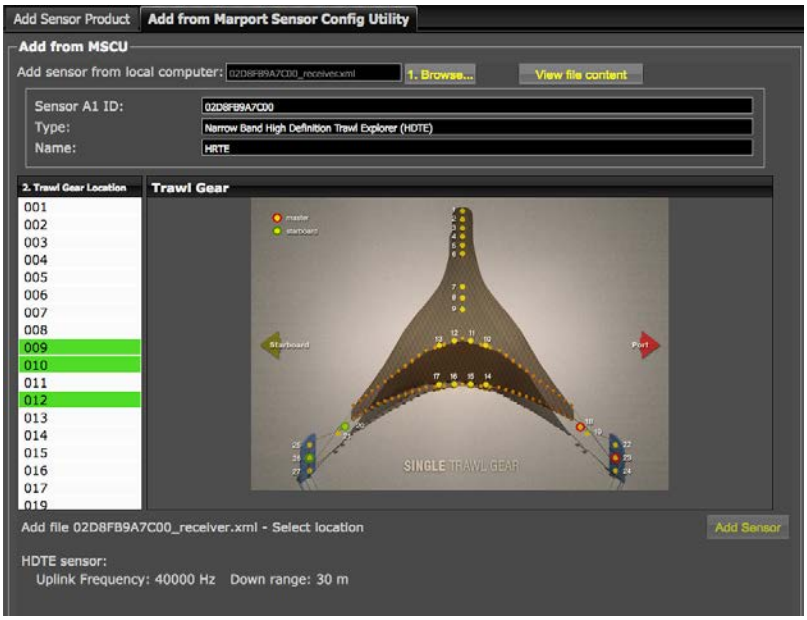
2. From the left side of the page, click **Sensors**.



3. Click the tab **Add from Marport Sensor Config Utility**.
4. Click **Browse** and select the XML file (if you have not changed its name, it ends by `receiver`).



Information about the sensor is displayed.



5. Select a node from the list on the left. If you defined a node in Mosa, make sure it is the same. Nodes in green are already used.

   Note: Nodes are numbered locations for the sensor on the trawl gear. Refer to the picture of the trawl to know the location of the node. We recommend you to choose: 7, 8 or 9 to install the sensor on the tunnel, and 10, 11, 12 or 13 to install it on the headrope.

6. Click **Add Sensor**.

   The sensor is added to the system, with all its settings.

Results

You can see incoming data from the control panels, in **Sensors Data**.

What to do next

- If you want to apply filters on data received by the sensor, see Configuring the Sensor Settings on page 39.
- You can now configure the display of incoming data in Scala.

Adding the Sensor Manually

You can add the sensor to the receiver from Scala, by entering the same settings as the ones in Mosa.

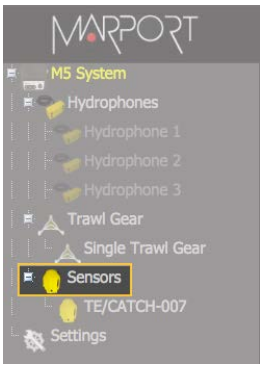
Adding the Sensor to the Receiver

About this task

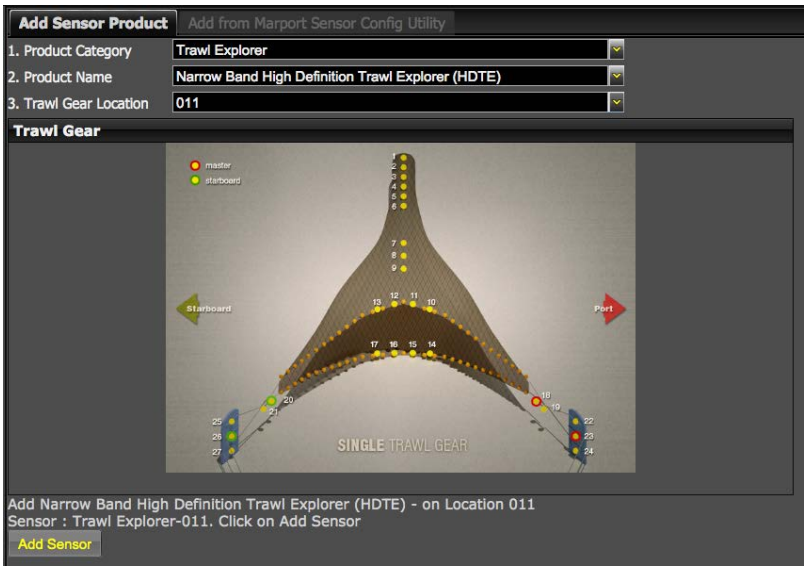
In order to avoid differences of settings between the configuration you made on Mosa and the one on Scala, we recommend you to rather add the sensor to the receiver with an XML configuration file exported from Mosa.

Procedure

1. From Scala, click menu > **Expert Mode** and enter the password `copernic`.
2. Click menu again, then **Receivers**.
3. From the left side of the receiver page, click **Sensors**.



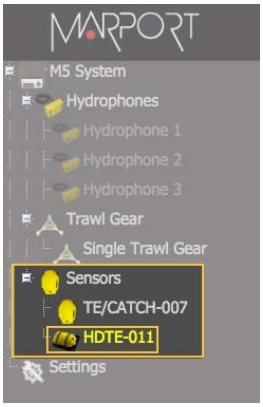
4. From **Product Category**, select **Trawl Explorer**.
5. From **Product Name**, select **Narrow Band High Definition Trawl Explorer (HDTE)**.
6. From **Trawl Gear Location**, select the location of the sensor on the trawl. Sensor locations are called nodes and have a numerical value between 1 and 999. We recommend you to choose: 7, 8 or 9 for a mounting on the tunnel, and 10, 11, 12 or 13 for a mounting on the headrope.



Note: If you defined a node in Mosa, be careful to keep the same node number.

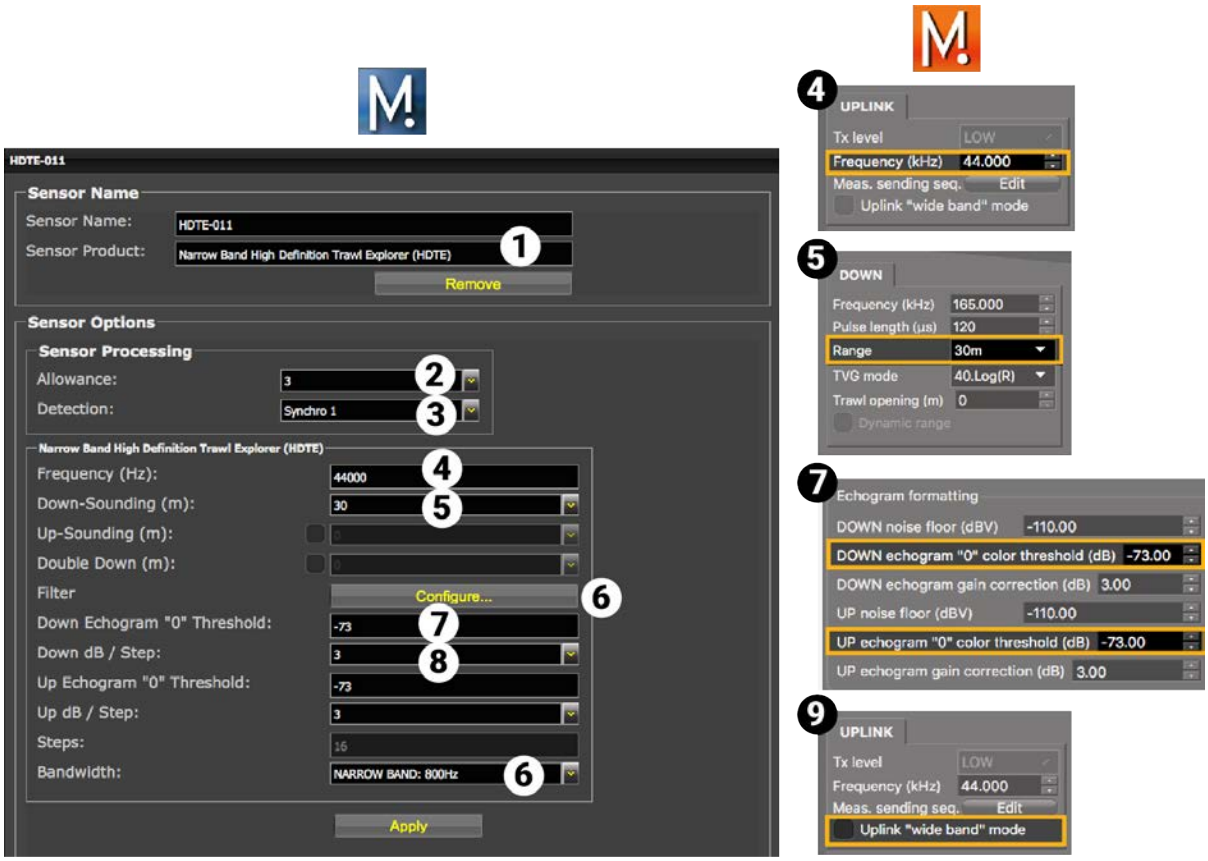
7. Click **Add Sensor**.

   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

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



1	Sensor name displayed in Scala and its features.
2	This setting helps detecting the signal of the sensor among other sensor or echosounder signals. Change default setting only if you have issues receiving data. • 0-2: select only if no interferences on the vessel (not recommended). • 3-4: default setting. • 5-6: select if you have issues receiving data. It allows you to receive more data, but be aware they might be wrong data.
3	This setting also helps detecting the sensor signal. Leave default setting at Synchro 1.
4	Enter the same frequency as the one entered for the uplink frequency in Mosa. **Note:** In normal mode, the HDTE uses a 800 Hz bandwidth. When configuring other sensors, make sure there is an interval of 200 Hz with other sensors' frequencies (before and after). If you are in wide band mode, the HDTE uses a 2400 Hz bandwidth. You also need an interval of 200 Hz before and after.
5	Range of the sounding. Depends on soundings enabled.

6	Click **Configure** to change filters applied on incoming data. It is particularly useful to reduce interferences on the echogram data. **Tip:** Please refer to Scala user guide for more information about filters.
7	Helps you detecting targets on the echogram. Corresponds to **Channel minimum TS** in Mosa.
8	Do not change this setting.
9	Change to **WIDE BAND** if you selected **Uplink "wideband" mode** when configuring the sensor in Mosa.

Click **Apply** when you have finished.

Results

The sensor is added to the system. You should see incoming data from the control panels, in **Sensors Data**. You can now configure the display of incoming data in Scala.

Configuring Sensor Data Display on Scala

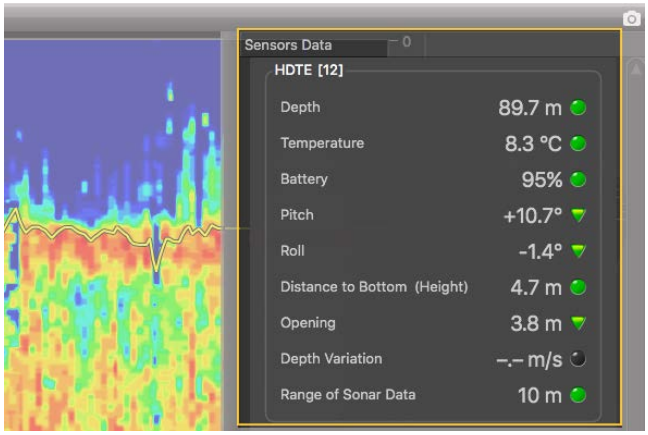
You can display HDTE incoming data (e.g. echogram, depth, temperature,...) on pages in Scala. You can also display target strength data, that help you differentiate sizes and species of fish.

Before you begin

HDTE has been added to the receiver and configured via Scala.

About this task

HDTE incoming data are displayed in the control panels, under **Sensors Data**. Data title should be **HDTE** followed by the node where the HDTE was placed when added to the system. Data displayed (e.g. depth, temperature, pitch & roll) depend on the firmware installed.



Procedure

1. From the top left corner of the screen, click menu > **Customize** and enter the password `eureka`.
2. From **Sensors Data**, click + hold HDTE data (for example Depth) for 3 seconds until a rectangle appears and drag it to a page in the middle of the screen. For more details about display in Scala, please refer to Scala user guide.

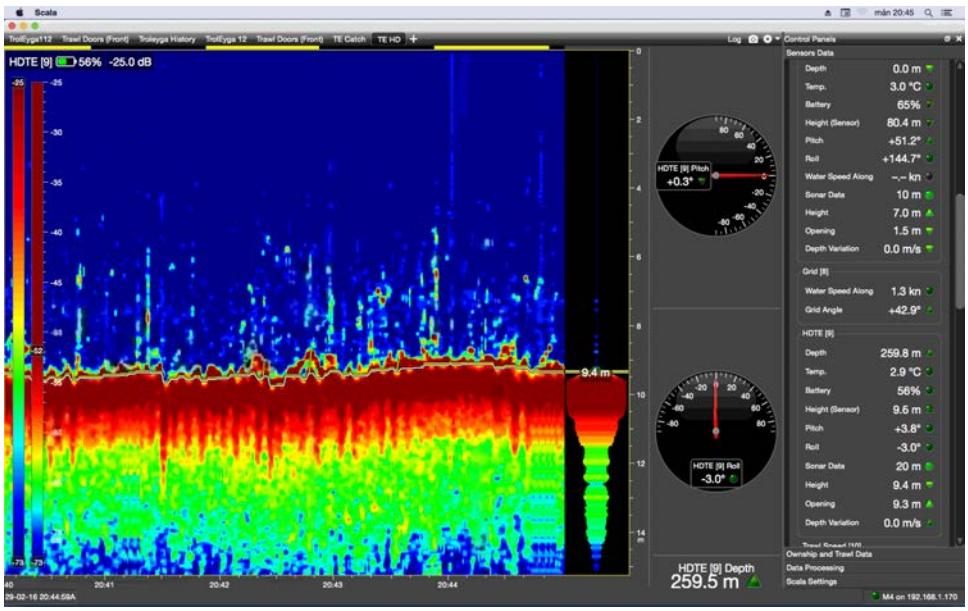
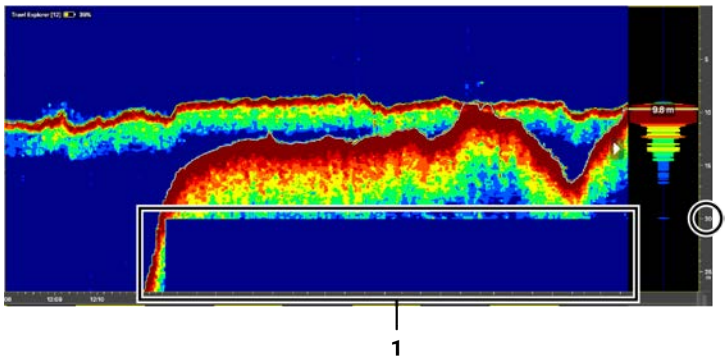


Figure 6: Example of HDTE display in Scala

3. If you enabled autorange (**1**) in the sounding settings (See Configuring Autorange on page 25), echogram images will be displayed like the example below:



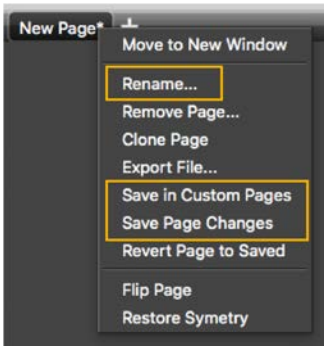
4. To display the target strength:

   a) From the top left corner of the echogram, right-click the HDTE name and select **Display Target Strength**.

   b) Hover the mouse over the echogram.

   The target strength of the element where you place your mouse is displayed next to the HDTE name. The higher is the target strength, the bigger is the fish.

5. To save the changes you made:



1. To rename the page, right-click the name of the page and click **Rename**.
2. To save the page, right-click the name of the page and click **Save Page Changes**.
3. To have a backup of the page, right-click the name of the page and click **Save in Custom Pages**.
   Your page is saved in Scala's page backups.

6. When you have finished customizing pages, you need to deactivate the Customize mode: click **Menu** ☰ > **Customize** again.

Installation

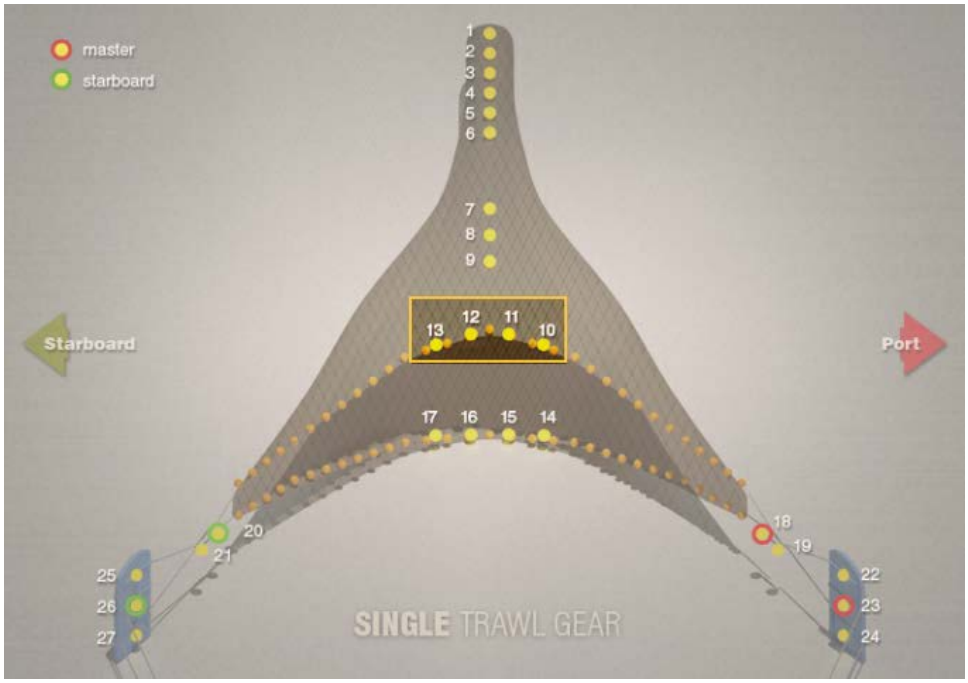
Learn how to install HDTE sensors on the trawl gear.

Installing an HDTE on the Trawl

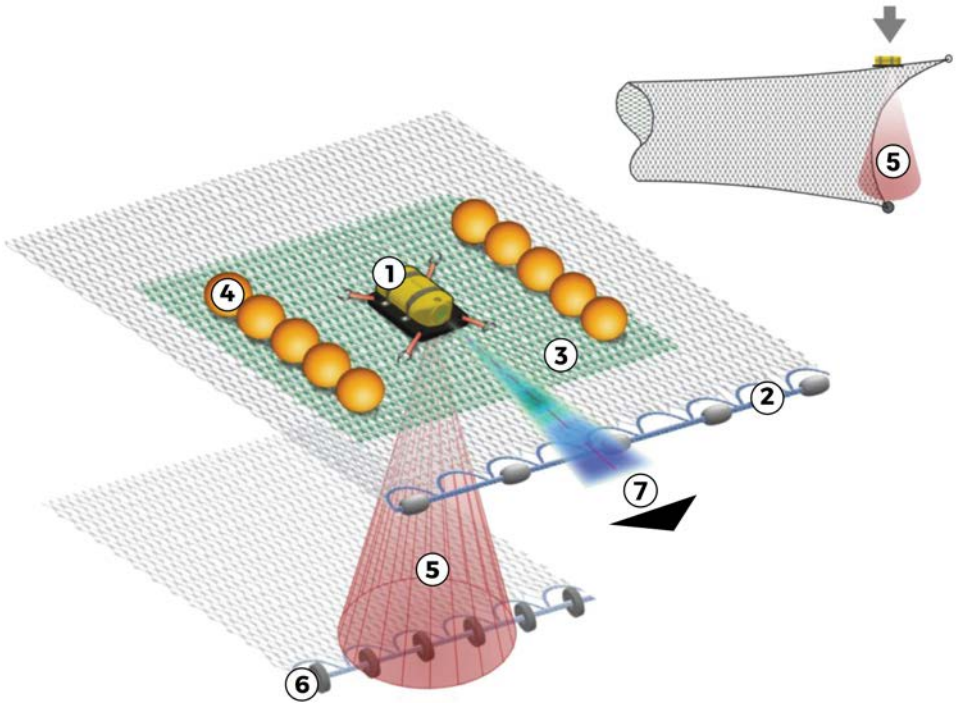
We recommend to install the sensor on the headrope in order to see the trawl opening and fish entering the trawl. You can also install it on the trawl tunnel to see fish going toward the codend.

Headrope

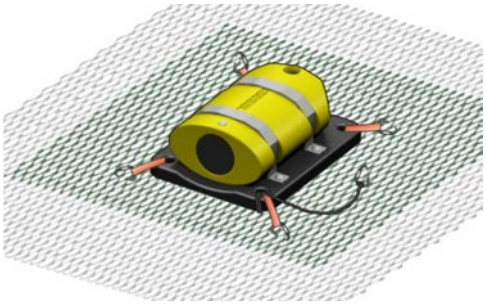
To install the sensor on the headrope, install it on a location corresponding to nodes 13, 12, 11 or 10 on the image below:



If you want to see the footrope, move back the sensor of a few meters, as illustrated below.



1. Place sensor (**1**) at the centre of the net's headrope (**2**), facing the vessel.
2. Install a double-mesh piece of netting (**3**) to stabilize the sensor.
3. Buoys (**4**) on either sides provide a level platform for the unit during trawling operations.
4. Buoys ensure that down-looking transducer beam (**5**) is vertical for footrope (**6**) detection.
5. The signal is oriented toward the vessel (**7**).

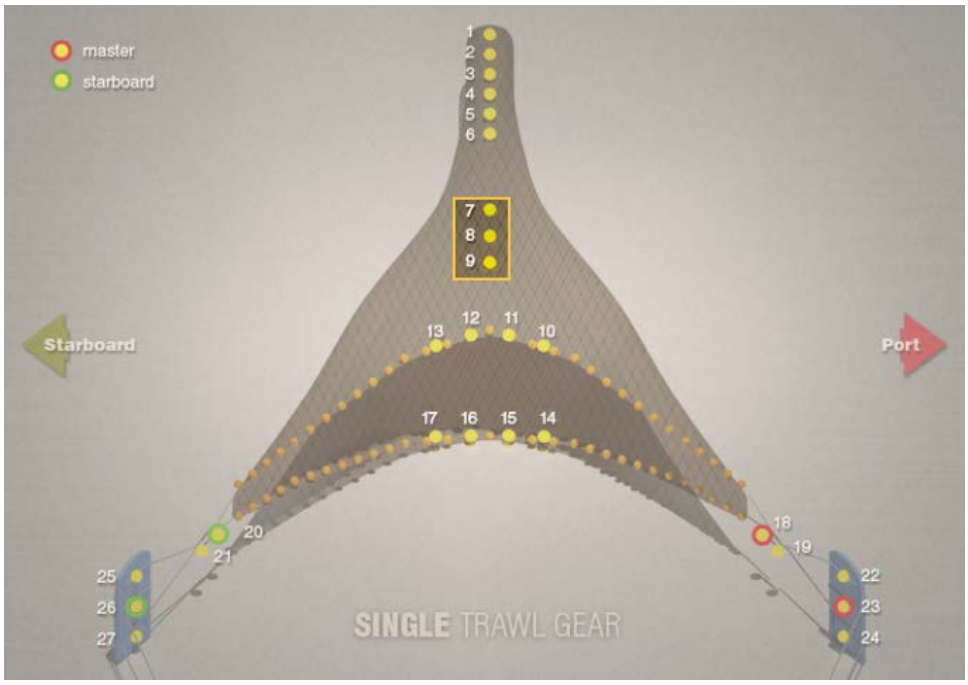


We recommend you to use a netting bag placed on a suitable location in the net. Use a safety line between one of the sensor's attachment lugs, as shown in the picture below. The safety line should be a steel wire with fitted small shackles at either end.

Important: Sensors not properly secured may be lost during fishing operations.

Tunnel

To install the sensor on the trawl tunnel, install it on a location corresponding to nodes 7, 8 or 9 on the image below:



The installation procedure is the same as the one for the headrope.

Servicing and Maintenance

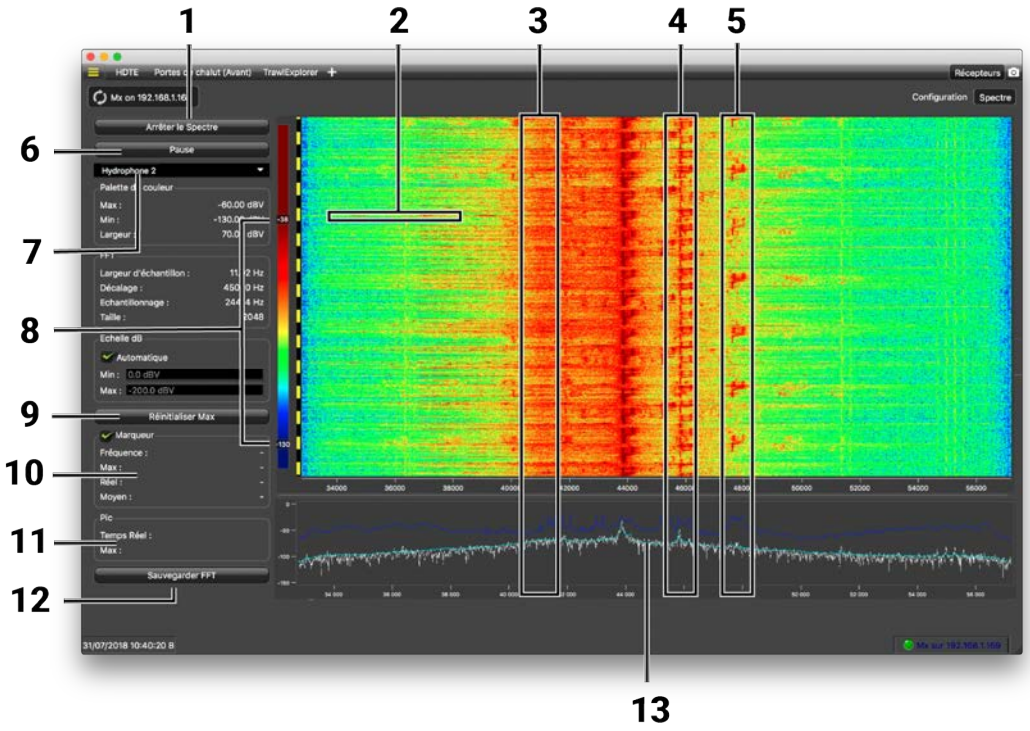
Read this section for troubleshooting and maintenance information.

Interference Check

You can check if there is noise interfering with the reception of signals.

Spectrum Analyzer Display

The following picture explains the main parts of the spectrum analyzer 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

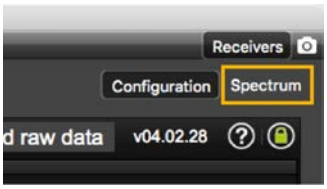
You can use the spectrum analyzer to check the noise level of the hydrophones and check for interference.

About this task

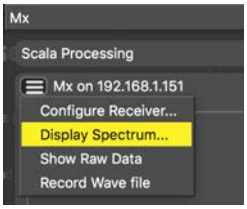
See Spectrum Analyzer Display on page 46 for details about the spectrum analyzer display.

Procedure

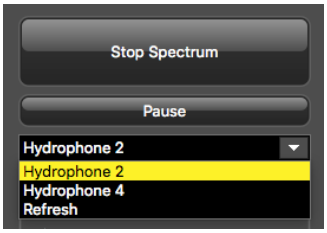
1. From the top left corner of Scala window, click **Menu** ☰ > **Expert Mode** and enter the password `copernic`.
2. Again in the menu, click **Receivers**.
3. From the top right corner of the screen, click **Spectrum**.



4. Open the control panels and go to the **Mx** tab. Click the menu icon next to the name of the receiver and click **Display Spectrum**.



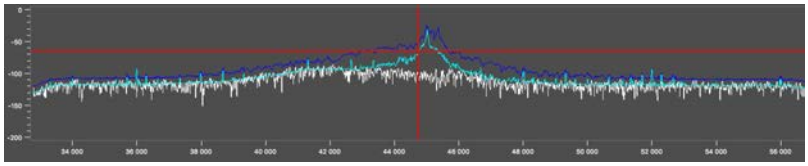
5. Select the hydrophone you want to test. Only the hydrophones that are switched on are displayed. Select refresh to update the list.



6. 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:

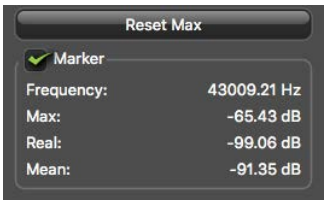
   1. **RealTime** (white): level of noise recorded in real time.
   2. **Mean** (cyan): mean recorded level of noise. It is useful to assess the noise floor.
   3. **Max** (dark blue): shows the latest highest level of noise recorded. It is useful to see on which frequencies are the sensors.



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

7. 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.



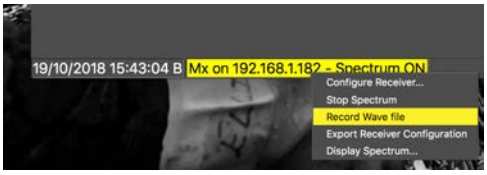
Frequency and levels of noise (dB) at the mouse pointer location are displayed under **Marker**.

8. 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.
9. 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.
10. 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.
11. 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

12. If you leave the page, you can access to the spectrum from the bottom of the screen. Right-click the yellow message to display options.



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

Charging the Sensor

Charge the sensor at any battery level with either **Marport Basic Sensor Charger** or **Marport Medusa II Multi-charger**.

About this task

The sensor uses lithium-ion batteries. Charge them only with Marport's chargers.

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

Important: Make sure to disconnect the charger from the sensor when you switch off the charger or vessel's power supply. If not, the contact of the charger's pins with the shoulder bolts switches on the sensor, that will run until discharged.

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 prevent corrosion of the charging pins.
2. Place the sensor and charger in a dry room like the deck or bridge. The optimal temperature while charging is between 10 and 25 °C.
3. Place the sensor away from any installing material (e.g. wet ropes) and fix the sensor with brackets to keep it stable while charging.
4. Allow good air circulation around the charger for cooling.
5. Connect the 3-pin charging connector to the sensor shoulder bolts.

   Tip: You can apply a small film of electrical contact grease lubricant on pins.
   To maintain the electrical pins, polish them with fine sandpaper.

   Important: Check that the shoulder bolts are not damaged. If they are, contact your local Marport dealer for replacement. Below is an example of shoulder bolts damaged because of insufficient maintenance.

6. Plug in the charger to a 110-240 V AC 50-60 Hz socket.
7. If you have the multi-charger, turn the power switch to the **ON** position.
   The power switch lights on. If not, check the AC power cord connection.

8. Wait for the battery to charge: standard charging cycle takes . A fast charge configuration allows a 70 % charge in 1 hour and full charge in hours.
9. Look at the LED(s) on the charger box to know the charge status. For the multi-charger, there is a LED for each sensor charging cable. The charge status are:
   - 🟢 Green LED: > 90%
   - 🟠 Orange LED: from 70% to 90%
   - 🔴 Red LED: < 70%
10. Make sure to disconnect the charger from the sensor when you switch off the charger or vessel's power supply. If not, the contact of the charger's pins with the shoulder bolts switches on the sensor, that will run until discharged.

Results

Once charged, the operational life time can be up to approximately 15 hours.

The operational life time depends especially on the uplink power of the sensor, but also on the sounding range, uplink frequency and options activated.

Maintenance

Read this section to learn best practices for maintaining the sensor.

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 sensor.

⚠ **CAUTION:** Never remove shoulder bolts directly from the end cap (black part). Shoulder bolts are attached to cables and trying to remove them will damage the cables.

⚠ **CAUTION:** Always inspect and correctly install all the o-ring seals inside the sensor when doing internal maintenance duties. If o-ring seals are worn out, missing or incorrectly installed, sensor may be flooded.

Cleaning the Sensor

You need to regularly clean the sensor for proper performance.

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

Regularly check that the sensor is clean. If not:

- Remove any marine life with a piece of wood or screwdriver.
- Wash away mud or debris with warm water.

  ⚠ **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 50 for cleaning procedures.
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). • If you put the sensor into storage for a long period of time, charge it once in a while. If you do not, batteries can become inoperable.
Every 2 years	Return the sensor to an approved Marport dealer for inspection and maintenance.

Troubleshooting

Read this section to know how to solve common problems.

Mosa does not start due to error message

Mosa displays an error message saying Mosa cannot be opened.

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

1. From the upper left corner of the screen, 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 applicable).
3. At **Allow apps downloaded from**, select **Anywhere**.
4. For some macOS Sierra versions, click **Open Anyway** or see Installing Mosa on page 15 to know how to add the **Anywhere** option.
5. Close the dialog box.

Sensor has difficulty connecting to Mosa

Mosa is very slow or unable to detect the sensor.

➜ The wireless connection does not work correctly.

- Connect and disconnect the sensor to a charger to make the sensor reboot.

➜ The sensor is out of the range of the wireless signal.

1. Bring the sensor closer to the computer.
2. To extend the range of the wireless signal, you can use a key (ref. TRENDnet TBW-106UB) with a USB range extender connected to the computer. Place the key as close as possible to the sensor.

Sensor cannot connect in wireless connection

When trying to connect to the sensor by wireless connection, the sensor appears on Mosa discovery area but you cannot click it OR the sensor does not appear on discovery area.

➜ In some cases, the computer keeps an history of some wireless devices and this interfere with the correct detection of sensors. You need to launch a script to uninstall Mosa and erase all wireless preferences.

1. Double-click the DMG file of a Mosa version **01.02.05 and after**.
2. Right-click **UninstallMosa.command** and select **Open With** > **Terminal**.

3. From the terminal window, enter your computer password and press **Enter**.

   Note: For security reasons, the terminal window will not display anything when you type the password.

   The terminal window displays **Process completed** when the script is completed. Mosa is uninstalled from your computer and all wireless settings on the computer are erased.

4. From the DMG file, install Mosa again.

After installation of a new firmware, there is no pitch and roll

You installed a new firmware with more options than the previous one, but pitch and roll data are not displayed in Scala.

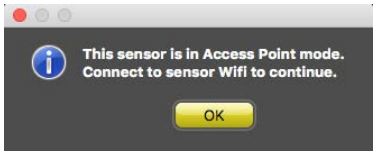
➜ If you had no pitch and roll measurements in the previous firmware, the pitch and roll is not automatically added to the uplink measurement sending sequence.

- From Mosa, in the **User Settings**, edit the measurements sending sequence and add pitch and roll measurements.

  See Configuring Measurements Sending Sequence on page 27 for more details.

Mosa error message: sensor in Access Point mode

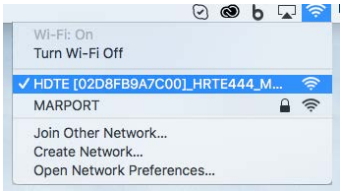
In Mosa, you have the following message when you click the sensor name in **Available inputs**:



➜ The sensor cannot connect to Mosa because your computer is connected to an external WiFi network and not to the sensor WiFi access point.

Disconnect your computer from the WiFi network and connect to the sensor WiFi access point:

1. From the top right corner of your computer screen, click the WiFi icon.
2. Click the sensor name instead of the WiFi network.



Mosa error message: Network unreachable

In Mosa, you have the following message when you click the sensor name in **Available inputs**:

➜ The sensor is not yet a WiFi access point or not yet connected to the WiFi network (depending on the connecting mode you configured).

Check the WiFi icon on the top right corner of your screen:

- If it is blinking, it means it is searching for the network. Wait for a few seconds.
- If it is blank, it means your WiFi is off. Click **Turn Wi-Fi On**.

Data in Scala is wrong

Data displayed in Scala is wrong and the echogram is noisy.

➜ There are signal interferences.

1. First, check that the sensor frequencies and telegrams are the same in the sensor configuration (via Mosa) and the receiver configuration (via Scala).
2. Check the frequencies of your other sensors to make sure there is enough distance between them.
3. Check the noise on the spectrum (see Checking Noise Interference on page 47). If the frequency where the sensor is placed is too noisy, change for a less noisy frequency: see Configuring Uplink, Up and Down Settings on page 21.

   Important: Do not forget to also change the frequency on Scala receiver page.

4. You can change the Echogram filter on Scala receiver page:
   1. From Scala, click **Menu** ☰ > **Expert Mode** and enter the password `copernic`.
   2. Click again **Menu** ☰ > **Receivers**.
   3. From the left side of the receiver page, click the name of the sensor.
   4. From the sensor configuration page, click **Configure** next to **Filter**.
   5. From NBTE Echograms Filter select **Echosounder and Interference Reduction Medium** or **High**.

Echogram is fixed and blue

The echogram displayed in Scala is completely blue. There is no yellow line moving on top of the echogram, which means that no sonar data is received.

➜ Sounder frequency may be outside the correct frequency range.

1. From Mosa, click **Trawl Explorer** > **Ping Down Frequency** and check that the frequency is between kHz.
2. If not, change the frequency.

➜ You may have dragged and dropped wrong sonar data to the display.

1. Check that the name of the sensor on the top left corner of the echogram is .

2. If not, from in Sensors Data, click + hold **Range of Sonar Data** and drag it to the page display.

➜ The sounder in the transducer is damaged.

- Contact the support service for repair.

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

Fossaleyni 16

112 Reykjavik, Iceland

supporticeland@marport.com

SPAIN

Marport Spain SRL

Camino Chouzo 1

36208 Vigo (Pontevedra), Spain

supportspain@marport.com

USA

Marport Americas Inc.

12123 Harbour Reach Drive, Suite 100

Mukilteo, WA 98275, USA

supportusa@marport.com

Appendix

Appendix A: 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.

Boat & Channel Codes

This list shows the standard frequencies for PRP telegrams. When you configure boat codes, make sure to respect the correct interval between frequencies (see table above).

Codes		
BC/CH	Frequency	FID (Scanmar)
C-1/CH1	42833	45
C-1/CH2	41548	32
C-1/CH3	41852	35
C-1/CH4	40810	25
C-1/CH5	42500	42
C-1/CH6	43200	49
C-2/CH1	42631	43
C-2/CH2	41417	31
C-2/CH3	41690	33
C-2/CH4	40886	26
C-2/CH5	42300	40
C-2/CH6	43100	48
C-3/CH1	42429	41
C-3/CH2	41285	30
C-3/CH3	41548	32
C-3/CH4	40970	27
C-3/CH5	42100	38
C-3/CH6	43000	47
C-4/CH1	42226	39
C-4/CH2	41852	35
C-4/CH3	41417	31
C-4/CH4	41160	29

C-4/CH5	42700	44
C-4/CH6	43300	50
C-5/CH1	42024	37
C-5/CH2	41690	33
C-5/CH3	41285	30
C-5/CH4	41060	28
C-5/CH5	42900	46
C-5/CH6	43400	51
C-6/CH1	39062	3
C-6/CH2	39375	7
C-6/CH3	39688	11
C-6/CH4	40000	15
C-6/CH5	40312	19
C-6/CH6	40625	23
C-7/CH1	38906	1
C-7/CH2	39219	5
C-7/CH3	39531	9
C-7/CH4	39844	13
C-7/CH5	40156	17
C-7/CH6	40469	21

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.

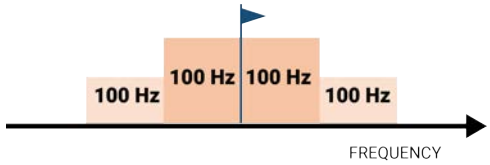


Figure 7: PRP sensors (e.g. Catch sensor, Trawl Speed, Spread sensor...)

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

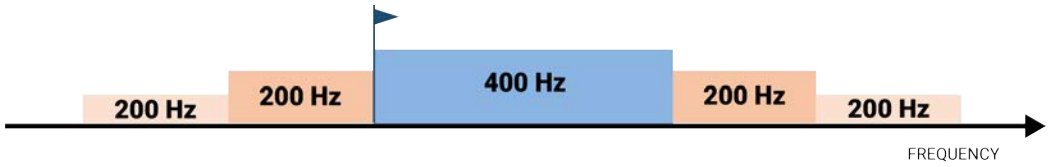


Figure 8: NBTE sensors (e.g. Speed Explorer, Trawl Explorer, Catch Explorer, Door Sounder)

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

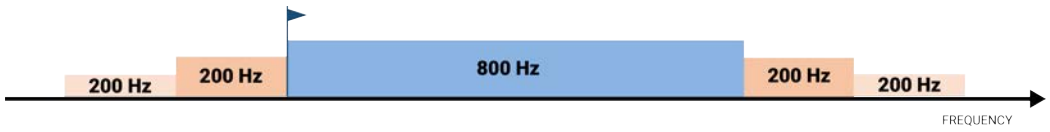


Figure 9: HDTE narrow band mode

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

Figure 10: HDTE wide band mode

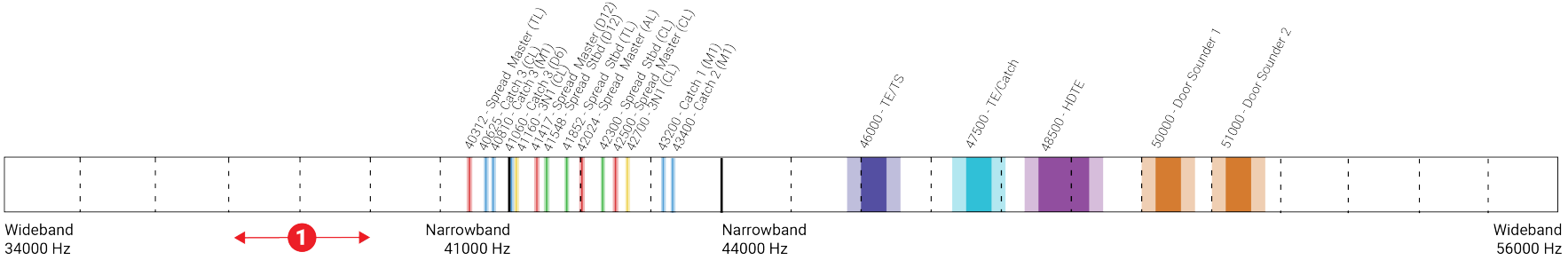
Example: If the frequency of the sensor is 40kHz, there should be no sensors between 39.8-40kHz and 40-42.6kHz.

Frequency of the sensor | Bandwidth | Mandatory distance with other sensors | Recommended distance with other sensors

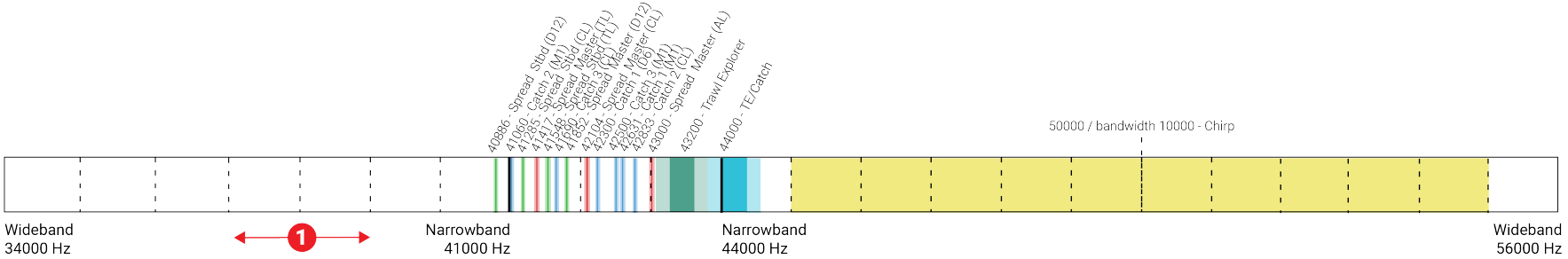
Examples of frequency allocations

- 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.

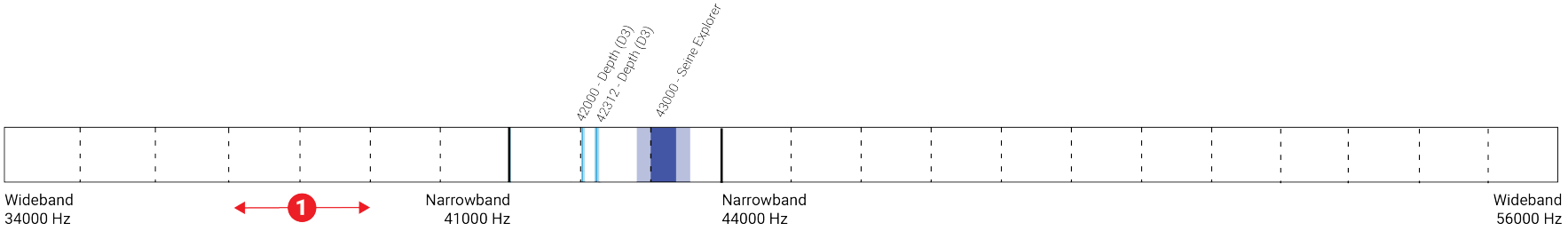
Example of a system with Spread, Catch, Trawl Speed sensors and Speed Explorer, Catch Explorer, HDTE and Door Sounder.



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.

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