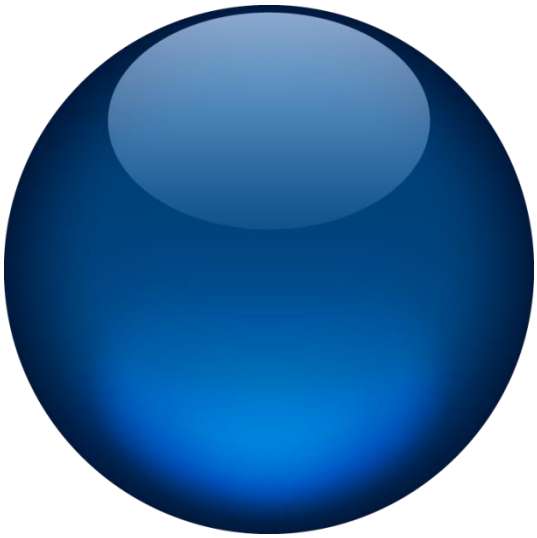

Inertial Products

Web-based Interface User Guide

iXblue
DEEP INSIGHT. SHARPER SENSES.

Document Revision History

Edition	Date	Comments
A	01/2014	First Edition
B	06/2014	OCTANS NANO & HYDRINS products added OCTANS NANO screen captures added
C	08/2014	Position option, heading reference selection added Water type selection added Important note for password management added Detailed Status Messages updated UTC screen capture added
D	10/2014	Required environment updated Heart beat and alerts management added Product alignment chapter updated
E	11/2014	Selecting the Attitude Conventions chapter added Heave output parameters added
F	01/2015	Updating system chapter updated
G	03/2015	New style guide updated to the document
H	05/2015	Heave sections updated
I	09/2015	Advanced position filtering and selecting backup sensors sections added Configuring the DVL sensor section updated Control and options pages description updated
J	11/2015	chapters 7.3 & 5.13 updated
K	12/2015	Chapters 3.2.4 & 5.4 updated
L	01/2016	Chapters 2.2 & 5.4 & 5.5 & 5.13 updated
M	05/2016	PHINS COMPACT C7 product added
N	11/2016	PHINS COMPACT C3, ROVINS NANO and OCTANS SUBSEA products added. Chapter 2, 4.1, 4.2.3.2, 4.3.1 & 6.6 updated.
O	04/2017	Chapters 3.2.3, 4.5, 5.1 & 6.6 updated

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Text Usage

bold	Bold text is used for items you must select or click in the software. It is also used for the field names used into the dialog box.
`Courier`	Text in this font denotes text or characters that you should enter from the keyboard, the proper names of disk Drives, paths, directories, programs, functions, filenames and extensions.
italic	Italic text is the result of an action in the procedures.

Icons

The **Note** icon indicates that the following information is of interest to the operator and should be read.

Important

The **Important** mention indicates that the following information should be read to forbid or prevent a product dysfunction or a faulty operation of the equipment.

The **Caution** icon indicates that the following information should be read to forbid or prevent product damage.

The **Warning** icon indicates that possible personal injury or death could result from failure to follow the provided recommendation.

Abbreviations and Acronyms

Abbreviations and acronyms are described in the Inertial Products - Principle & Conventions document (Ref.: MU-INS&AHRS-AN-003).

Overview

This document is a user guide to be applied to the web-based user interface for the INS and AHRS products, especially for marine applications.
This document is a part of the set of documentation provided with the products. This set of documentation must be read and understood prior to using the product.

The manufacturer shall in no case be held liable or use that does not comply with the stipulations in this guide.
This document is preferably used for configuration and monitoring when using the Ethernet connector to connect the product to a PC. It is part of the product standard delivery as it is embedded into the product.

This INS – Web-based Interface User Guide is divided into several parts:

- **Part 1: Introduction** – This part introduces the procedures described in this user guide.
- **Part 2: Getting Started** – This part lists all the products and the firmware version associated to which this user guide applies. It also gives information to launch the Web-based User Interface, or reload it if necessary.
- **Part 3: User Interface** – This part gives information about the description of the web-based user interface and how to configure it.
- **Part 4: Defining the Product Installation Parameters** – This part describes how to configure the parameters common to all missions: orientation and misalignment of product with respect to the vehicle (MECHANICAL PARAMETERS option), lever arms for external monitoring points, the INPUTS (external sensors, UTC), the OUTPUTS and the IP address, DHCP and PPP modes, network mask (NETWORK option).
- **Part 5: Defining the Product Setup Parameters** – This part describes how to configure the “mission” parameters i.e., the parameters that may vary from one mission to another or even during the same mission: position, activation of the sensors used by the Kalman filter, the position update, ZUPT mode; the WARNING CONFIGURATION, the DVL CALIBRATION, the setting management.
- **Part 6: Monitoring the Product Operation** – This part describes how to:
  - Follow the product navigation sequence
  - Display in real time data delivered or used by the product
  - Be informed of the product Status
  - Record data
  - Monitor the external sensor data input
  - Perform product Alignment procedure
- **Part 7: Software Maintenance Tasks** – This part describes the maintenance tasks of the product software.

A **Table of Contents** is available in the following pages to quickly get the dedicated information.

Table of Contents

1 INTRODUCTION

The document Web-based Interface User Guide for INS & AHRS is a part of the standard product delivery. The Web-based User Interface runs either on a workstation or on a mobile device, and allows to configure the product before the mission, during the mission and to monitor the parameters given by the product.
It supposes that the product installation has been performed.

- Configuration settings may be performed while the product is operating.
- The INS or AHRS Web-based User Interface contains a protocol library interface to configure the product outputs. This library interface is described in INS Interface Library (Ref.: MU-INSIII-AN-001) or AHRS interface Library (Ref.: MU-AHRS-AN-003).
- The use of the Web-based User Interface is not necessary to operate the product. This is a tool for configuring the product, modifying the configuration during operation, and displaying or recording data output from the product. Alternatively, some configuration and monitoring commands are available directly as ASCII frames to be sent to the product repeater port in case the Web-based User Interface is not available during operation. Refer to the INS - Advanced Configuration - User Manual (Ref.: MU-INSIII-AN-004) for detail on product configuration commands.
- This document applies to several INS or AHRS products. Please, refer to the Product User Manual included in the set of documentation provided with your product to check:
  - the number of available ports
  - the list of available external sensors
- In the Web-based User Interface, the drop-down lists and the shown options are adapted to the product. This is the reason why some parameters shown in this document may not be available on the Web-based User Interface of your product.

2 GETTING STARTED

2.1 List of products and versions

The current edition of this document is applicable to the following products and versions:

Table 1 – List of products and versions

Product	CINT Firmware version	GUI Version
HYDRINS	Higher than FrmWCINT_INS_v6.48 version	Higher than 5.76.3 version
MARINS	Higher than FrmWCINT_INS_v6.52 version	Higher than 5.76.3 version
PHINS	Higher than FrmWCINT_INS_v6.48 version	Higher than 5.76.3 version
PHINS 6000	Higher than FrmWCINT_INS_v6.48 version	Higher than 5.76.3 version
PHINS COMPACT C3	From FrmWCINT_INS_v7.0 version	Higher than 5.76.3 version
PHINS COMPACT C7	Higher than FrmWCINT_INS_v6.48 version	Higher than 5.76.3 version
QUADRANS	Higher than FrmWCINT_INS_v5.73 version	Higher than 3.9.14 version
ROVINS	Higher than FrmWCINT_INS_v6.48 version	Higher than 5.76.3 version
ROVINS NANO	From FrmWCINT_INS_v7.0 version	Higher than 5.76.3 version
OCTANS NANO	Higher than FrmWCINT_INS_v4.11 version	Higher than 5.61 version
OCTANS SUBSEA		
OCTANS		

Refer to section 7.1 to check the versions currently loaded on your unit.

In case of problem, contact iXBlue customer support to get the updated firmware version to be downloaded into your system (Refer to the Inertial Products - General Information document (Ref.: MU-INS&AHRS-AN-007)).

2.2 Required Environments

The Web user interface has been optimized and qualified on the following environment following the GUI version (refer to the previous section).

GUI version	Software version
Higher than 5.76.1 version	• Firefox version ESR 45 • Java Runtime Environment 8 update 73
Before the 5.76.1 version	• Firefox version 27.0.1 • Flash player version 12.0.0.77 • Java Runtime Environment 7 update 51

It is highly recommended to update your workstation environment with the CD provided with your system then to disable the automatic updating of the required softwares.

In case of problem with Java Runtime Environment 7 update 51, just activate it in the Tools-Add-on – Plugins list.

2.3 Launching the Web-based User Interface

In order to configure, operate or monitor the product:

- the product must be connected to a PC though the Ethernet or the serial connector in PPP mode. For detail on product to PC wiring and connection, please refer to the Product User Manual included in the set of documentation provided with the product.
- the Web-based User Interface must be launched with the product powered on

To set-up the communication between the product and your workstation refer to the Inertial Products - Network Set-up Guide document (Ref.: MU-INS&AHRS-AN-005).

Connecting on a Workstation

The communication with the workstation can be performed either directly or through a local network.

Through an Ethernet link

The product Web-based User Interface is launched from the Web browser hosted on the workstation. Its default URL address is `192.168.36.1xx`, xx being the two last numbers of the product serial number: (note: this is the default IP address – it can be changed from the Web-based User Interface if required).

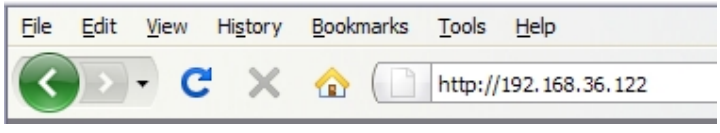


Figure 1 - Example of default URL for a product with serial number ending by 22

Through a direct serial link

The serial link connection is not the default case.

To use the direct serial link, the product repeater port must be configured to accept PPP connections. Refer to the document Inertial Products - Network Set-up Guide (Ref.: MU-INS&AHRS-AN-005) to activate it before launching the Web-based User Interface.

Then, when it is configured, the Web-based User Interface can be launched from the Web browser hosted on the workstation using its serial link URL address. The default one is `192.168.36.201` (direct serial link)

Connecting on a mobile device

Supports only Wi-Fi connection. A Wi-Fi router must be connected to the network to which the Product is connected. With the mobile device, connect to the product network. Once the connection has been established, enter the IP address of the product to launch the Web-based User Interface.

Workstation and/or mobile device

In both cases, during the first seconds the logo is flashing grey-blue indicating that the Web-based User Interface is loading the internal configuration of the product. Then the logo turns blue, showing that the alignment sequence of the product is starting (refer to section 6.2.2 for details about the alignment).

In case the Web-based User Interface has not been correctly downloaded or is corrupted, the following page may open instead of the Control page of the Web-based User Interface:

To update the system with one or several files, use the System Updater Tool.

Refer to the System Updater Tool User Guide (ref. MU-UPDTAPN-AN-001).

3 USER INTERFACE

3.1 General Overview

The web-based user interface is a user-friendly interface and is composed of one main window which displays the menus to be selected and all the information of your product. Two other windows are displayed as pop-up windows from the selected menu in order to display specific information during the mission.

3.1.1 CONTROL PAGE

After launching the INS Web-based User Interface, the control page is displayed. It is composed of several areas as shown on the figure below.

- The **Menus area** which allows you to configure and to monitor your product.
- The **Position and status area** where the main navigation and status information are displayed. A click on the **logo** gives access to the detailed status.
- The **Compass area:** the compass displays the heading in degrees from 0 to 360° by main steps of 20° and sub steps of 10°. Fine outer graduations are displayed by steps of 2°. An internal fine heading rose displays heading steps between 0 and 10.

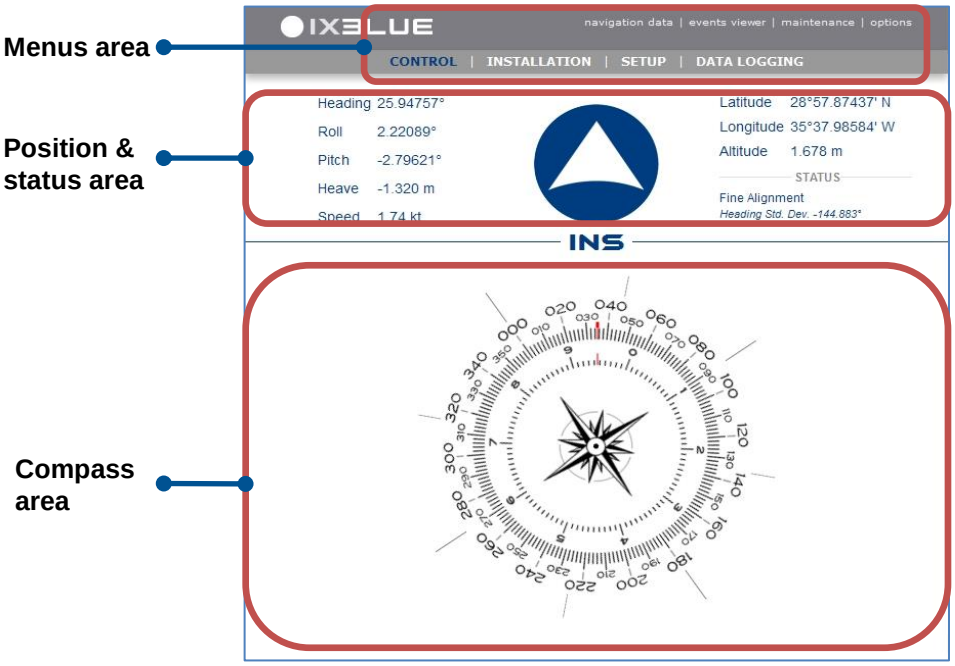


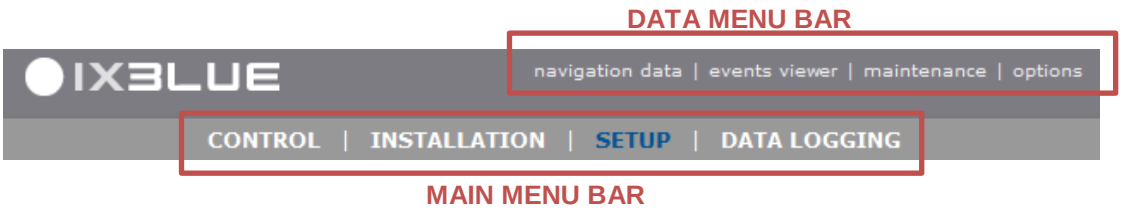
Figure 2 - Main page of the web-based user interface

This window is displayed when the product has been powered on or reset for more than 5 minutes.

The Logo is always visible whichever the selected menu is.
It gives visual information about the system status thanks to the associated color code (refer to section 3.1.5) and provides a quick access to the detailed status.

3.1.2 MENU DESCRIPTION

Many menus are available in order to configure and monitor the product.



- **MAIN MENU BAR**
  - **CONTROL** menu to get information on the product and navigation & status information. This page is the default page displayed when the web-based interface is launched.
  - **INSTALLATION** menu to configure the installation parameters (refer to section 4 to get details for each parameters):
    - Mechanical parameters
    - Input
    - Output
    - Network
  - **SETUP** menu to set specific parameters during a mission (refer to section 5 to get details for each parameters):
    - Position fix
    - Navigation parameters
    - Warning configuration
    - DVL calibration (available for PHINS, MARINS and ROVINS product)
    - Setting management
    - Simulation mode
    - Passwords
    - Advanced position filtering
  - **DATA LOGGING** menu to start the data logging. Refer to section 6.6.

- **DATA MENU BAR**
  - **navigation data** menu to access to all the data values. These information are displayed in a pop-up window. Refer to section 996.4.
  - **events viewer** menu to get a list of all errors, status or events messages that have occurred. The information are displayed in a pop-up window. Refer to section 6.5.
  - **maintenance** menu to start maintenance tasks. Refer to section 7.
  - **options** menu to set specific options of this interface. Refer to section 3.1.8.

3.1.3 DETAILED STATUS WINDOW

To view the detailed status of the product, just click on the logo at any time.

This window can be displayed:

- **Either with detailed status**

The status are displayed by category and colors, refer to section 6.3 for more details.

- **Or with detailed status and external sensors switches** (the sensor switches are automatically displayed when they are configured).

To get more information about the detailed status, refer to section 6.3.2

To display the control window, just click on the logo again.

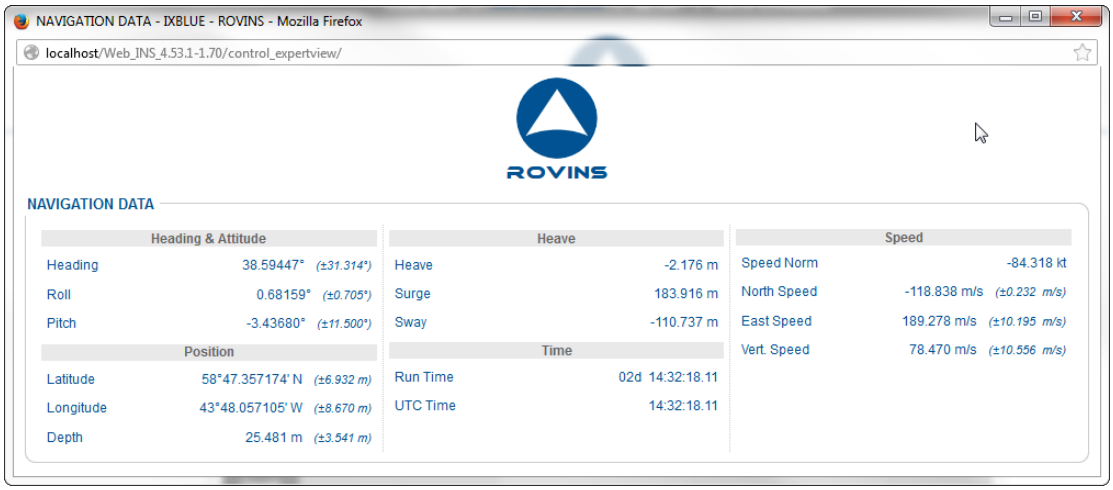
The data are displayed with the following resolution:

Data type	Resolution after the decimal point
Latitude, Longitude °	8 digits
Latitude, Longitude ° ‘	6 digits
Latitude, Longitude ° ‘ “	4 digits
All other real data	3 digits

3.1.4 POP-UP WINDOWS

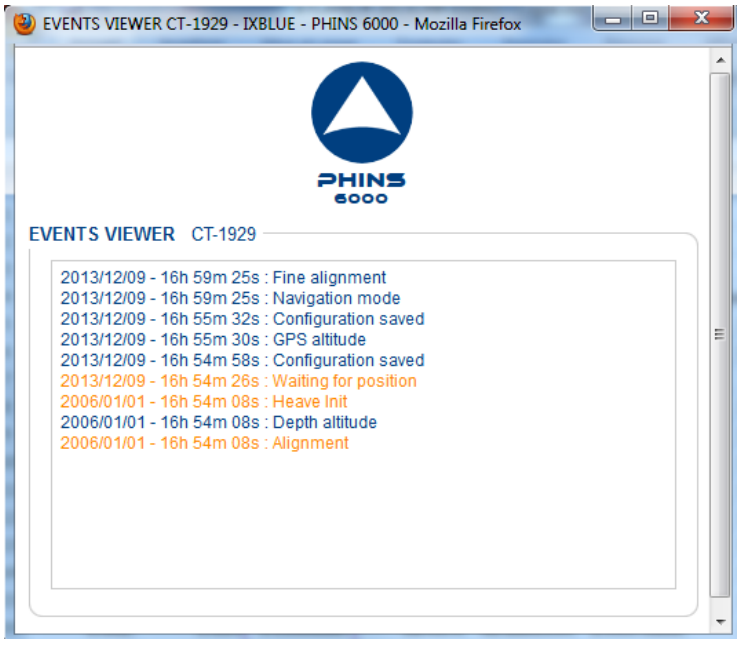
Pop-up windows are displayed when one of the following menus is selected:

- **navigation data menu**



For more information about the navigation data window refer to section 6.4.

- **events viewer menu**



For more information about the events window refer to section 6.5.

To close a window click on the  button.

3.1.5 COLOR CODE

The color code is defined in table 2; it presents the meaning of the colors used for text labels, status indicators and logo.

Table 2 – Color code definition

Color	Definition
Grey	Inactivity
Flashing Grey /Blue	System Configuration (during initialization for example)
Blue	Activity, nominal operation
Orange	Activity, warning
Red	Activity, alarm

When a problem occurs, the color of the logo changes and the detailed status window is automatically displayed with the equipment in fault.

OK/Cancel buttons

Each command page displays the same buttons; they appear as soon as an item has been selected or modified in the page.

To validate the new configuration and store it in the product PROM. Turns to blue color on “mouse-over” action.

To return to the previous entered values. Turns to orange color on “mouse-over” action.

Other Button

On “mouse over” action, a button may be highlighted in orange to indicate that clicking the button has an impact on the product.

Examples of such action:

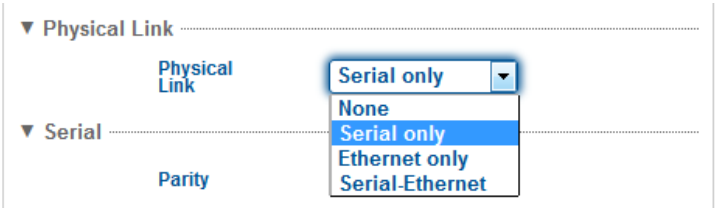
- Product restart (the alignment process is repeated)
- Reset to factory settings (the customized configuration is lost)

3.1.6 HOW TO SELECT THE PARAMETERS

There are several means to select the parameters. After clicking on the desired parameter, the parameter area is highlighted in blue on the screen.

Drop-down list selection

•By selecting it directly in the drop-down list:



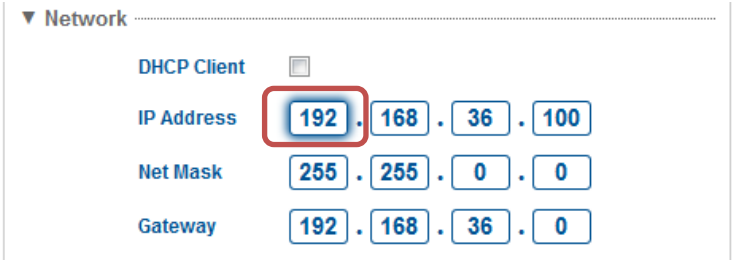
You can also use the up arrow (**[↑]**) and down arrow (**[↓]**) keys to scroll the list.

Check box

•By selecting it by clicking in the dedicated box:

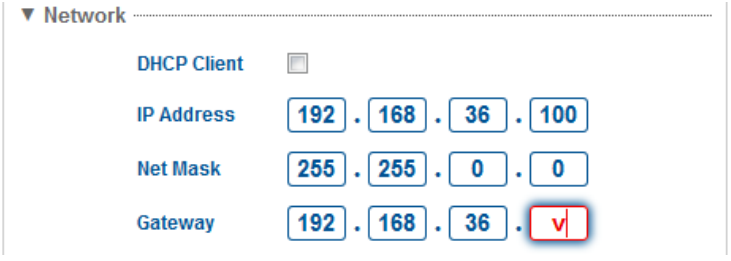
Text box

•By typing it in the dedicated area, the frame of this area is highlighted in blue:



You can also use the up arrow (**[↑]**) and down arrow (**[↓]**) keys to increase or decrease the numerical values.

Incorrect values are immediately indicated by red color:

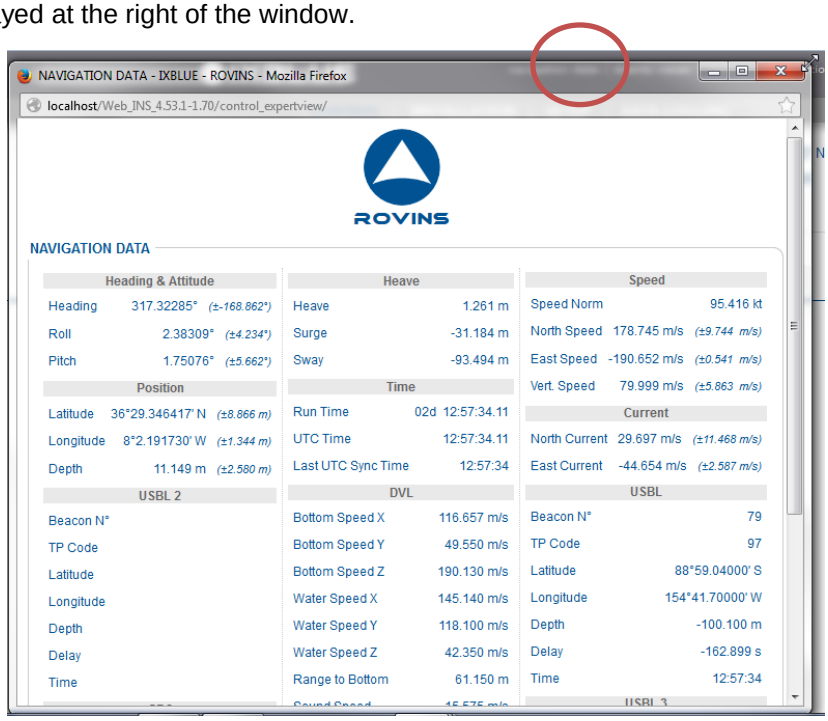


3.1.7 How to Resize the Window or Expand The Text Area

At any moment, the page can be resized. Please note that some elements may disappear as you reduce the size of the page.

Resizing the window

In addition to the product and configuration, some windows display many data items. Resize the window by using the mouse arrow until all items are visible. A vertical scroll bar will be displayed at the right of the window.

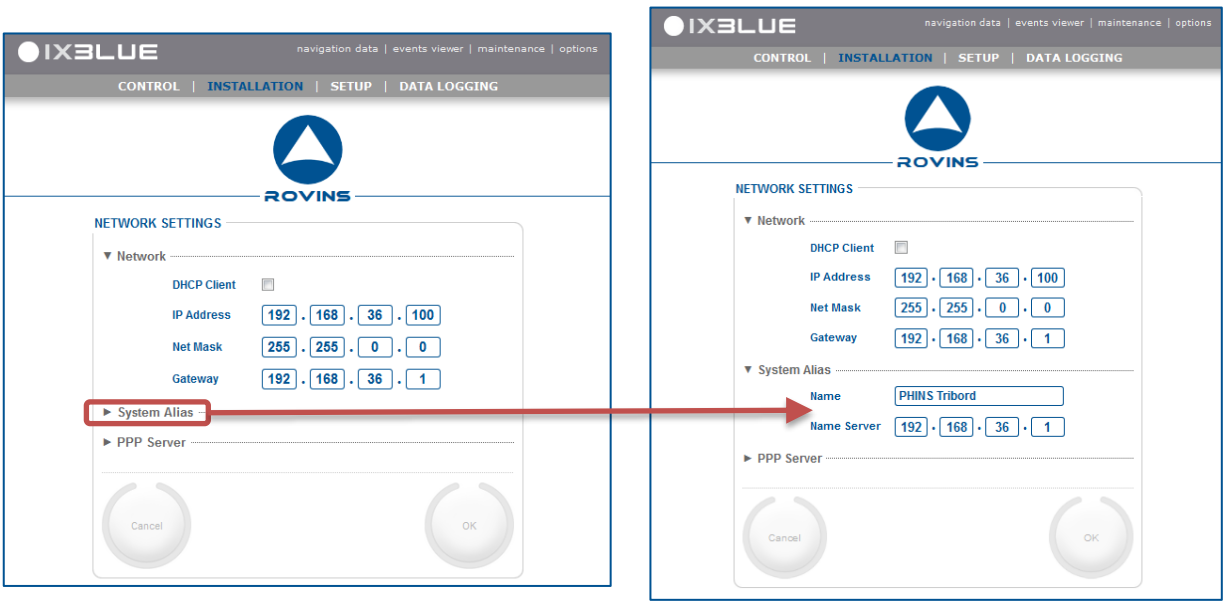


Expanding hidden area

In order to keep each browser page as small as possible, only the main parameters are visible by default.

Click on the text label to expand the dedicated area.

The figure below shows an example to expand the “System alias” area.



3.1.8 How to Use The Interface With A Mobile Device

The web-based user interface can be used also with a mobile device without “mouse over” action.

To display the options of the INSTALLATION or SETUP menu, just click on the menu. The window is displayed with the corresponding options as shown below. Then select the option to configure the desired parameters.

Figure 3 - NAVIGATION & SETUP pages

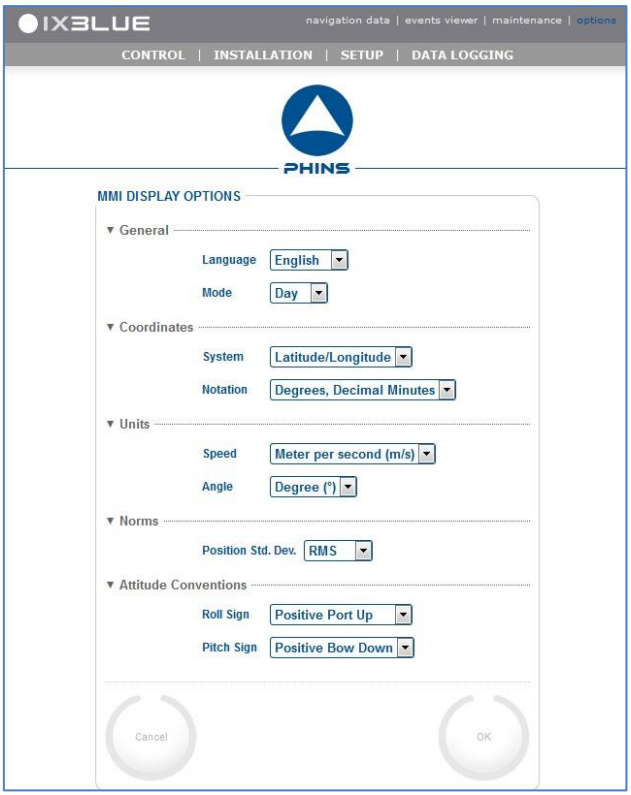
3.2 Configuring the Web-based user interface

At first delivery, the web-based user interface parameters are set to their default values. You can modify them to fit your needs.

3.2.1 SELECTING THE WEB-BASED USER INTERFACE LANGUAGE

Procedure

Step	Action
1.	**Click on the options** menu. The following window is displayed.

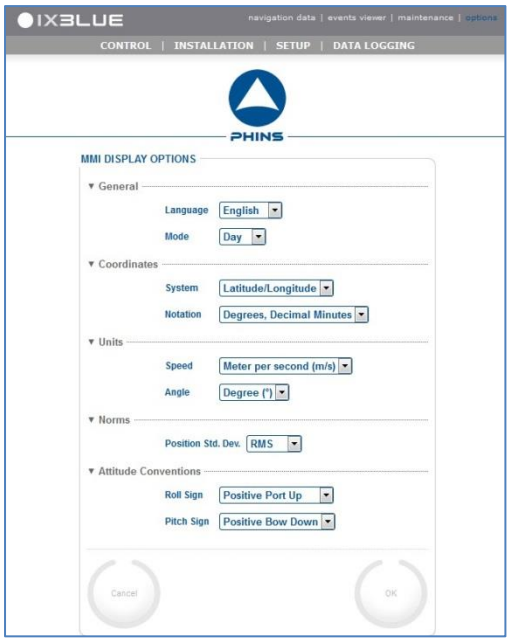


1.	In the **General** area, **select the right language** in the **Language** drop-down list: French or English. The text of the web-based user interface is displayed with the selected language.
2.	Click on the OK button.
3.	End of procedure.

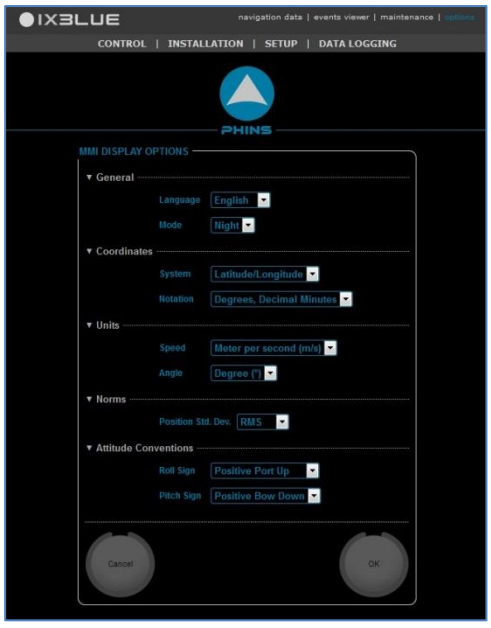
3.2.2 SELECTING DAY MODE OR NIGHT MODE DISPLAYS

Procedure

Step	Action
1.	**Click on the options** menu. The following window is displayed.



2.	In the **General** area, **select Day or Night** in the **Mode** drop-down list.
3.	**Click on the OK** button. When the Night mode is selected, the web-based user interface is displayed as follows:



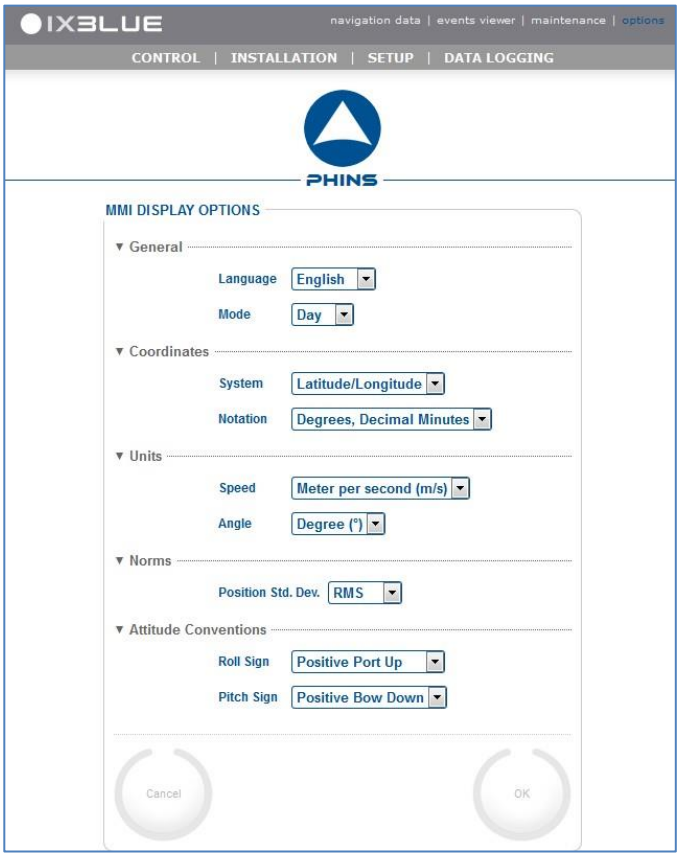
4.	End of procedure.

3.2.3 SELECTING THE SYSTEM COORDINATES

Procedure

Step	Action

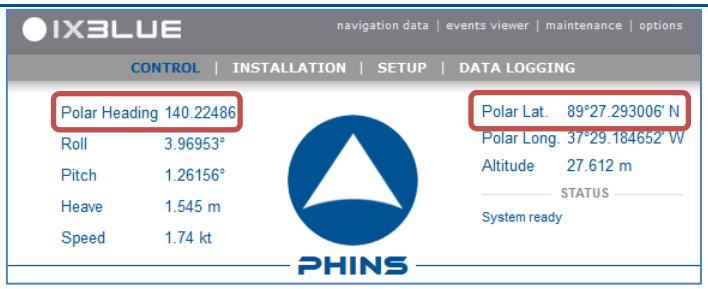
1. **Click on the options** menu. The following window is displayed.

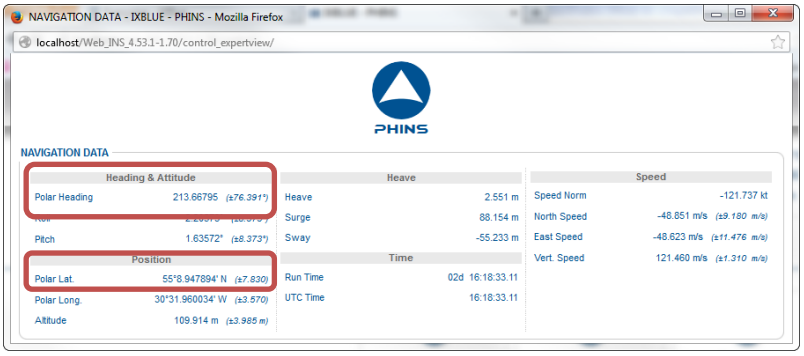


2. In the **Coordinates** area, select the type of coordinates in the **System** drop-down list:
   - Latitude/Longitude
   - UTM (UTM Northing, UTM Easting) position representations, in meters (WGS84)
   - Polar Lat./Long. It is recommended for the navigations close to the poles. In this case the reference is a point of the equator instead of the North pole.
   - UPS: Universal Polar Stereographic
   - OSGB: Ordonance Survey Great Britain
   - MGRS: Military Grid Reference System
   - GEOREF: World Geographic Reference System
   - ECEF: Earth Centered Earth Fixed

   Some protocols (like INHDT, for example) give a conventional heading when the Latitude/Longitude mode is selected, and polar heading when the polar Lat/Long mode is selected. At this time, the polar coordinates are displayed in the CONTROL page and in the NAVIGATION DATA window, see below.

Step	Action





3. For Latitude/Longitude or Polar Lat. /Long. System, select the type of notation in the **notation** drop-down list:
   - Decimal Degrees
   - Degrees, Decimal Minutes
   - Degree, Minute, Seconds

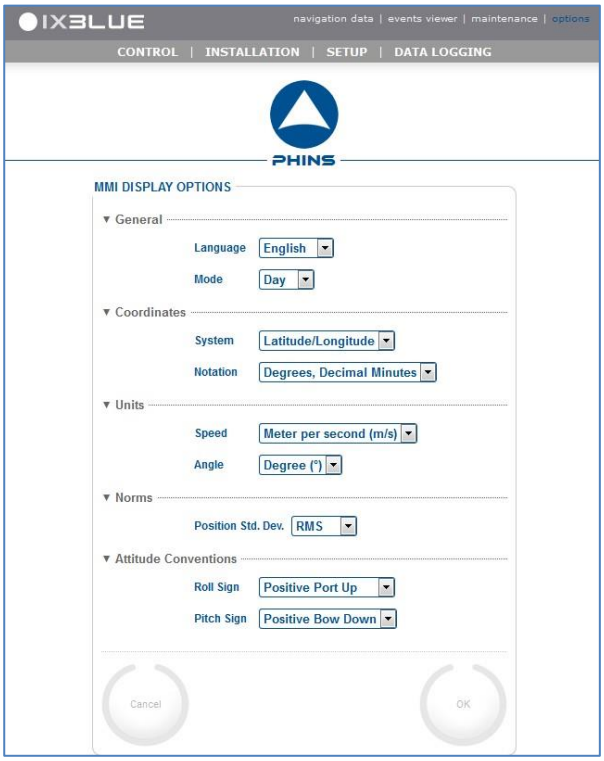
4. Click on the **OK** button.

5. End of procedure.

3.2.4 SELECTING THE SPEED AND ANGLE UNITS

Procedure

Step	Action
1.	**Click on the options** menu. The following window is displayed.

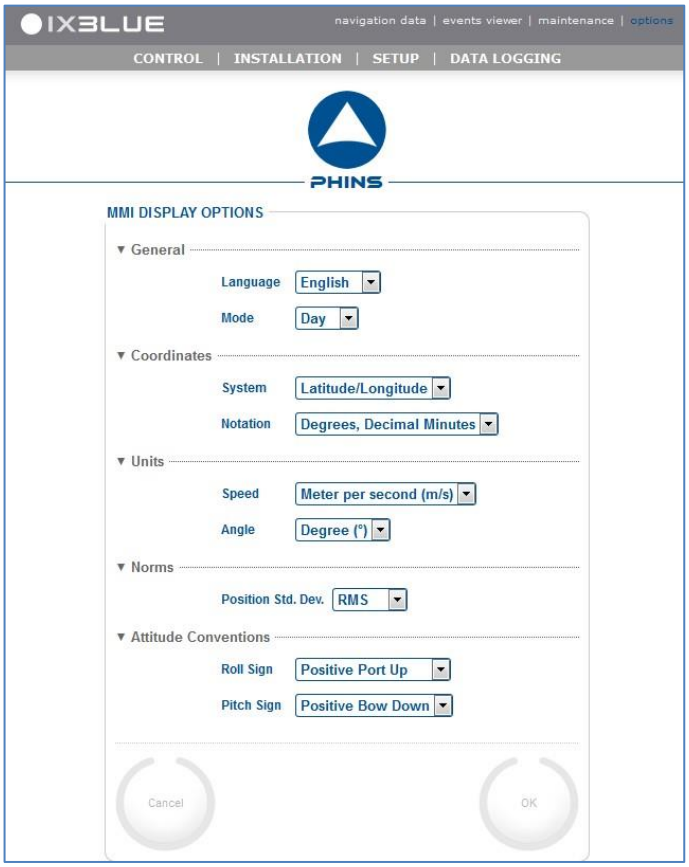


2.	In the **Units** area, select the units in the **Speed** drop-down list: • **Knot (kt):** Knot • **Meter per second (ms)**: meter/second
3.	Select the angle in the **Angle** drop-down list: • **Degree (°)**: for degree • **Mil (mil)**: NATO
4.	Click on the **OK** button.
5.	End of procedure.

3.2.5 SELECTING THE ATTITUDE CONVENTIONS

Procedure

Step	Action
1.	**Click on the options** menu. The following window is displayed.

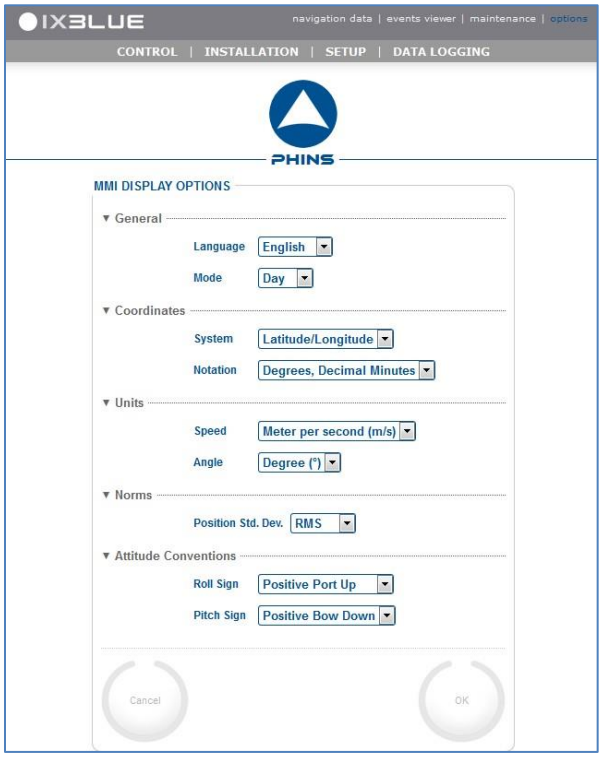


2.	In the **Attitude Conventions** area, select the convention in the **Roll Sign** drop-down list: • **Positive Port up** • **Positive Port down**
3.	Select the convention in the **Pitch Sign** drop-down list: • **Positive Bow down** • **Positive Bow up**
4.	Click on the **OK** button.
5.	End of procedure.

3.2.6 SELECTING THE POSITION UNCERTAINTY REPRESENTATION

Procedure

Step	Action
1.	**Click on options** menu. The following window is displayed.



2.	In the **Norms** area, select the position (latitude, longitude, altitude) uncertainty representation for one dimension value in the **Position Standard Deviation** drop-down list: • **RMS** • **CEP 50** • **CEP 95**
3.	Click on the **OK** button.
4.	End of procedure.

4 DEFINING THE PRODUCT INSTALLATION PARAMETERS

4.1 Configuring the Mechanical Parameters

This section deals with:

- The definition of the product orientation with respect to the vehicle
- The definition of the remaining roll, pitch and heading misalignments between the product and the vehicle
- The definition of primary and secondary lever arms
- The definition of the center of gravity (COG) of the vehicle

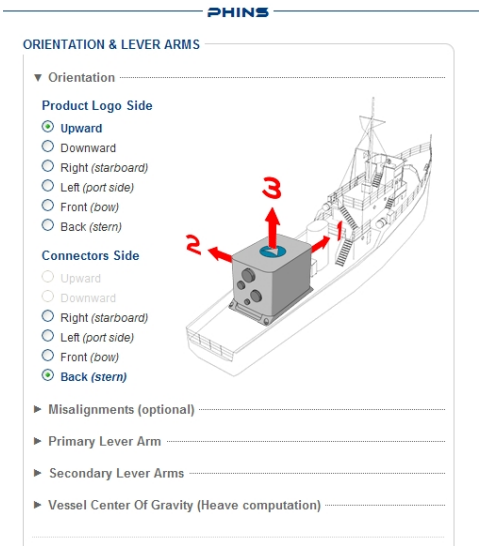
Before selecting mechanical parameters, refer to the Inertial Products - Principle & Conventions document (Ref.: MU-INS&AHRS-AN-003) to get more details about:

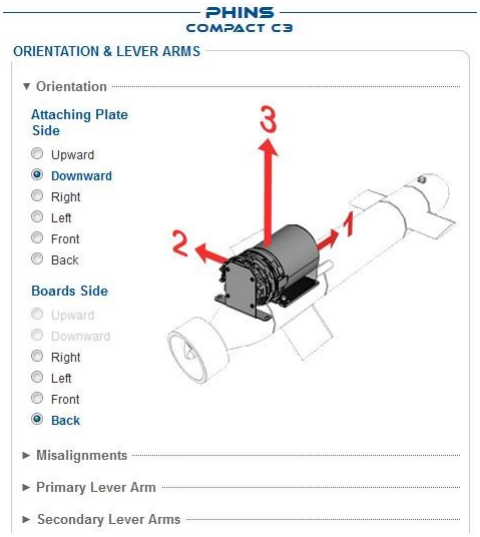
- Rough misalignment
- Angular misalignment biases
- Lever arms
- Secondary lever arms

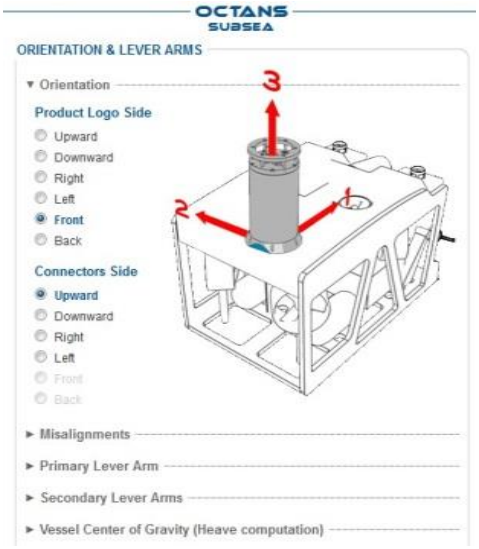
Procedure to configure the product orientation and the lever arms

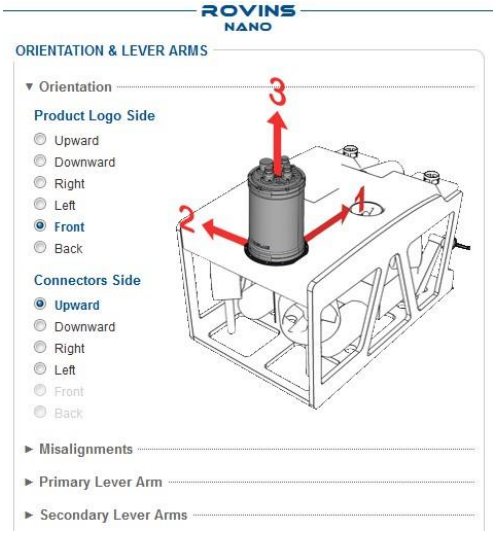
Step	Action

1. In the Web-based User Interface**, click on the INSTALLATION menu** then select **MECHANICAL PARAMETERS**. The following window is displayed.









Step	Action
2.	The **Orientation** area allows you to configure the product to vehicle orientation. **The orientation is used when the product axes orientation is different from vehicle axes orientation (displayed in red), with 90 degrees rotations of any of the product axis with respect to the vehicle axes.** Define simply the orientation by indicating: • The direction to which the **Product Logo Side** is pointing. • The direction to which the product **connector side** is pointing. On the illustration, the product logo side and the product connector side point to the chosen direction. **For OCTANS NANO & ROVINS NANO products:** the reference frame (X1, X2, X3) pictogram located on the top plate of the product helps you to define the orientation.
3.	**Click on Misalignments (optional)**, only for MARINS product, the Heading reference area is displayed.  Select the heading reference to be used for fine misalignments: • **Centering pins** • **Mirror**: the direction for the heading reference is perpendiculary to the mirror reflecting plane.

Step	Action

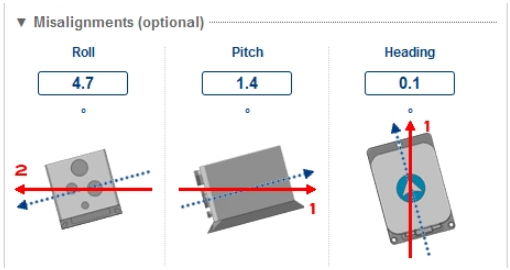
4. **Click on Misalignments (optional)**: the Misalignment area is displayed.

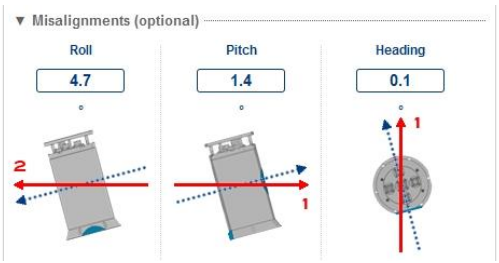
   Misalignment is used once orientation has been set to correct fine biases between the product and the vehicle axes that are due to angular misalignment of the product with respect to the vehicle.
   The illustrations help you to see which angle you have to measure precisely.

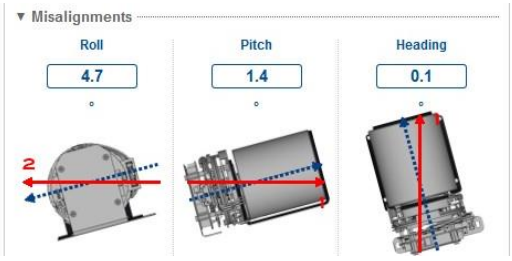
   Enter the following value in degree. Positive and negative values can be entered.

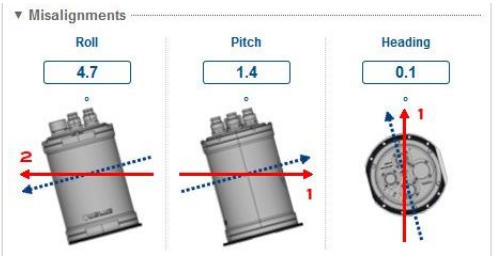
   - **Roll** misalignment
   - **Pitch** misalignment
   - **Heading** misalignment

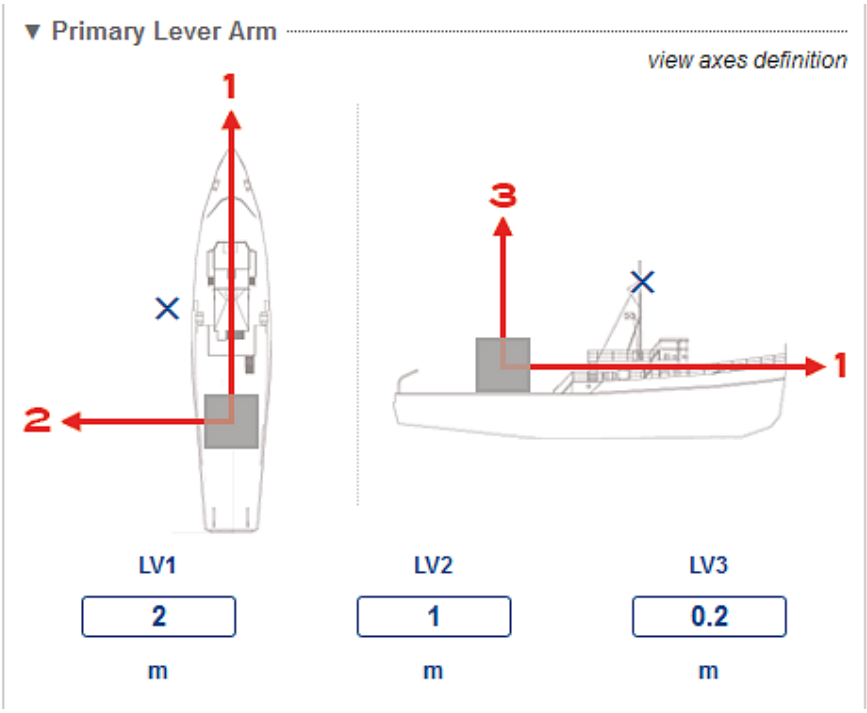
   The illustration displays how your product unit is installed each time the value is entered. See the examples below.

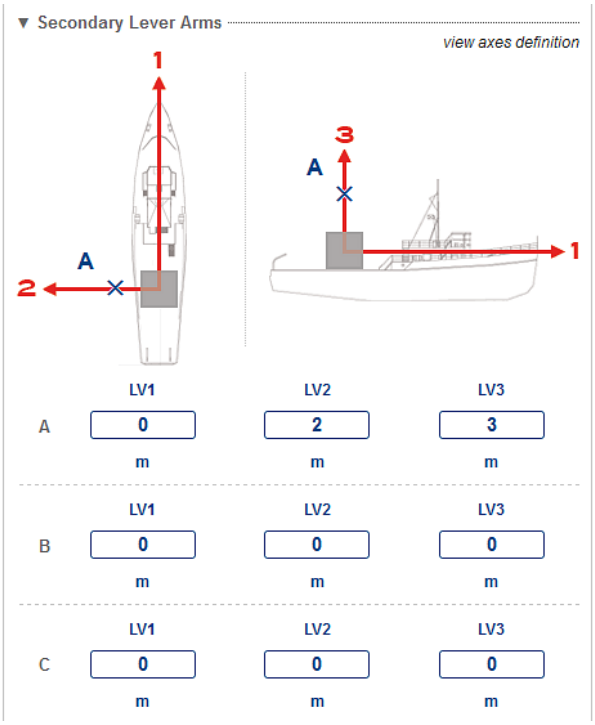








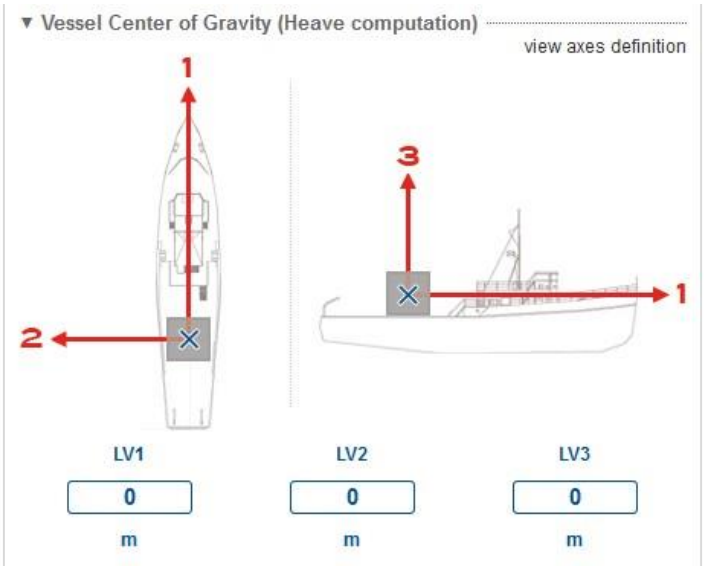
Step	Action
5.	**Click on Primary Lever Arm** to configure the primary external monitoring point through its coordinates: the Primary Lever Arm area is displayed (available only for some products). **The primary lever arm corresponds to the lever arm from the product center of measurements to the point to monitor.** The data displayed at the left of the logo provide the Latitude, Heading, Roll, Pitch and Heave at the point defined by the primary lever arm coordinates. The logged Repeater data flow is also computed for the primary lever arm. A vessel illustration can be displayed by clicking on the **view axes definition** label**.** It provides a definition of the LV1, LV2 and LV3 values to be entered. Note that LV1, LV2, and LV3 are positive for the monitoring point defined on this illustration. **Enter the following values** in meter. Positive and negative values can be entered. • **LV1**: the blue cross moves along the first axis • **LV2**: the blue cross moves according to the LV2 value sign • **LV3**: the blue cross moves according to the LV3 value sign A blue cross is displaying on the illustration once the lever arm coordinate is entered in order to show where the monitoring point you just defined is located with respect to the vehicle. This helps in detecting a mistake. See an example below. 

Step	Action
6.	**Click on Secondary Lever Arm** to configure the secondary external monitoring point through its coordinates: the Secondary Lever Arm area is displayed (available only for some products). **The secondary lever arms are used to compute the heave, surge and sway at locations different than that of the primary lever arm for the output protocols that provide the heave. Up to three secondary lever arms (A, B, C) can be defined.** A vessel illustration can be displayed by clicking on the **view axes definition** text**.** This provides a definition of the LV1, LV2 and LV3 values to be entered. LV1, LV2, and LV3 values are positive for the monitoring point defined on this illustration. Enter the following values in meter for each A, B, C secondary monitoring points. Positive and negative values can be entered. • **LV1**: the blue cross and the letter of the monitoring point is displayed along the first axis on the illustrations above • **LV2**: the blue cross and its attached letter move according to the LV2 value sign on the illustration on the left • **LV3**: the blue cross and its attached letter move according to the LV3 value sign on the illustration on the right Once the lever arms coordinates of the A, B or C secondary monitoring point are entered, a blue cross with the corresponding letter ‘A’, ‘B’ or ‘C’ is displayed where the secondary monitoring point is located with respect to the vehicle. This helps in detecting a mistake. See an example below. 

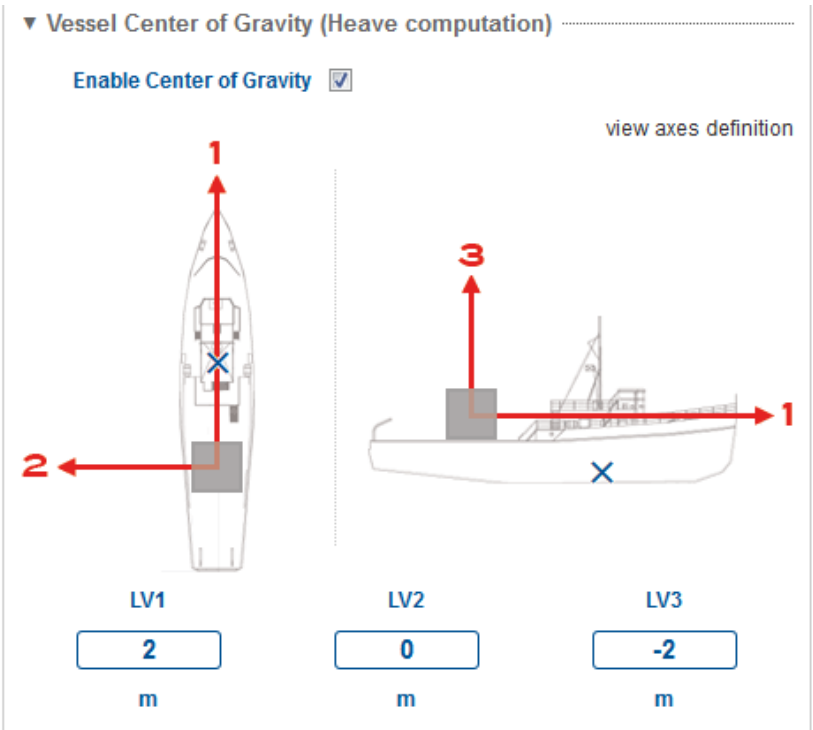
Step	Action

7. **Click on Vessel Center Of Gravity (Heave computation)** (available only for some products) to avoid the effect of transient vehicle/vessel movement on heave measurement. Enter the values in meter.

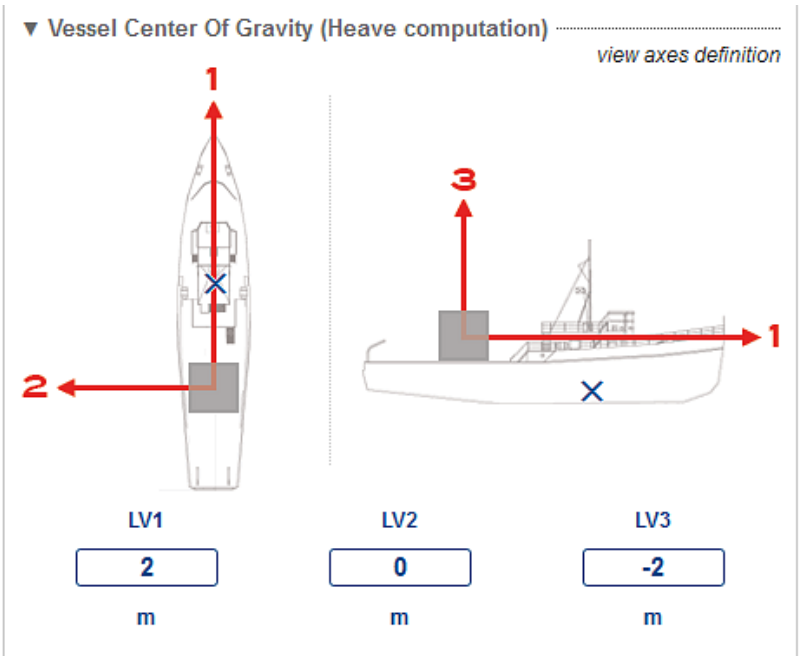
   For products which output heave, the Vessel Center Of Gravity area is displayed as follows:



   For OCTANS product, the Vessel Center Of Gravity area is displayed with a tick box:



   Enable the center of Gravity (tick box) to force the Center of Gravity lever arm. Please note that in this case the primary lever arm is then not configurable.

Step	Action
8.	**To avoid the effect of transient vehicle/vessel movement on heave measurement,** type in the position of the center of gravity (COG) of the vehicle/vessel by entering the lever arms (**LV1**, **LV2**, **LV3**) between the product center of Measurements and the COG of the vehicle/vessel. **Enter the following position of the center of gravity (in meter)** of the vehicle /vessel by entering levers arms (LV1, LV2, LV3) between the product center of measurements and the COG of the vehicle/vessel. Positive and negative values can be entered. • **LV1**: the blue cross moves along the first axis • **LV2**: the blue cross moves according to the LV2 value sign • **LV3**: the blue cross moves according to the LV3 value sign In this case, the product will compute heave data at the COG and add the heave induced by lever arms from the COG to external monitoring points. Once the center of gravity coordinates are typed in, a blue cross clearly shows where the defined point is located with respect to the vehicle. This helps in detecting a mistake. See an example next page.  To get more detail about the heave measurement refer to the Inertial Products – Application Note - Installation and Configuration of AHRS and INS for Seabed Mapping

Step	Action
9.	**Click on the OK button** to validate the modifications. The following message is displayed on the top of the window.

10.	**Click on the Restart button** to validate the modifications.
11.	End of procedure.

4.2 Configuring the Product Inputs

The product uses external sensor data to improve its own estimates of position, speed, attitude and heading. The number and the type of sensor depend on the product unit.
Refer to your Product User Manual to check the available configurations.

In order to prevent corrupted external data to degrade the estimation of the product, external sensor data goes through a rejection filter before being incorporated into the product main computation and Kalman filter.
This mechanism can be activated or deactivated: refer to section 5.8.
The product input configuration has been set during the product installation (refer to your Product User Manual) and recorded into the corresponding tables in the Inertial Products - Installation Form (Ref.: MU-INS&AHRS-AN-004) document. Refer to these tables to further proceed with the electrical interfaces configuration.
The Web-based User Interface lets you specify whether you want to use the internal sensor or an external one connected to the system.
Then, using the Web-based User Interface, you have to:

- Assign the external sensor to the chosen input
- Define the parameters of these input connections
- Define the parameters of each external sensor connected
- Define the parameters of the external reference clock, if needed

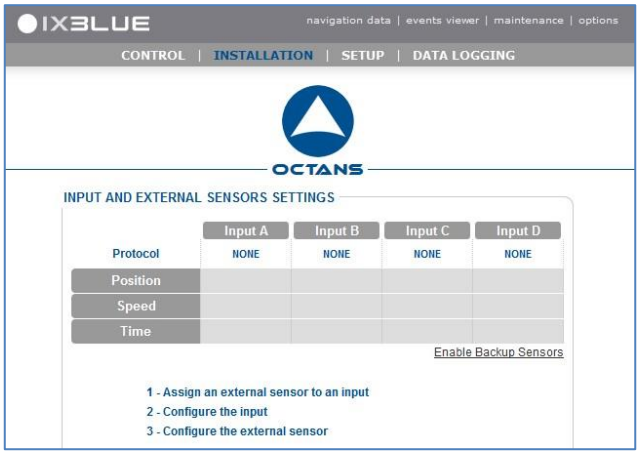
4.2.1 ASSIGNING AN EXTERNAL SENSOR TO AN INPUT

Procedure

Step	Action

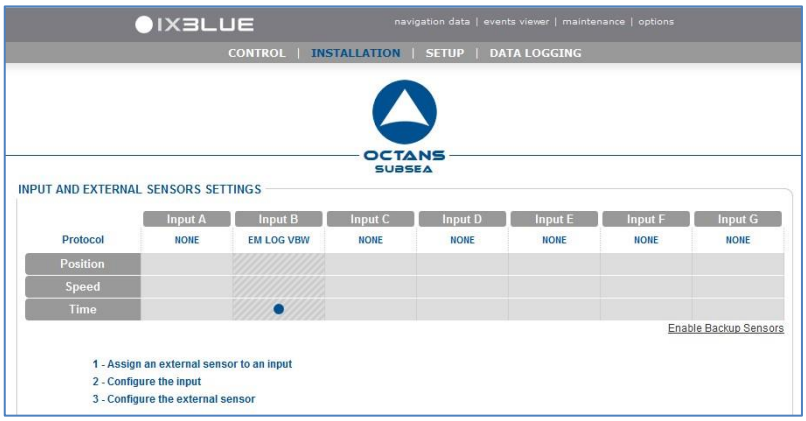
1. **Click on the INSTALLATION** menu **then select the INPUTS** option. A window is displayed with the available sensors.

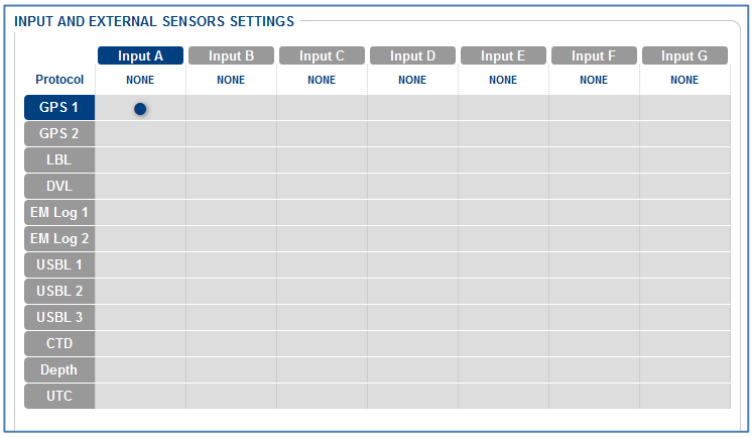
For OCTANS NANO & OCTANS, the window is displayed as follows:



For OCTANS product, Position and Speed setting parameters are not required.

For OCTANS SUBSEA, the window is displayed as follows:



Step	Action
2.	**Click** in the table to associate the sensor (e.g., **GPS1, LBL, etc.)** to the input to which the external sensor is connected (e.g., **Input A, Input B, etc.)** for the case of an external sensor (or **Internal** for an internal one). When the external sensor is assigned to the input, the selection is displayed as follows with a blue circle.  To configure the input settings, click on the Input “x” text (e.g., Input A, Input B...). Refer to section 4.2.2 to get more details. To configure the external sensor settings, click on the sensor type in the column at the left of the table (e.g., GPS, DVL...). Refer to section 4.2.3 to get more details. No parameters are required for CTD and DOV external sensors.
3.	End of procedure.

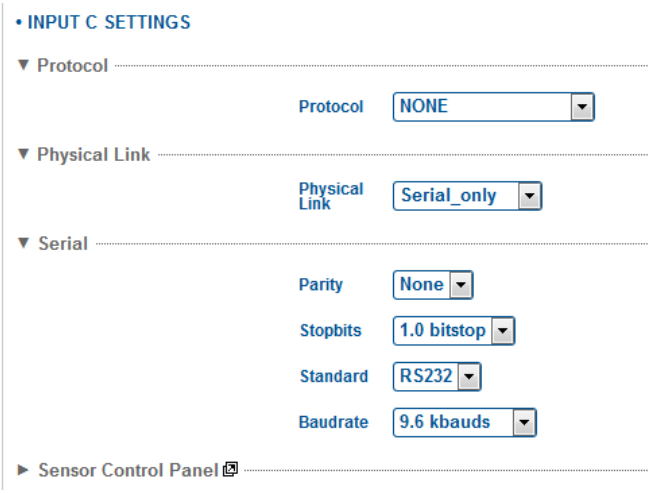
4.2.2 CONFIGURING THE INPUT STREAM SETTINGS

Important

For an external sensor, the input data can be received either on serial or Ethernet device, but not both.

On some products, input and output serial parameters of each port are common. This means that changing input serial parameters of a port impacts the output serial parameters of the port and vice-versa.

Procedure

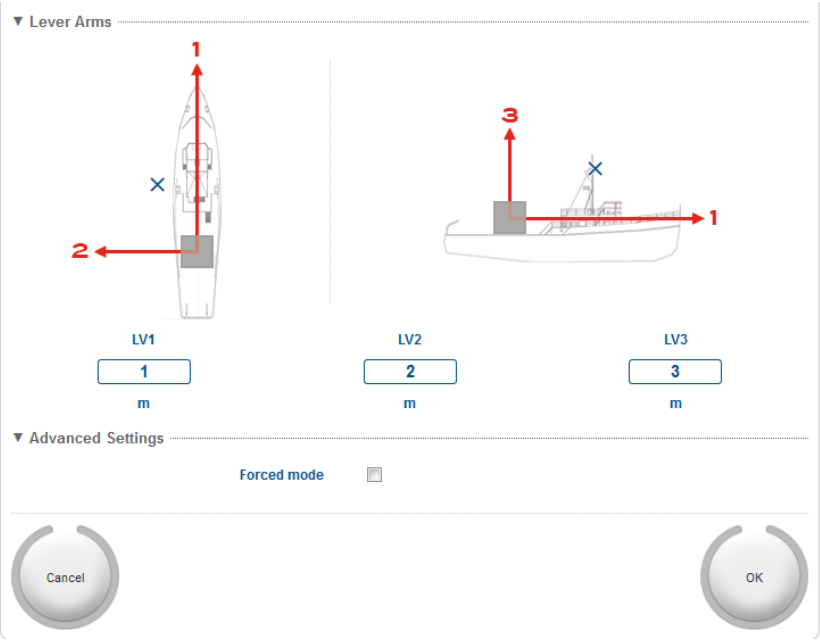
Step	Action
1.	Click on the **INSTALLATION** menu then select the **INPUTS** option.
2.	**Click on the Input "x"** text (e.g., Input A, Input B...). The input "x" settings area is displayed. 
3.	**Select the input protocol in the Protocol** drop-down list. Each protocol is defined in the INS Interface Library document (Ref.: MU-INSIII-AN-001) or AHRS Interface Library document (Ref. MU-AHRS-AN-003).
4.	**Select** on which device the data will be transmitted in the **Physical Link** drop-down list. • **Serial only**: data is transmitted via the Serial stream only. The Serial area is then displayed. • **Ethernet only**: data is transmitted via the Ethernet stream only. The Ethernet area is then displayed.
5.	When "Serial only" physical link is selected, set the following parameters: • **Parity**: from Odd, Even or None • **Stopbits**: from 0.5, 1, 1.5, or 2 • **Standard**: electrical standard for serial output: RS232 or RS422. For some products, RS422 is not available. • **Baudrate:** from 600 bauds up to 460.8 kBauds

Step	Action
6.	When “Ethernet only” physical link is selected, set the following parameters: • **Transport Layer**: TCP server, TCP client, UDP, UDP broadcast, UDP multicast • **IP**: IP address of the target (only used in UDP and TCP client) • **Port**: port socket number
7.	If needed, **click on “Sensor Control Panel”** to monitor the external sensor data. Refer to section 4.2.3.7 to get more details.
8.	**Click on OK button** to save the settings.
9.	End of procedure.

4.2.3 CONFIGURING THE EXTERNAL SENSORS

4.2.3.1 Configuring the GPS, LBL or EM LOG Sensor

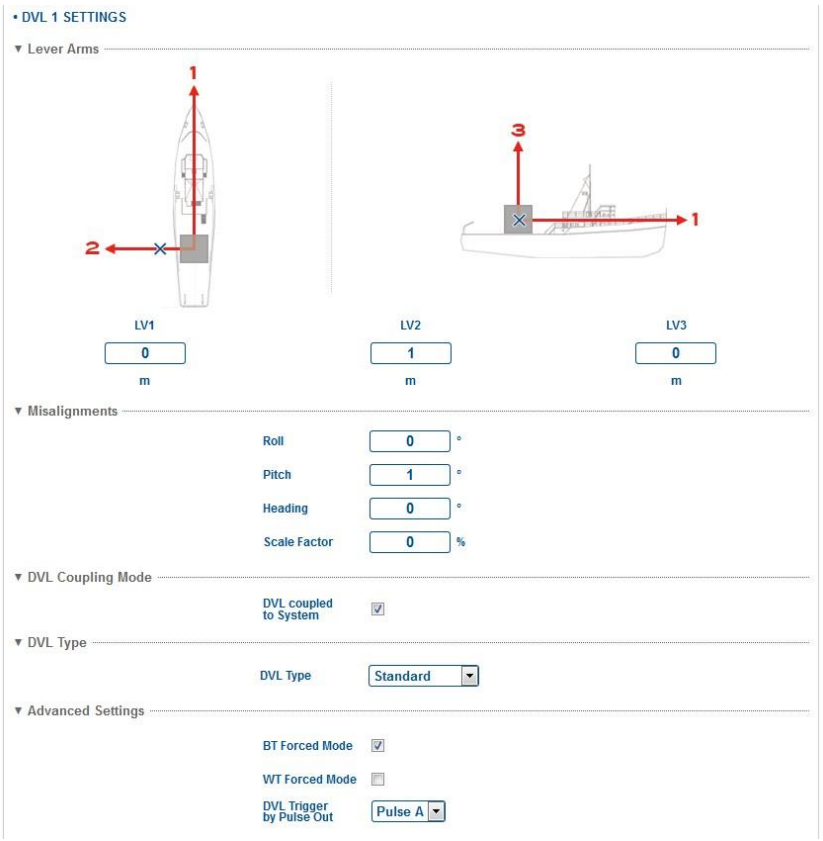
Procedure

Step	Action
1.	Click on the **INSTALLATION** menu then select the **INPUTS** option.
2.	**Click on the sensor type** in the column at the left of the table (GPS, LBL or EM LOG...). The following parameters are displayed under the table: 
3.	**Select the value of the lever arms**. The external sensor **Lever Arms** corresponds to the lever arm from the product center of measurements to the external sensor. • **LV1** is the signed distance from the product center of measurements to the external sensor along axis XV1 • **LV2** is the signed distance from the product center of measurements to the external sensor along axis XV2 • **LV3** is the signed distance from the product center of measurements to the external sensor along axis XV3
4.	**Tick the Forced mode** box if you wish the incoming sensor data to bypass the rejection filter and directly feed the Kalman filter. To get more information, refer to 5.10 section. When this mode is selected, it is impossible for the user to enable/disable the related sensor from the **CONTROL** page.
5.	Click on the **OK** button to save the settings.
6.	End of procedure.

4.2.3.2 Configuring the DVL Sensor

To get details about the DVL calibration, refer to the INS Calibration with RDI Workhorse document (ref.: MU-INSAPN-AN-001).

Procedure

Step	Action
1.	Click on the **INSTALLATION** menu then select the **INPUTS** option.
2.	**Click on the DVL sensor** type in the column at the left of the table. The following parameters are displayed under the table: 
3.	**Select the value of the lever arms**. The external sensor **Lever Arms** corresponds to the lever arm from the product center of measurements to the external sensor. • **LV1** is the signed distance from the product center of measurements to the external sensor along axis XV1 • **LV2** is the signed distance from the product center of measurements to the external sensor along axis XV2 • **LV3** is the signed distance from the product center of measurements to the external sensor along axis XV3

4. **Enter the Misalignments values** and the scale factor of the DVL in the Misalignments area. The precise values of the misalignment are determined during the DVL sensor calibration.

5. **Enable DVL Coupling Mode** by ticking the DVL coupled to system box.
   The coupling mode is used to indicate if DVL is coupled to the system. When DVL is coupled to the INS system (i.e: ROVINS DVL Ready, PHINS 6000 DVL Ready), DVL calibration values are updated when user misalignments are modified.

6. Select the **DVL type:**
   - **Standard:** to select the standard DVL type (doppler). All the axis of the speed of sound are corrected.
   - **Phased Array:** to select the phased array DVL type. This means that only vertical speed of sound is corrected for this type of DVL.

7. In the **Advanced Settings** area, select one or several parameters:
   - if you wish the incoming sensor data to bypass the rejection filter and directly feed the Kalman filter, select:
     - **BT Forced Mode:** DVL Bottom Track
     - **WT Forced Mode:** DVL Water Track

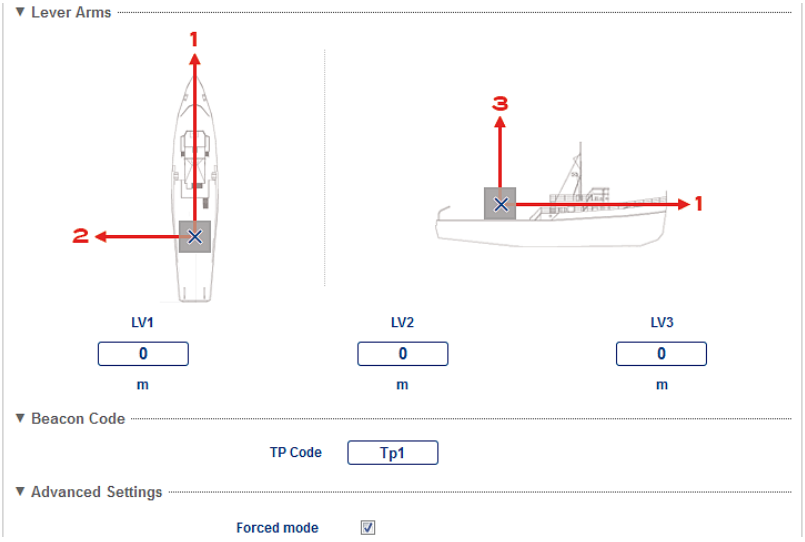
     When one mode is selected, it is impossible for the user to enable/disable the related sensor from the **CONTROL** page. For more information about how to enable the external sensors, refer to 5.10.
   - **DVL Trigger by Pulse Out:** the DVL measure is triggered on input pulse and is sent to the output pulse which is connected to the DVL.

8. Click on the **OK button** to save the settings.

9. End of procedure.

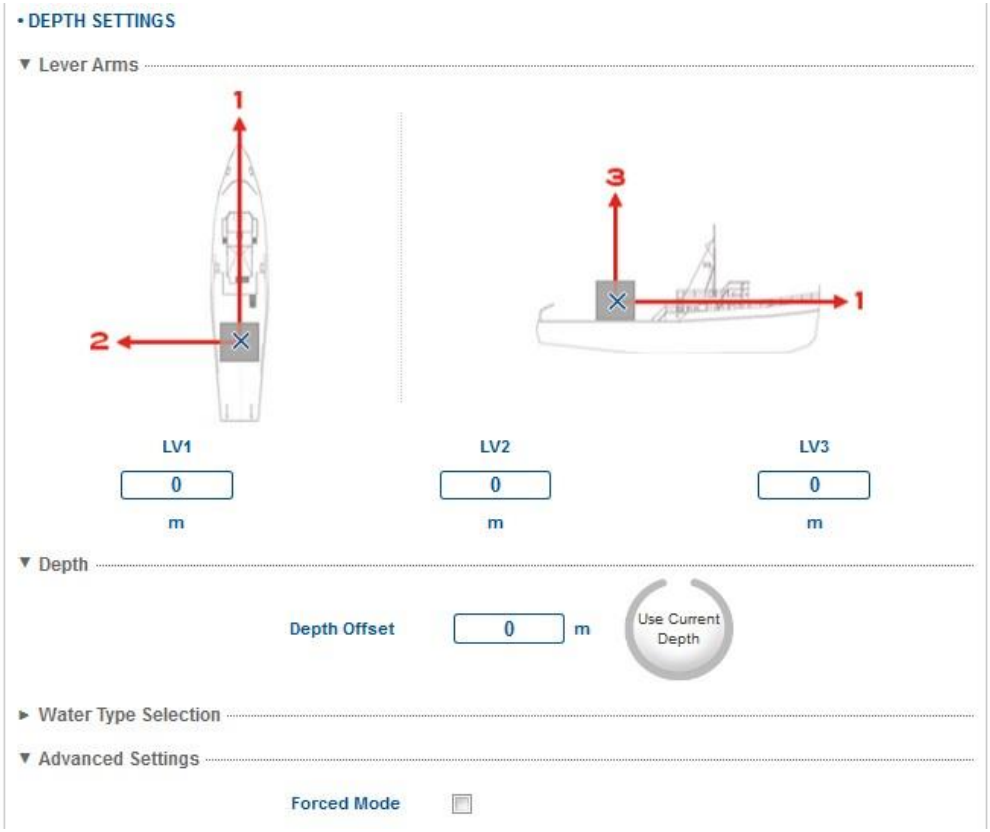
4.2.3.3 Configuring the USBL Sensor

Procedure

Step	Action
1.	Click on the **INSTALLATION** menu then select the **INPUTS** option.
2.	**Click on the USBL** sensor type in the column at the left of the table. The following parameters are displayed under the table: 
3.	**Select the value of the lever arms**. The lever arm of the USBL sensor is the lever arm from the product center of measurements to the beacons. Up to three lever arms can be defined. • **LV1** is the signed distance from the product center of measurements to the defined beacon along axis XV1 • **LV2** is the signed distance from the product center of measurements to the defined beacon along axis XV2 • **LV3** is the signed distance from the product center of measurements to the defined beacon along axis XV3
4.	**Enter the TP code** in the **Beacon code** area. This is the transponder code used to discriminate between incoming USBL data in the input protocol. Up to 8 alphanumeric characters. For example: Tp1 for USBL 1, Tp2 for USBL 2 and Tp3 for USBL 3.
5.	**Tick the Forced mode** box if you wish the incoming sensor data to bypass the rejection filter and directly feed the Kalman filter. To get more information, refer to 5.10 section. When this mode is selected, it is impossible for the user to enable/disable the related sensor from the **CONTROL** page.
6.	Click on the **OK** button to save the settings.
7.	End of procedure.

4.2.3.4 Configuring the Depth Sensor

Procedure

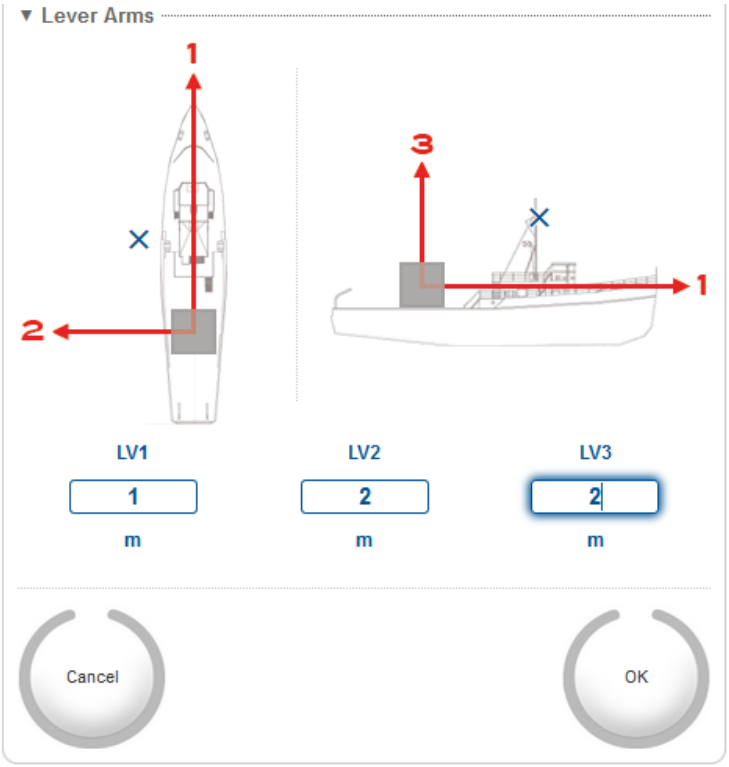
Step	Action
1.	Click on the **INSTALLATION** menu then select the **INPUTS** option.
2.	**Click on the Depth** sensor type in the column at the left of the table. The following parameters are displayed under the table: 
3.	**Select the value of the lever arms**. The external sensor **Lever Arms** corresponds to the lever arm from the product center of measurements to the external sensor. **LV1** is the signed distance from the product center of measurements to the external sensor along axis XV1 **LV2** is the signed distance from the product center of measurements to the external sensor along axis XV2 **LV3** is the signed distance from the product center of measurements to the external sensor along axis XV3
4.	Enter the **Depth Offset in the Depth area**. When clicking on the **Use current depth** button, this offset is set to the current depth measured by the sensor. That means that the Depth sensor can be set to zero using the **Use current depth** button under the **DEPTH SETTINGS** area. It can be useful to adjust the depth sensor to zero before submerging it into the sea.

Step	Action
5.	Click on the **Water Type Selection** title. Select the Water Type: • **Salt Water**. The pressure to depth formula from “Unesco Technical Papers in Marine Science n°44, Algorithms for computation of fundamental properties in seawater” is applied). • **Fresh Water**. Then you can enter the volumetric mass density rho in kg/m^3 with a resolution of 0.1 kg/ m^3. Default value is 1000 kg/m^3, value from 950.0 to 1100.0. Then the following pressure to depth conversion applies: $z=P/(rho.g)$ with the pressure P in Pa, rho in kg/m^3 and the earth gravity g in m/s^2 (1 Pascal= 1 N/m^2. 1 bar= 10^{-5} Pa). The earth gravity g will be the one calculated by the product. The entered values will be between 950.0 and 1100.0.
6.	**Tick the Forced mode** box if you wish the incoming sensor data to bypass the rejection filter and directly feed the Kalman filter. To get more information, refer to 5.10 section. When this mode is selected, it is impossible for the user to enable/disable the related sensor from the **CONTROL** page.
7.	Click on the **OK** button to save the settings.
8.	End of procedure.

4.2.3.5 Configuring the Position or Speed Sensor

This section concerns OCTANS NANO and OCTANS product.

Procedure

Step	Action
1.	Click on the **INSTALLATION** menu then select the **INPUTS** option.
2.	**Click on the Position** or **Speed** sensor type in the column at the left of the table. A window is displayed under the table with the Lever arms: 
3.	**Select the value of the lever arms**. The lever arm of the sensor is the lever arm from the product center of measurements to the beacons. Up to three lever arms can be defined. • **LV1** is the signed distance from the product center of measurements to the defined beacon along axis XV1 • **LV2** is the signed distance from the product center of measurements to the defined beacon along axis XV2 • **LV3** is the signed distance from the product center of measurements to the defined beacon along axis XV3
4.	Click on the **OK** button to save the settings.
5.	End of procedure.

4.2.3.6 Configuring the UTC or Time sensor

If available, it is recommended to add a synchronization pulse (Synchro in from Pulse A, B, or C) with the appropriate Protocol to improve precision.

The product internal clock can be synchronized with data coming from an external reference clock (i.e., GPS clock).

Time will be synchronized with input coming from the selected interface (i.e., **Input A**, **B**, **C**, **D**, or **E**) with appropriate **Protocol**.

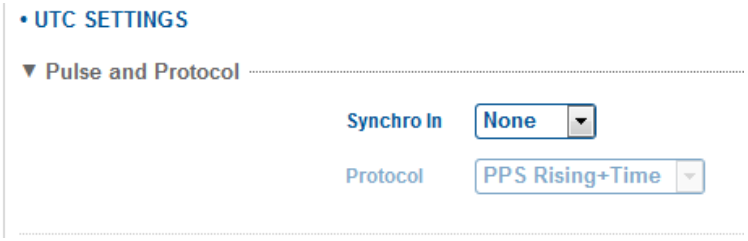
The product updates the offset between UTC time and internal time and uses this offset to convert internal validity time of navigation data into UTC referenced time. The time synchronization can be done either with time message only (less precise) or with Time + Pulse Per Second (PPS) signal.

With Time only, the reception time of the UTC message and the UTC time content is used to compute the offset between internal time and UTC time.

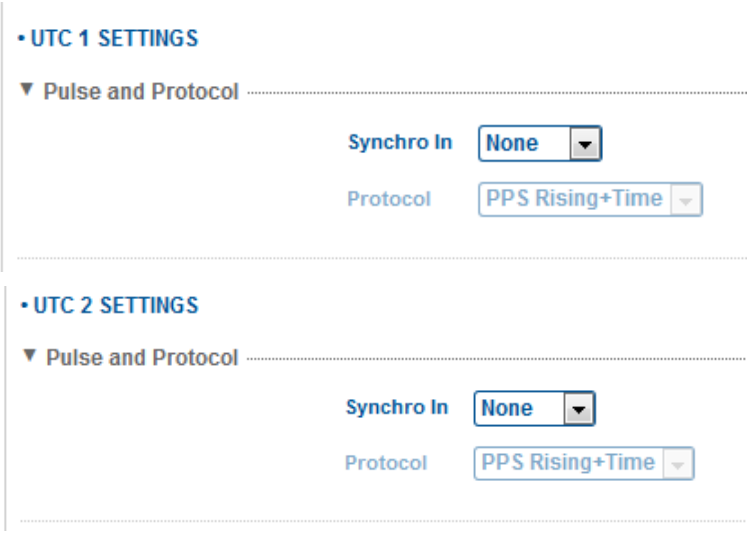
With Time + PPS or PPS + Time, the internal time of reception of the pulse rising/falling edge is latched and the UTC time contained in following/preceding time message is associated to this internal time to determine the UTC offset.

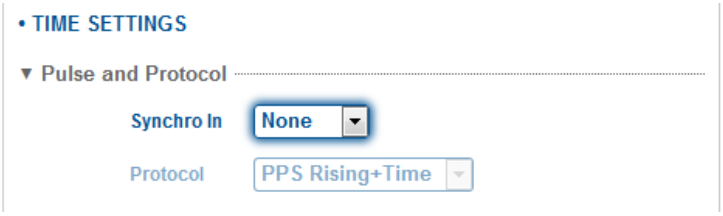
Procedure

Step	Action
1.	Click on the **INSTALLATION** menu then select the **INPUTS** option.
2.	**Click on the UTC** (or **Time**) sensor type in the column at the left of the table. The following parameters are displayed under the table:



For MARINS product, you can configure 2 UTC.

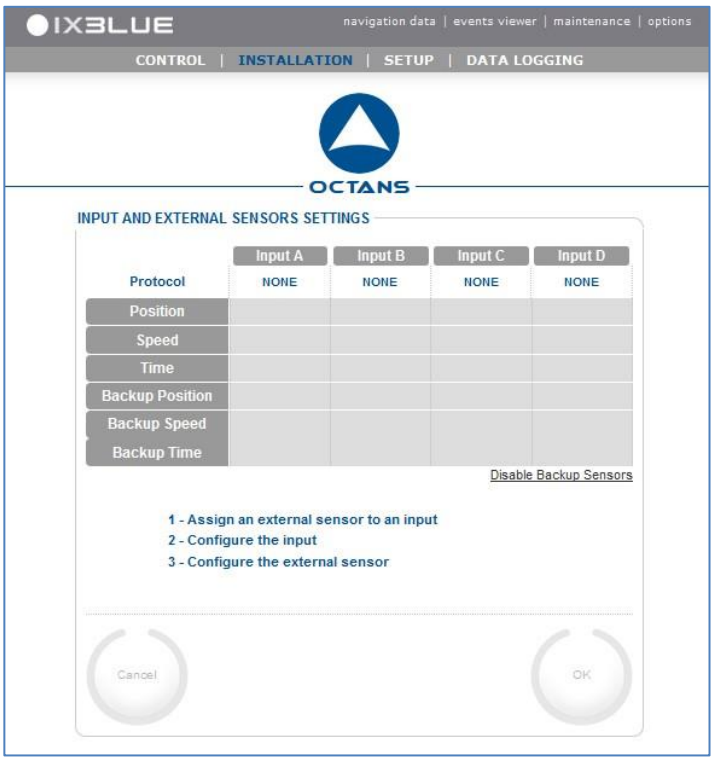


Step	Action
	For OCTANS and OCTANS NANO, the parameters are displayed as follows: 
3.	**Select from which pulse input** the pulse synchronization is coming in the **Synchro In** drop-down list (e.g., Pulse C).
4.	Select its protocol in the drop-down Protocol list.
5.	**Click on the OK button** to save the settings.
6.	End of procedure.

4.2.3.7 Selecting the Backup Sensors

This section only concerns OCTANS product.

Procedure

Step	Action
1.	**Click on the INSTALLATION** menu then **select the INPUTS** option.
2.	**Click on Enable Backup Sensors** at the right of the table. The following window is displayed with the backup sensors available: 
3.	Assign the backup sensor to the right input. This allows you to get the data from the backup sensors in case of loosing the : • Backup position: the data of the backup position sensor will be taken into account in case of primary position sensor data loss. • Backup Speed: the data of the backup speed sensor will be taken into account in case of primary speed sensor data loss. • Backup Time: the data of the backup time sensor will be taken into account in case of primary time sensor data loss.
4.	Click on the **OK** button to save the settings.
5.	To unselect the backup sensors, just click on **Disable Backup Sensors**.
6.	End of procedure.

4.2.4 MONITORING THE EXTERNAL SENSOR DATA

Procedure

To monitor external sensor data

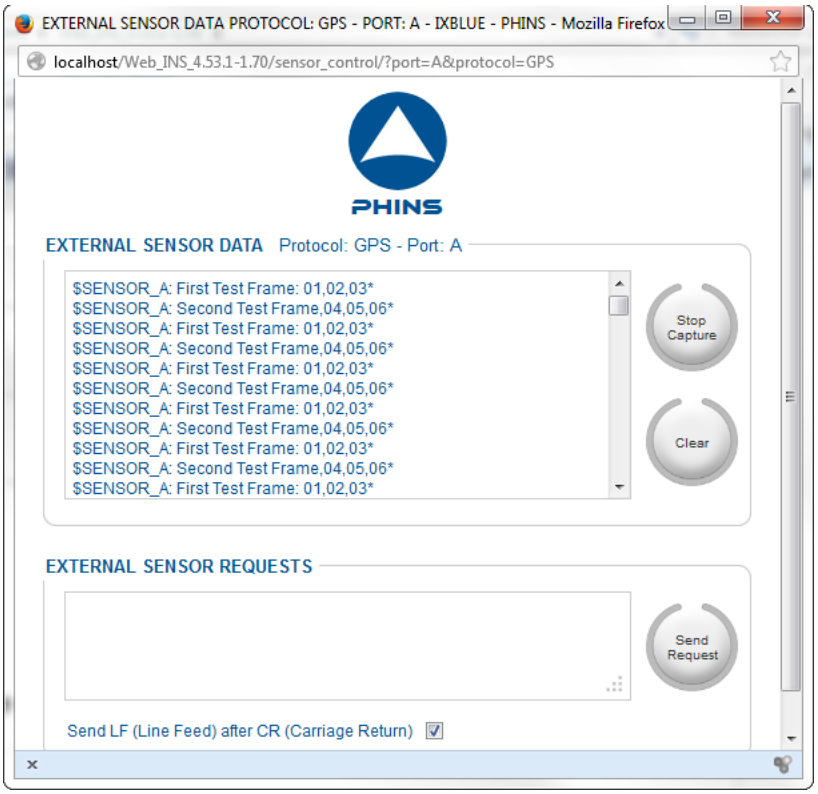
Any external sensor that inputs data into the product can be monitored.

Step	Action
1.	Click on the **INSTALLATION** menu then select the **INPUTS** option.
2.	In the first row of the INPUTS table, click on the input (e.g., **Input A**) to which the external sensor to monitor is connected. The Input X (e.g.,: Input A) area is displayed. In this example: GPS is connected to Input A.

Step	Action

3. Click on the **Sensor Control Panel** label.

   A pop-up window is displayed with the sensor data; in the following example the data of the GPS1 connected to Input A is displayed.



4. From this window, you can:
   - Display the data sent by the external sensor to the product in the dedicated area
   - Stop the display of the data (Stop Capture button) in the dedicated area
   - Reset the display (Clear button) in the dedicated area
   - Send a Request to the external sensor:
     - ❑ Use the dedicated area to type the command
     - ❑ Press enter after the command if the sensor requires a carrier return after commands
     - ❑ Select Send LF (Line Feed) after CR (Carrier Return) option if needed
     - ❑ Click the **Send Request** button to send the command typed in

5. End of procedure.

4.3 Configuring the Output Ports and Pulses

The product Output configuration has been set during the product installation (refer to the Product User Manual document) and recorded into the corresponding tables in the Inertial Products - Installation Form document (Ref.: MU-INS&AHRS-AN-004). Refer to these tables to further proceed with the electrical interfaces configuration.

4.3.1 Configuring the Output Ports

Up to five serial (A, B, C, D, E) and five Ethernet outputs (A, B, C, D, E) are available. Refer to your Product User Manual for the corresponding wiring on the connector for the different serial/Ethernet interfaces available.

Important

The Output data can be duplicated on both Serial and Ethernet devices.
On some products, input and output serial parameters of each port are common. This means that changing output serial parameters of a port impacts the input serial parameters of the port and vice-versa.

Important

While configuring the output port in serial mode, check that sampling period and baud rate are consistent with the protocol data field length. If not, data output will not be correct, and a “SerOut X full” flag will appear in the product detailed status window. Checking procedure is as follows:

- Count the maximum number of bits Nb (including parity and stop bits) in the protocol data frame. ASCII characters are 10 to 12 bits long max. (1 start bit, 8 bit ascii character, 0 or 1 parity bit, 1 or 2 stop bit).
- Select Baudrate and Sampling period so that:

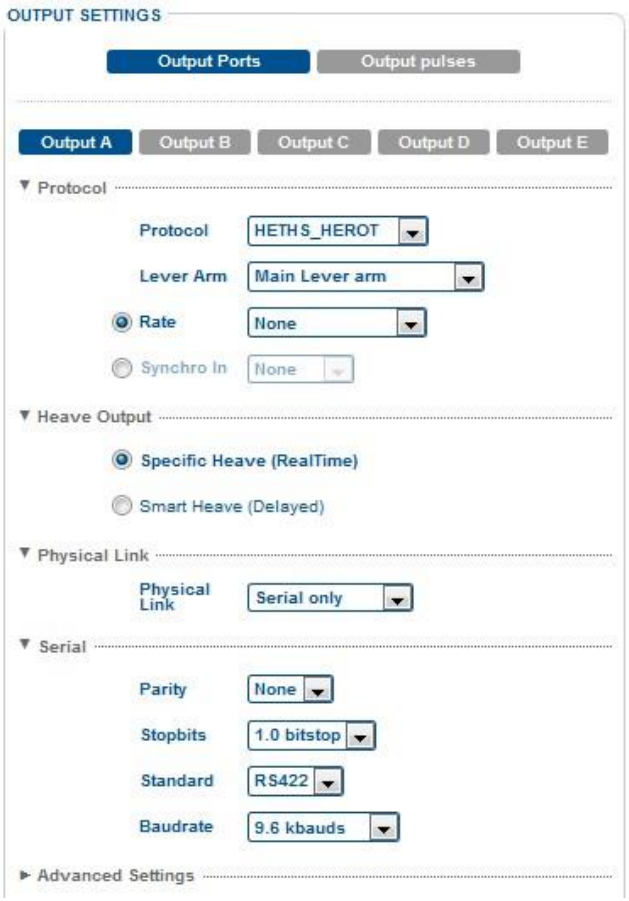
  Nb * Sampling Period (in ms) < Baudrate (in kBauds)

Example

A 30-character protocol set up with 1 stop bit and even parity will generate 30 x (1(start bit) +8(ASCII character) +1(stop bit)+1(parity bit)) = 330 bits. If this protocol output rate is 20 Hz (50 ms), the baud rate must be at least 6600 baud. First compatible baudrate in the product is 9600 bauds.

Procedure

Step	Action
1.	**Click on the INSTALLATION** menu then **select the OUTPUTS** option. The following page is displayed:

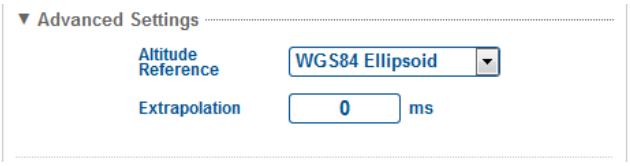


2.	**Click on the output port** to be configured (e.g.: **Output A** to configure Port A). Five outputs can be configured. When the output port is not connected, there is no need to configure the output.
3.	**Select the output protocol in the Protocol** drop-down list. The list of protocol depends on the product. Refer to INS Interface Library document (Ref.: MU-INSIII-AN-001) or AHRS Interface Library document (Ref.: MU-AHRS-AN-003) to get more details about the product protocols.
4.	**To select an UDP protocol** (**OCTANS and OCTANS NANO product**), select **From the library** in the Protocol drop-down list. Click on **Browse…** button to select the protocol file. The files are located in the UDP directory in the provided CD-ROM. Click on **Open** in the File Upload window.
5.	**Select the lever arm** used in the **Lever Arm** drop-down list. Motion sensing output on the protocol selected will be the motion measured at the external monitoring point defined by the lever arm.

Step	Action
6.	**Select the output frequency in the Rate** drop-down list to specify the time interval in milliseconds between the beginning of two consecutive outputs. The minimum value is 5 ms, corresponding to a maximum output frequency of 200 Hz. or **click on the grey bullet to select the input pulse synchronization in the Synchro in** the drop-down list: when this option is selected, the output frequency is determined by the input coming from the input pulse A, B or C.
7.	If needed, click on **Heave Output** text to select the type of heave output (available only if the heave is computed by the system). The following window is displayed.  • **Specific Heave**: real time which provides heave in real time mode. There is a sea-state selection to optimize the heave accuracy depending on sea conditions. • **Smart Heave**: which provides a measurement of heave with a 100 s fixed delay. This data will give the best accuracy in all sea conditions. This data is available through protocols which output heave.
8.	**Select** on which device the data will be transmitted in the **Physical Link** drop-down list. • **Serial only**: data is transmitted via the Serial stream only. The Serial area is then displayed. • **Ethernet only**: data is transmitted via the Ethernet stream only. The Ethernet area is then displayed. • **Serial-Ethernet**: data is transmitted via both Ethernet and Serial stream. The Serial and Ethernet areas are then displayed.
9.	When “Serial only” physical link is selected, set the following parameters: • **Parity**: from Odd, Even or None • **Stopbits**: from **0.5**, **1**, **1.5**, or **2** • **Standard:** electrical standard for serial output: RS232 or RS422 • **Baudrate:** from 600 bauds up to 460.8 kBauds
10.	When “Ethernet only” physical link is selected, set the following parameters: • **Transport Layer**: TCP server, TCP client, UDP, UDP broadcast, UDP multicast • **IP**: IP address of the target (only used in UDP and TCP client) • **Port**: port socket number

Step	Action

11. If needed, click on **Advanced Settings** text to configure advanced parameters. The following window is displayed.



12. **If needed**, you can generate an envelope of the serial output on the selected output pulse.

13. If necessary, select the Altitude Reference to be applied:
    - **Geoid (MSL)**: altitude is referenced to the Geoid surface also called Mean Sea Level (MSL). It is an equipotential gravity surface of the earth that coincides with mean ocean surface.
    - **Ellipsoid:** Altitude is referenced to an Ellipsoid surface (WGS-84). It is a mathematical geometric model which represents an approximation of the geoid.

14. Enter the **Extrapolation** time to anticipate future data by linear extrapolation. The product computes new data each 5 ms, and latency of the full system is, in the best case, 2.35 ms (time between sensor raw data sampling and first bit of output protocol on serial line).

    In some specific applications, the system latency (product intrinsic latency plus additional latency due to other equipments connected to the product) must be compensated to provide real time data to the target equipment. This usually requires anticipating future data and writing them into protocol frames before they are actually computed by the system. To perform this anticipation, the product firmware was modified to include a user configurable extrapolation time (**Extrapolation** field) on each output protocol. By default, extrapolation is disabled on output protocols (**Extrapolation** = 0). With this feature, output data is computed as follows:

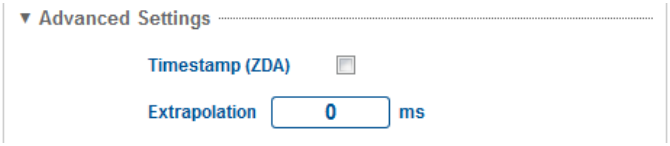
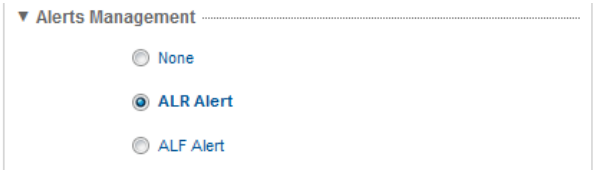
    Output data = $Data_N$ + **Extrapolation** * ($Data_N$ – $Data_{N-1}$) / SamplingTime

    This mechanism is applied on every product output data (attitude, position, speed, accelerations, etc.). This linear extrapolation introduces approximation errors that will increase with real signal amplitude and frequency.

    The Table 3 gives the examples of error due to this extrapolation on heading. Red cells indicate where the error is above the product specification on heading (i.e., 0.03° max).

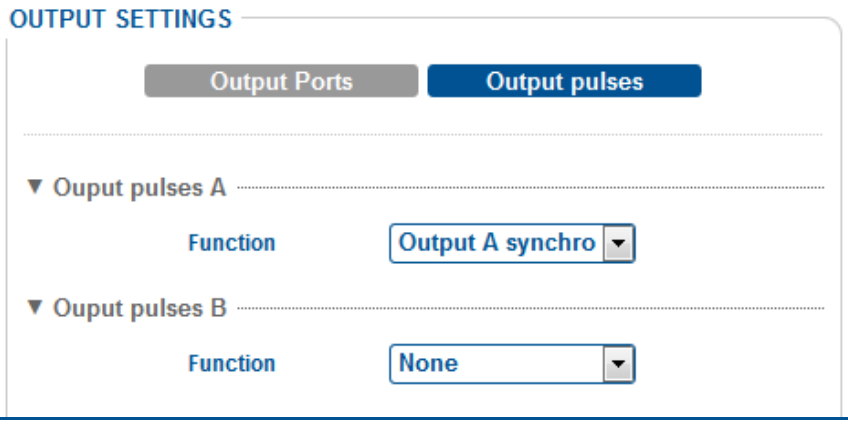
Table 3 – Heading errors in degrees with a linear extrapolation time of 5 ms.

	0.1Hz	0.5Hz	1Hz	5Hz	10Hz	20Hz
0.1°	9.10^{-7}	2.10^{-5}	9.10^{-5}	0.0025	0.0097	0.038
1°	9.10^{-6}	$2.4.10^{-4}$	1.10^{-3}	0.024	0.098	0.38
5°	$4.9.10^{-5}$	0.0012	0.0049	0.12	0.49	1.90
10°	$9.8.10^{-5}$	0.0025	0.0098	0.25	0.98	3.81
15°	$1.4.10^{-4}$	0.0037	0.015	0.37	1.47	5.72
20°	2.10^{-4}	0.0049	0.020	0.49	1.95	7.64

Step	Action
15.	**For OCTANS & OCTANS NANO,** the advanced settings window is displayed as follows:  Tick the **Timestamp (ZDA)** parameter to add a ZDA message after each ASCII output frame. Enter the **Extrapolation** time, refer to step 9.
16.	If needed, click on **Heart Beat Management** text label to expand the Heart Beat Management area then:  Tick the **Heart Beat** parameter to enable the Heart Beat transmission on this port. The heart beat management is used to verify integrity of the connection between two systems over NMEA link (i.e: failure of the AHRS/INS or physical transmission line). Heart beat message is sent each 30 second period. The heart beat management is not available for repeater output port in serial and Ethernet. For full functional description of the Heart Beat management, refer to Interface Library document (Ref.: MU-AHRS-AN-003 for AHRS or MU-INS-AN-001 for INS).
17.	If needed, click on **Alerts Management** text label to expand the Alerts Management area then:  Tick the type of Alerts Management on this port: • **None**: no management of the alerts • **ALR Alert**: old alarm mechanism • **ALF Alert**: new alarm mechanism The alerts management is not available for repeater output port in serial and Ethernet. The alerts management is only available for repeater input port in serial and Ethernet. For full functional description of the alerts management, refer to Interface Library document (Ref.: MU-AHRS-AN-003 for AHRS or MU-INS-AN-001 for INS).
18.	Click on the **OK** button to save the settings.
19.	**Perform steps 2 to 15** for each port to be configured.
20.	End of procedure.

4.3.2 CONFIGURING THE OUTPUT PULSES

Procedure

Step	Action
1.	Click on the INSTALLATION menu then select the OUTPUTS option.
2.	**Click on the Output pulses** text in grey. The following page is displayed: 
3.	**Select** the pulse function in the Output pulses A or B to generate an envelope signal on the corresponding output pulse.
4.	**Select the function** from which will be generated a TTL signal: • Output A synchro • Output B synchro • Output C synchro • Output D synchro • Output E synchro • Distance travelled rising: distance in meters that will trigger the pulse • Distance travelled falling: distance in meters that will trigger the pulse • PPS Like: PPS associated with output ZDA in some protocols • Time rising: number of milliseconds that will trigger the pulse • Time falling: number of milliseconds that will trigger the pulse
5.	Click on the **OK** button to save the settings.
6.	End of procedure.

Refer to the INS Interface Library document (Ref.: MU-INSIII-AN-001) or AHRS Interface Library document (Ref.: MU-AHRS-AN-003) for details concerning Output pulses specifications.

4.4 Configuring the Network Parameters

The network configuration is described in the Inertial Products - Network Set-up Guide document (Ref.: MU-INS&AHRS-AN-005).

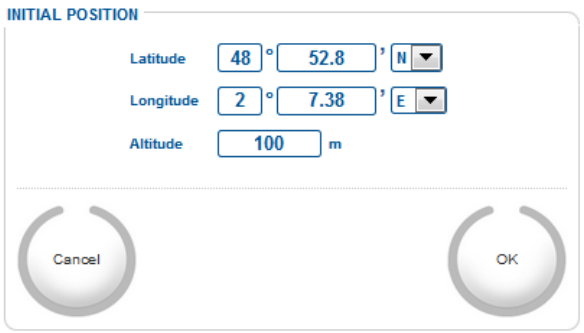
4.5 Configuring the Initial Position

This section only concerns MARINS product.

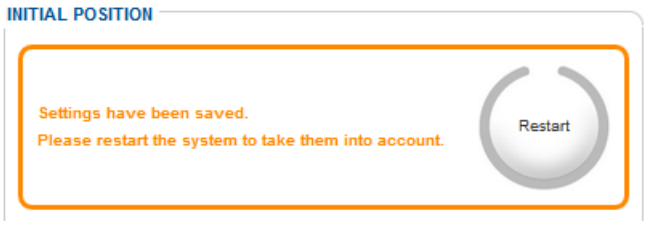
The “Initial Position” page allows you to manually enter a position that will be taken into account for the next reboot. The page automatically suggests to reboot to take the position into account.

Procedure

Step	Action
1.	**Click on the INSTALLATION** menu then **select the INITIAL POSITION** option. The Initial Position page is displayed according to the position representation (UTM or Latitude/Longitude):



2.	Enter the following parameters: • **Latitude** • **Longitude** • **Altitude**
3.	**Click on the OK button** to take this initial position into account. Then the following message is displayed:



4.	**Click on the Restart button** to restart the system.
5.	End of procedure.

5 DEFINING THE PRODUCT SETUP PARAMETERS

5.1 Configuring manually the Position

Whenever the product is started, the initial position is required. Position initialization can be performed either manually or with a GPS. Failure to input a correct initial position can generate unconsistent heading value, and algorithm failure if the actual position is too far from the entered one.

If no GPS is connected to the product, it is mandatory to enter manually the current initial position. If no GPS is connected, the manual position saved into the product PROM is used as initial position.

If a GPS is connected, valid GPS fixes can update the position during the 5-minute long alignment sequence.

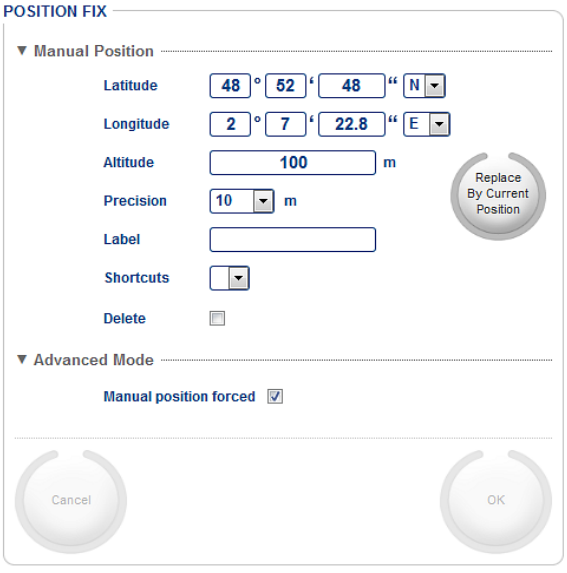
The position can be entered either in Latitude/Longitude or in UTM, depending on the currently selected option setup, see section 3.2.3.

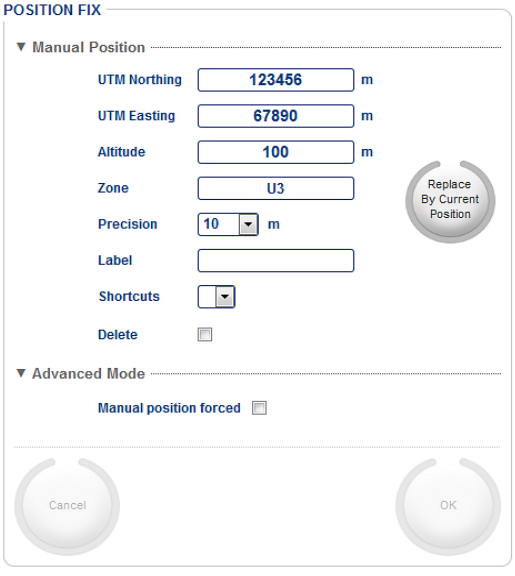
The position sent to the system is used both as an individual fix that is rejected by the Kalman as GNSS position and as the initial position for next reboot.

For Marins product the position sent to the system is used only as an individual fix that is rejected by the Kalman as GNSS position. The fix position is not saved as initial position in the memory when using the MARINS dedicated position fix page.

Procedure

Step	Action
1.	**Click on the SETUP** menu then **select the POSITION FIX** option. The position fix page is displayed according to the position representation (UTM or Latitude/Longitude)





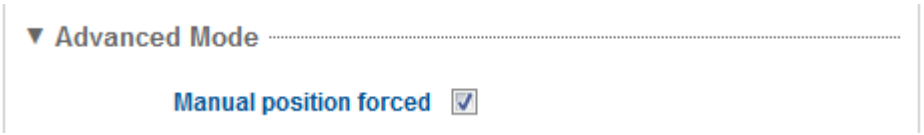
Step	Action

2. In the **Manual position** area, select or enter the following parameters:
   - For Latitude/longitude system coordinates
     - **Latitude**: Latitude in either degrees, or (degrees, decimal minutes) or (degrees, minutes, seconds) + hemisphere: **N** (North) or **S** (South)
     - **Longitude**: Longitude in degrees, or (degrees, decimal minutes) or (degrees, minutes, seconds) + **E** (East) or **W** (West)
     - **Depth**: depth in meters (for all subsea INS)
     - **Altitude** : altitude in meters (for all surface INS)
     - **Precision**: standard deviation of the position entered, to be chosen in a drop-down list
     - **Label**: defining a text label for this position allows it to be kept locally on the computer (i.e., the position is kept in a cookie)
     - **Shortcuts**: to use a position already defined and labeled
     - **Delete** box: check this box to delete the position saved with the entered label

   - For UTM system coordinates
     - UTM Northing
     - UTM Easting
     - Depth: depth in meters (for all subsea product)
     - Altitude : altitude in meters (for all surface product)
     - Zone: letter + number of the UTM zone
     - Precision: standard deviation of the position entered, to be chosen in a drop-down list
     - Label: defining a text label for this position (waypoint system) allows it to be kept locally on the PC (i.e., the position is kept in a cookie)
     - Shortcuts: to use a position already defined and labeled
     - Delete box: check this box to delete the position saved with the entered label

3. **Click on the Replace by Current Position** button: the product copies its current position in the Initial position fields.

4. **Click on the OK button** to take this update position into account and save it in the product PROM. After initial alignment, the manual position can be used to send position fixes in case no GPS is available. This information will be used by the Kalman filter to improve its position estimation.

Step	Action
5.	In the **Advanced** area, tick the **Manual position forced** box so the Kalman filter always uses the input position (the position is never rejected). When the Manual position forced is enabled, the system behaves as if the sensor value was from a manual GPS. 
6.	End of procedure.

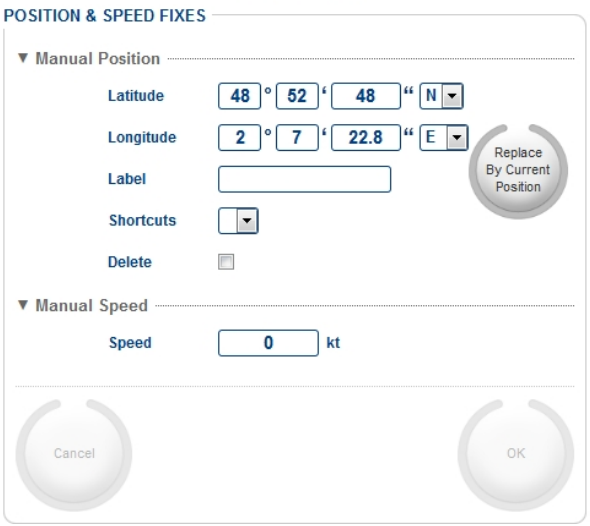
5.2 Configuring manually the Speed

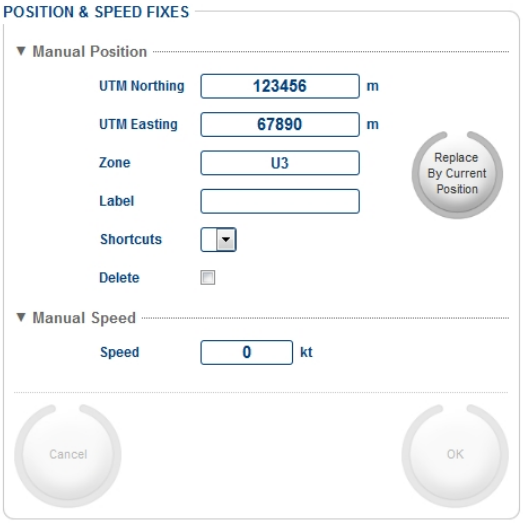
In case no EM log and no GPS are connected, a position and/or speed value can be entered manually. Note that some products do not offer this option.

Procedure

Step	Action

1. **Click on the SETUP** menu then **select the POSITION FIX** option.
   The position fix page is displayed according to the position representation (UTM or Latitude/Longitude).





2. In the **Manual Speed** area, enter a speed value in Knots. In this case, the “Manual speed” message will be displayed in the detailed status area.

3. **Click on the OK** button to save the setting.

4. End of procedure.

5.3 Configuring the Starting Mode

The starting mode can be set only for some products.

Procedure

Step	Action
1.	**Click on the SETUP** menu then **select the NAVIGATION PARAMETERS** option. The Navigation Parameters page is displayed.
2.	In the **Starting Mode** area, select the starting mode from the list.

- **Wait for position**: once powered on, the product waits for the first valid position data to start the alignment sequence. The first valid position data is used as the initial position to start the alignment.
- **Immediate Run**: the product alignment sequence starts immediately after powering-on using the input position. A valid initial position must be input manually when using this starting mode.
- **Restore position**: In this mode, the product restores the position saved during the preceding power outage then initializes the algorithm with this position. The product static alignment starts with the last known position with the default standard deviations (50m).
- **Restore attitude**: In this mode, the product restores the position and attitude saved during the preceding power outage then initializes the algorithm with these data. In this mode the static alignment is very fast as it lasts less than 30 seconds, the message 'Fast Alignment' appears in the system status of the control page. Unlike the other starting modes, the **Restore Attitude** mode is not automatic and needs a specific user action after product restart: this mode **needs to be selected during the first 5-minute alignment** phase. Both following conditions must be met:
  - ❑ The heading standard deviation saved during the preceding power outage must be inferior to 0.2°
  - ❑ The product remained static for the duration of the power outage

  The starting mode is never saved and returns to its initial configuration (i.e., Immediate run, Wait for position or Restore Attitude mode). The standard deviations are initialized as follows:
  - ❑ Position standard deviations = position standard deviations values before power outage.
  - ❑ Heading standard deviations = 1.5 x heading standard deviations value before power outage. The minimum value being 0.12°.

Step	Action
	❑ Roll and pitch standard deviations = 1.5 x roll and pitch standard deviation values before power outage. The minimum value being 0.012°.
	• **Emulation** mode: Emulation mode is an algorithm starting mode where DSP input sensor data is simulated instead of being captured from sensor board. This is useful in a demo unit where sensors are not available, but it may also be used in a real unit with sensors. Simulated sensor values will correspond to a static system at current user latitude, with a fixed heading of 45° and a roll and pitch of 0°. Once you select this mode you need to restart the product.
3.	**Click on the OK** button to save the settings.
4.	End of procedure.

5.4 Configuring the ZUPT Mode

The ZUPT mode can be set only for some products.

Important

Activation/de-activation of the ZUPT mode is performed though the Control page (refer to section 5.10).

Procedure

Step	Action
1.	**Click on the SETUP** menu then **select the NAVIGATION PARAMETERS** option. The Navigation Parameters page is displayed.
2.	In the **ZUPT Mode** area, select the ZUPT (Zero Velocity Update) mode from the list.

- **None**: no zero velocity update
- **Static 10 m/s**: the fake sensor is sending to the product a speed value of 0 m/s with a standard deviation of 10 m/s. The acquisition mode is « Always True » which means that the product will always consider this information valid. The ZUPT flag will always be valid. This mode can be set when the product is used as a gyrocompass and no external aiding sensor are connected (i.e., GPS).
- **Static 0.1 m/s**: the fake sensor is sending to the product a speed value of 0 m/s with a standard deviation of 0.1 m/s. The acquisition mode is « Always True » which means that the product will always consider this information valid. The ZUPT flag will always be valid.
- **Autostatic:** the fake sensor is sending to the product a speed value of 0 m/s with a standard deviation of 0.01 m/s. The product will exit this mode if the measured rotation rate of any gyro is greater than 10°/h or if the product computed speed is greater than the product computed speed standard deviation. In this case the ZUPT flag will change from valid to invalid.
- **Autostatic Bench**: the fake sensor is sending to the product a speed value of 0 m/s with a standard deviation of 0.01 m/s. An additional constraint here is that heading, roll and pitch are assumed to be constant. The product will exit this mode if the measured rotation rate (compensated from earth rotation) of any gyro is greater than 0.7°/h or if the product computed speed is greater than the product computed speed standard deviation. This mode is restricted to very stable environment (i.e., internal calibration on turn table, alignment on bench for check-up tests).

Step	Action
	• **Position**: the fake sensor is sending to the product no displacement in the three axis with a standard deviation of 0.1 m in the navigation frame. The acquisition mode is « Always True » which means that the product will always consider this information valid. The ZUPT flag will always be valid. It is recommended to restrict the use of a Zero Velocity Update Mode to configurations when no external sensor is available. After a Zero Velocity Update sequence, it is highly recommended to deactivate the Zero Velocity Update mode.
3.	**Click on the OK button** to save the settings.
4.	End of procedure.

5.5 Configuring the Altitude Computation Mode

The altitude computation mode can be set up only for some products.

The estimation of altitude (depth for subsea product) cannot be done by free inertial means: the error would increase exponentially.

The altitude/depth of the product is stabilized (either by external sensor data or artificially) to prevent this exponential growth of the altitude/depth error. The stabilization of the product altitude/depth is configured with the altitude computation mode.

Procedure

Step	Action
1.	**Click on the SETUP** menu then **select the NAVIGATION PARAMETERS** option. The Navigation Parameters page is displayed.
2.	In the **Altitude Mode** area, select the Altitude mode from the list. The number of modes depends on the product.

- **Stabilization:** The stabilization mode is selected when the update of the mean altitude is not needed and the altitude drift to be avoided during long GPS drop-outs (i.e., Military navigation application).

  In this mode, the altitude drift will be maintained small around a mean value by filtering out the low frequency components of the altitude variation computed by the INS. The mean value is the manually entered initial altitude or the current altitude if the mode is changed during operation.

- **GPS:** In this GPS altitude mode product will use GPS altitude and vertical speed (i.e., DVL) to compute altitude. GPS altitude mode is used, when altitude is used and product is interfaced with a stand-alone or differential GPS.

  In navigation mode, GPS data is filtered by the product algorithm. The product will use the quality factor in the GGA telegram to evaluate the reliability of the GPS position. Refer to GPS input protocol description in the INS Interface Library document (Ref.: MU-INSIII-AN-001).

  If the GST telegram is received, the product will use this data instead of the quality factor. This quality factor information will be used to reject GPS spikes, resulting in smooth position data. The smaller the standard deviation (STD) on altitude is, the better the spike rejection will be and the product computed altitude will follow more closely the GPS altitude.

  If the GPS signal is lost (i.e., under a bridge), and no 3D-speed sensor is received, the altitude drift will be maintained small around a mean value by filtering out the low frequency components of the altitude variation computed by the INS.

Step	Action

The mean value is the value of the INS when the last valid aiding measurement was received.

The product will exit stabilization as soon as altitude STD and vertical speed STD are within a given criteria. This will happen when GPS is back on and valid.

- **Hydrography**: This hydrography mode is meant to be used solely with RTK GPS. In this case, the goal is to reject GPS mode jumps that are associated to poor altitude fixes and will degrade product altitude computation (i.e., multibeam imagery in Hydro application). The altitude is the combination of GPS altitude mode with an added feature of quality mode rejection. In this mode product will use GPS altitude and vertical speed (i.e., DVL) to compute altitude. It operates in the following manner:

  If the GST telegram is received, altitude standard deviation is retrieved in the datastring. If not, the quality factor in the GGA telegram is converted in altitude standard deviation (STD).

  For Q = 4 (RTK), altitude STD = 0.3 m by default. If Q=4 (mode RTK) then the GPS altitude in GGA string is used by the product to compute height. Otherwise it is not. When this condition is not met (i.e., Q = 0, 1, 2, 3, 5, 6) the product will stabilize the altitude to the last valid valueProduct will exit stabilization as soon as altitude STD and vertical speed STD are within given criteria. This will happen in practice when GPS is back to mode 4 (RTK). If GPS is lost (i.e., under a bridge), the same altitude stabilization applies.

  Note: the filtering of the GPS altitude based on the mode will apply only after a first data with Q=4 has been received. Which means that at startup, as long as as no RTK GPS has been received, the system will take any GPS data.

- **Depth**: In this mode (only available on specific product), depth is computed using subsea positioning system depth (i.e., USBL, depth sensor) and vertical speed (i.e., DVL). If a depth sensor is available, ZUSBL is not used to avoid using noisy Z data. As long as underwater sensor depth is available, the product filters this information based on sensor standard deviation. In case of sensor drop-out, if no 3D speed sensor is received, the depth value is stabilized around the last value received as in stabilization mode, until sensor data becomes available again.

  In all these modes, the default altitude output by the product is the mean sea level altitude (MSL). Ellipsoid WGS84 height can also be selectable from the Web-based User Interface (Advanced Settings area in the output parameters, see section 4.3.1).

3. Click on the **OK** button to save the settings.

4. End of procedure.

The following table can be used to select appropriate altitude mode for each configuration:

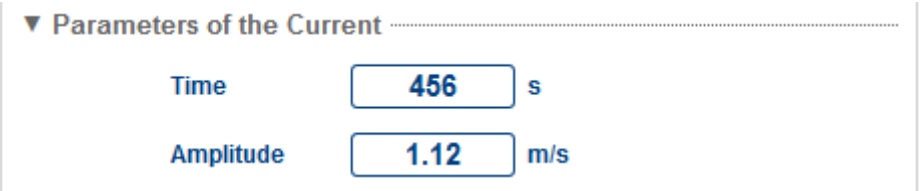
Altitude	Naval/Surface	Subsea
Acurate	Hydrography	Depth
Smooth	GPS	
Not necessary	Stabilization	Stabilization

5.6 Configuring the Current Parameters

The product automatically estimates the current when using a Log Sensor in water track mode together with either a GPS or a Log Sensor in bottom track mode.
Water track mode should be configured before using with the following parameters:

- The correlation **Time** of current variation
- The maximum Amplitude of current variation

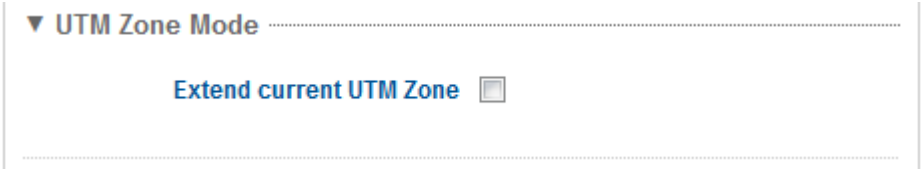
Procedure

Step	Action
1.	**Click on the SETUP** menu then **select the NAVIGATION PARAMETERS** option. The Navigation Parameters page is displayed.
2.	In the **Parameters of the Current** area, enter the following parameters.  • Time: correlation time of current variation • Amplitude: maximum amplitude of current variation These two parameters allow the product to deal with GPS or bottom track data input interruption. When in water track mode, the product estimates the current as long as the data from the GPS or from the Log Sensor bottom track are valid. When GPS or bottom track data is no more valid, the product updates the water current estimate using previous estimates together with these two parameters. The correlation time sets the time when the product current estimate is reliable with an uncertainty equal to the set maximum amplitude of current variation. As an example, the settings **Time** = 3600 s and **Amplitude**=3 m/s assume that the current estimate after one hour (=3600 s) in water track mode without GPS or Log input has an uncertainty of 3 m/s. The recommended default parameter is 0.5 m/s in 3 h (3 x 3 600 = 10 800 s)
3.	**Click on the OK** button to save the settings.
4.	End of procedure.

5.7 Activating the Extension of the UTM Zone

A check box allows the user to extend the current UTM zone to keep linear UTM coordinates and to avoid automatic zone computation as done by the product in standard mode.

Procedure

Step	Action
1.	**Click on the SETUP** menu then **select the NAVIGATION PARAMETERS** option. The Navigation Parameters page is displayed.
2.	In the **UTM Zone Mode** area, tick the **Extend current UTM** zone box.  Product continues to give UTM position referring to the original zone, even if the vehicle has over-passed the bounds of the original area.
3.	**Click on the OK** button to save the settings.
4.	End of procedure.

5.8 Enabling and configuring the Advanced Position Filtering

The Advanced Position Filtering page is available only for some products.

Important

The Advanced Position Filtering must be enabled and configured at the product installation and with the help of iXBlue support.

Procedure

Step	Action

1. **Click on SETUP** menu then **select ADVANCED POSITION FILTERING** option. The following page is displayed.

2. **To enable the Advanced Position Filtering**, click on the parameter until displaying **ON**.

Some parameters are displayed with default values.

To restore the default values, click on **Default values** button.

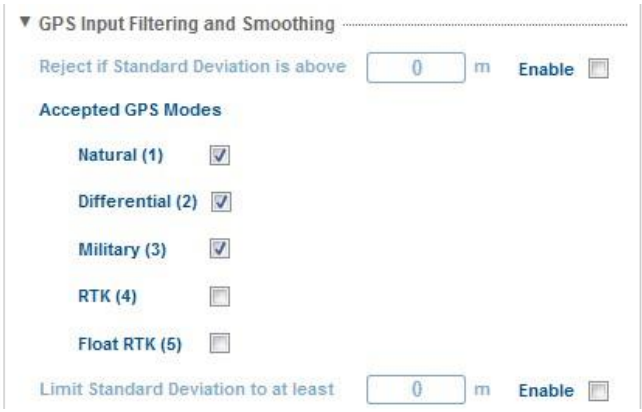
Step	Action

3. **Select the Position Input Priority** in order to declare which position sensor has highest priority between the following choice: GPS, USBL, none.

For example if USBL is selected only USBL data will be taken into account at INS input. If USBL data is lost for a timeout greater than 60 s (drift < 0.8 m in Pure inertial for PHINS) then GPS data is taken into account. As soon as USBL data is present at input it is taken into account in an exclusive manner. In any case if several USBL beacons and several GPS are configured at INS input the rule applies to any of these position data.

- **GPS**: exclusive priority to GPS sensor.
- **USBL**: exclusive priority to USBL sensor.
- **None**: no exclusive priority.

4. **Enable the GPS Input Filtering and Smoothing parameters** to optimize the position rejection and the GPS positions smoothing.



- Tick the Enable box next to **Reject if Standard Deviation is above** parameter in order to reject the position if the standard deviation is strictly greater than the entered value from 0.01 m to 100 m.
- **Select the Accepted GPS modes**, one or several modes can be selected. This parameter allows you to define the quality factor values accepted by the INS at GPS input. For any other value GPS data is rejected.
- Tick the Enable box next to **Limit Standard Deviation to at least** parameter then enter the value from 0.01 m to 100 m. This is the minimum value of the GPS standard deviation to optimize the smoothing position.

Step	Action

For example if user enters a value of 10 m and standard deviation on position in GPS telegram is 0.3 m then the value taken into account by INS will be 10 m. If value in the GPS telegram is > 10 m the GPS telegram value is taken into account. By increasing this value smoothing will be improved but risk is greater to accept GPS fix that could be to far from true position. Trade-off needs to be found.

5. **Enable USBL input filtering and smoothing parameters** to optimize the position rejection and the USBL positions smoothing.

- Tick the Enable box to enable the **Reject if Standard Deviation is above parameter** then enter the value from 0.01 m to 100 m in order to set the level of USBL pre-filtering on the criteria of an input position standard deviation strictly greater than a chosen setting value. For example if the setting is 0.3 m and the x, y position standard deviation in the USBL telegram is > 0.3 m the position is rejected by the INS.
- Tick the Enable box to enable the **Limit Standard Deviation to at least t**o optimize position smoothing of USBL position when USBL is coupled to INS, then enter a minimum position standard deviation associated to input USBL position data in the input field range: 0.01 m to 100 m. For example if user enters a value of 10 m and standard deviation on position in USBL telegram is 0.3 m then the value taken into account by INS will be 10 m. If value in the USBL telegram is > 10 m the USBL telegram value is taken into account. By increasing this value smoothing will be improved but risk is greater to accept USBL fix that could be to far from true position. Trade-off needs to be found.

6. **Enter adjustment of EM LOG input speed standard deviation** to set the input standard deviation value associated to the EM LOG by setting a value in input field range from 0.01 m to 100 m.

- **Longitudinal Speed Input Standard Deviation**, value from 0.01 m/s to 100 m/s.
  By reducing the EM LOG standard deviation value, more confidence is associated to the sensor data which will in turn improve the Shuler oscillation filtering on speed data in pure inertial navigation.
  The chosen value should be as close as possible to the real speed standard deviation of the EM LOG used. In doubt default value should be set.

Step	Action

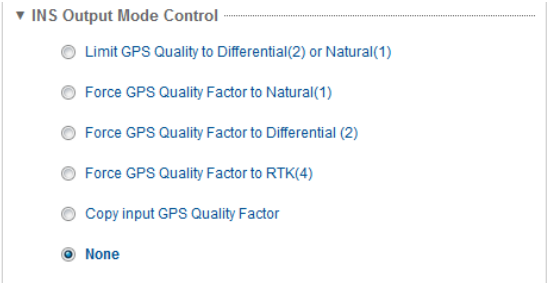
7. **Enter adjustment of DVL input speed standard deviation** to set the speed standard deviation associated to input data in the input field range: [0.01 m/s to 10 m/s]. This applies to all input protocols with Water speed and Bottom speed associated to DVL input. If input protocol sends speed standard deviation (i.e: IXSEA AUV) then the setting does not apply.

- **Bottom Speed Input Standard Deviation,** value from 0.01 m/s to 10 m/s, default value is 0.2 m/s.
- **Water Speed Input Standard Deviation**: default value is 0.5 m/s.
  Standard deviation on speed should be set as close as possible to real speed standard deviation of the sensor. This depends on DVL technology (i.e: doppler, correlation...) and application. For example for ROV navigation with an RDI WorkHorse DVL, bottom speed input standard deviation can be set to 0.05 m/s. Reducing the DVL SD, will improve navigation accuracy and position smooting in the case USBL data is also coupled to INS. If Speed data is rejected by INS, the SD value should be increased. In doubt default value should be set.

8. **Enter adjustment of Input depth standard deviation** to set the input standard deviation value associated to the depth by setting a value in input field range from 0.01 m to 100 m. This applies to all protocols that send a depth value at INS input for depth sensor input. If input protocol sends depth standard deviation (i.e: IXSEA AUV) then the setting does not apply.

- **Depth Input Standard Deviation,** value from 0.01 m to 100 m: default value is 1 m.

9. **Select INS output mode control** to control the position output quality factor or force the output quality factor value sent in the GGA string at INS output. This is only applied when INS is coupled to an external sensor.



Step	Action

- **Limit GPS quality to Differential (2) or Natural (1)**
- **Force GPS quality factor to Naturel (1)**
- **Force GPS quality factor to Differential (2)**
- **Force GPS quality factor to RTK (4)**
- **Copy input GPS quality factor:** when both GPS1 and GPS2 are received, the better quality factor (valid) is used.
- **None**

If the following mode “Limit GPS quality to Differential (2) or Natural (1)”, the following table applies:

INS output table		
SD (m)	Q	After Q limitation
< 0.1	4	2
< 0.3	5	2
< 3	2	2
< 10	1	1
>=10	6	1

For example if calculated INS position SD is < 0.1 m then quality factor output in GGA telegram will be set to Q=2.

10. **Click on OK button** to save the settings.

11. End of procedure.

5.9 Managing the Warning

According to the various sensors connected and the parameters chosen for your mission, you can be informed or not (**Do nothing** option) in case of:

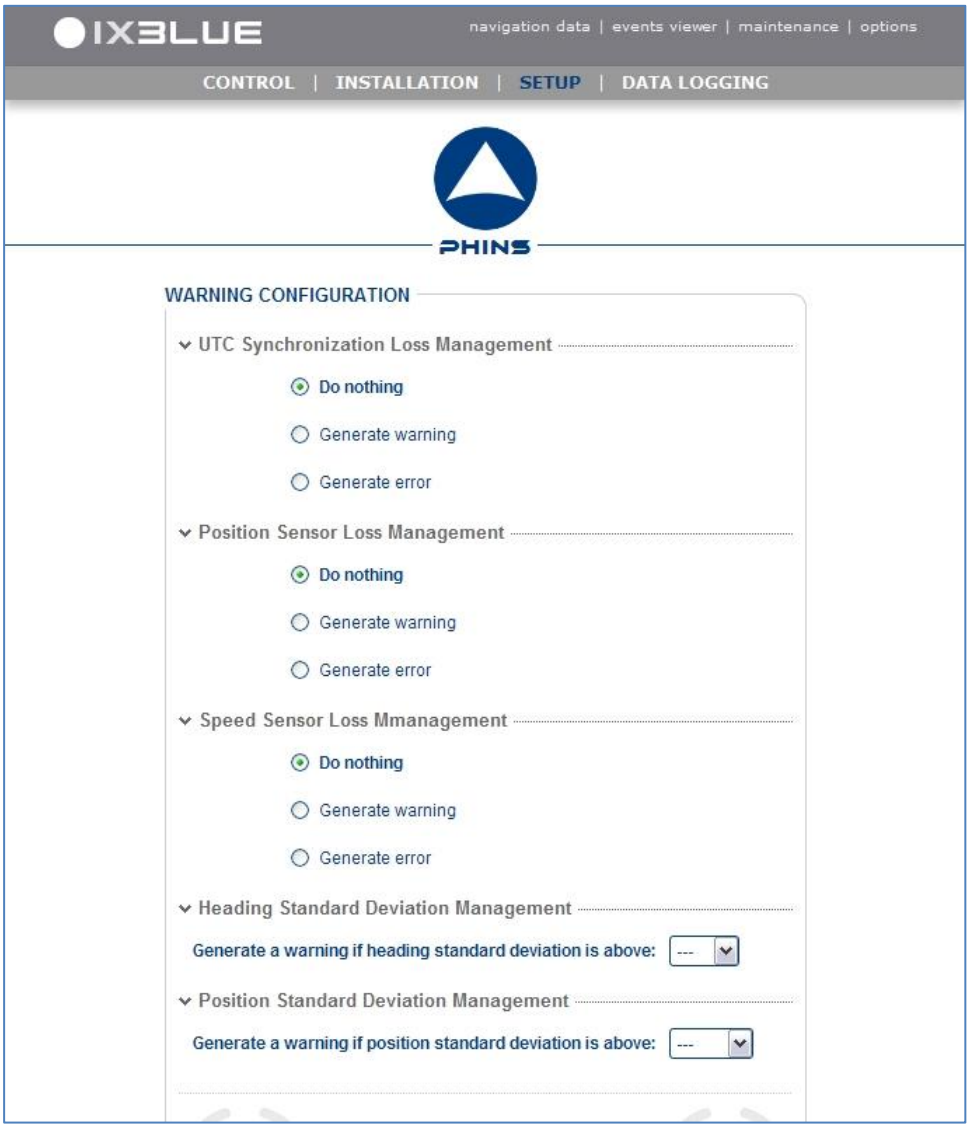
- Loss of UTC synchronization (UTC time or PPS lost)
- Loss of one position sensor (configured and activated)
- Loss of one speed sensor (configured and activated)
- Increase of the heading and/or position standard deviation (only for some products)

In case of warning (**Generate warning** option) or in case of error (**Generate error** option) some messages will be displayed.

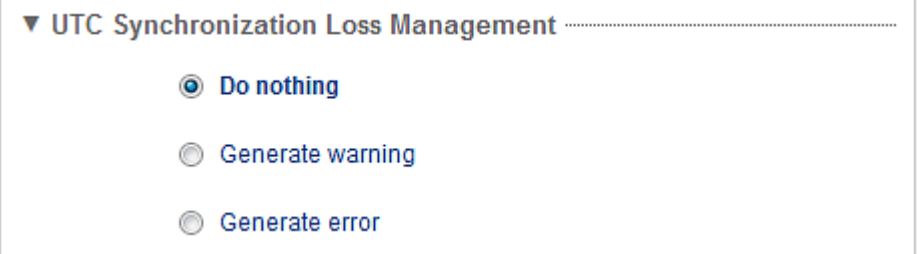
Procedure

Step	Action

1. **Click on the SETUP** menu then **select the WARNING CONFIGURATION** option. The following page is displayed.



Step	Action
2.	**For the UTC synchronization**, **decide whether or not to be informed** in case of UTC synchronization loss (UTC time or PPS lost) by clicking on the corresponding check box:



3.	**For the external sensor connected**, decide whether or not to be informed in case of synchronization loss of the position and/or speed data by clicking on the corresponding check box:

4.	To generate warnings concerning the standard deviation of the heading and position, you have to select, in a drop-down list, the thresholds from which warning will be generated:

5.	Click on the **OK** button to save the settings.
6.	End of procedure.

5.10 Enabling the External Sensors and/or ZUPT Mode

External sensor activation

The product receives data from external sensors. These data are displayed in the Navigation data (refer to section 6.4). External sensor data is used to get external input of position and/or speed into the product.

In order to prevent corrupted external data to degrade the estimation of the product, external sensor data pass through a rejection filter before being incorporated into the product main computation and Kalman filter.

Except for QUADRANS, for each sensor, you can decide to no longer take into account these sensor data into the product Kalman filter by setting their activation to OFF value.

Ticking the **Forced mode** box in the sensor configuration causes the incoming sensor data to bypass the rejection filter and directly feed the Kalman filter. Otherwise, sensor data can be rejected when the filter deems it inconsistent with current inertial navigation data. When **Forced mode** is selected, it is impossible for the user to enable/disable the related sensor from the **CONTROL** page.

ZUPT mode activation

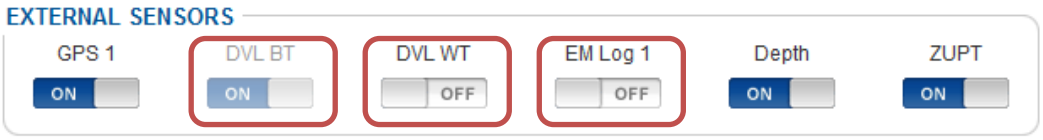
Zero velocity update modes may be used when the product is kept static without any external sensor connected. In this mode, fake speed information is input to the product in order to improve the estimation of attitude and heading and to prevent the estimated position and speed from drifting.

For all products that offer ZUPT modes, enabling/disabling the ZUPT mode is performed through the EXTERNAL SENSORS area on the CONTROL page.

Important

If an external sensor is set in Forced mode, the related ON/OFF button is inactive and no action is possible on this button.

In this case the sensor data will be always taken into account by the product Kalman filter.



Procedure

Step	Action
1.	Click on the logo. The following page is displayed.

2.	**To enable the external sensor**, click on the parameter of the desired external sensors(s) **until displaying ON**.

The sensor data will be used by the Kalman filter).

3.	**To disable the external sensor**, click on the parameter of the desired external sensors(s) **until displaying OFF**. The sensor data is no more used by the product Kalman filter.
4.	**To enable the ZUPT mode** click on the ZUPT parameter until displaying ON. 
5.	**To disable the ZUPT mode** click on the ZUPT parameter until displaying OFF. 
6.	End of procedure.

5.11 Saving/Loading the Product Settings

The product configuration can be saved into a text file. Alternatively, the saved configuration can be restored on the product.

The default location of the product settings file is defined by your Web browser options (**Downloads** folder).

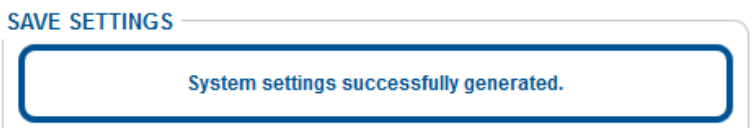
The name of the product settings file is `Settings_product_xxxx-zzz_yymmdd.txt` where:

- "product" is the name of your product (i.e., PHINS/ROVINS/PHINS_6000/HYDRINS /MARINS/AIRINS/QUADRANS/QUADRANS/MARINS_EXPORT)
- `xxxx-zzz` is the product serial number
- `yymmdd` is the creation date of the settings file (year-month-day)

The configuration file can be opened with any notepad software.

5.11.1 SAVING THE SETTINGS

Procedure

Step	Action
7.	**Click on the SETUP** menu then **select the SETTINGS MANAGEMENT** option. The following page is displayed. 
8.	In the **SAVE SETTINGS** area, click on the **Save Settings** button. A window is displayed to save the file.
9.	Click on ok to save the file. The files is saved in the default location for downloads of your WEB Browser and the following message is displayed: 
10.	End of procedure.

5.11.2 LOADING THE SETTINGS

Procedure

Step	Action
1.	**Click on the SETUP** menu then **select the SETTINGS MANAGEMENT** option. The following page is displayed. 
2.	In the **LOAD SETTINGS** area, browse to find the settings file to be loaded by clicking on the **Browse…** button, then select the file.
3.	**Click on the Load Settings** button to load the file. The product settings previously saved are now restored on the product.
4.	End of procedure.

5.12 Enabling the Simulation Mode

When the **simulation mode** is enabled, all DSP computed data from the interface board is ignored and replaced by simulated values.
Each simulated value is directly entered under the **SIMULATION PARAMETERS** area. Thus the Web-based User Interface and all output protocols will output simulated values instead of live ones.

Important

The simulation mode can be used during customer protocol debug and to check installation repeaters on ship.

Simulated parameters

Depending on the product, the list of simulated parameters may be shorter. The list below details all parameters that can be simulated (refer to Table 4 to know the range and step value of each simulated parameter):

- Heading, roll and pitch and associated standard deviations
- Main lever arm position (latitude, longitude and altitude/depth) and associated standard deviations
- Linear speeds and associated standard deviations
- Heave, surge and sway
- Rotation rates
- Accelerations
- Accelerations in body frame
- Statuses: sensor and algorithm statuses

A simulated sensor status (default to 0) will allow dummy system (without FOG and ACC) to run without having sensor error flags raised in the Web-based User Interface.

The system outputs heading, roll and pitch and linear speeds as configured sinus signal, defined by the following equation:
Value(t)=Mean+((Amplitude peak-peak)/2)*sin(2*π*t/Period)
Where Mean, Amplitude peak-peak and Period are to be entered in the simulation page.

Table 5 – list of product output parameters in simulation mode

Product output parameters	Name and location in simulation page	Range[7]	Step
HEADING (4)	Attitude / Heading (°)	0 to 360	0.001
Mean value	Heading / Mean (°)	0 to 360	0.001
Period	Heading / Period (s)	0 to 100	0.001
Amplitude	Heading / Amplitude (°)	0 to 360	0.001
ROLL	Attitude / Roll (°)	-180 to +180	0.001
Mean value	Attitude / Roll / Mean (°)	-180 to +180	0.001
Period	Attitude / Roll / Period (s)	0 to 100	0.001
Amplitude	Attitude / Roll / Amplitude (°)	-180 to +180	0.001
PITCH	Attitude / Pitch (°)	-90 to 90	0.001
Mean value	Attitude / Pitch / Mean (°)	-90 to 90	0.001
Period	Attitude / Pitch / Period (s)	0 to 100	0.001
Amplitude	Attitude / Pitch / Amplitude (°)	-90 to 90	0.001
HEADING STD	Attitude Std. Dev./ Heading Std. Dev. (°)	0.01 to 5	0.01
ROLL STD	Attitude Std. Dev./ Roll Std. Dev. (°)	0.01 to 5	0.01
PITCH STD	Attitude Std. Dev./ / Pitch Std. Dev. (°)	0.01 to 5	0.01
HEADING RATE [1]	Rotation rates / Heading rate (°/s)	-750 to 750	0.001
ROLL RATE (1)	Rotation rates / Roll rate (°/s)	-750 to 750	0.001
PITCH RATE [1]	Rotation rates / Pitch rate (°/s)	-750 to 750	0.001
ROTATION RATES XV1 [1]	Rotation rates / Roll rate (°/s)	-750 to 750	0.001
ROTATION RATES XV2 [1]	Rotation rates / Pitch rate (°/s)	-750 to 750	0.001
ROTATION RATES XV2 [1]	Rotation rates / Heading rate (°/s)	-750 to 750	0.001
DELAYED HEAVE	**N/A**	**N/A**	**N/A**
HEAVE	Heave, Surge, Sway / Heave (m)	-10 to 10	0.01
SURGE	Heave, Surge, Sway / Surge (m)	-10 to 10	0.01
SWAY	Heave, Surge, Sway / Sway (m)	-10 to 10	0.01
HEAVE SPEED [2]	Linear speed / XV3 (m/s)	-250 to 250	0.01
SURGE SPEED [2]	Linear speed / XV1 (m/s)	-250 to 250	0.01
SWAY SPEED [2]	Linear speed / XV2 (m/s)	-250 to 250	0.01
ACCELERATION XV1	Acceleration / XV1 or North Acceleration (m/s^2)	-300 to 300	0.01
ACCELERATION XV2	Acceleration / XV2 or East Acceleration (m/s^2)	-300 to 300	0.01
ACCELERATION XV3	Acceleration / XV3 or Vertical Acceleration (m/s^2)	-300 to 300	0.01
DATE OF DATA	**Computed**	**N/A**	**N/A**
TIME STAMP OF DATA	**Computed**	**N/A**	**N/A**
LATITUDE	Position / Latitude (°)	-90 to 90	0.000001
LONGITUDE	Position / Longitude (°)	0 to 360	0.000001
ALTITUDE or DEPTH	Position / Altitude (m)	-15000 to 15000	0.001
LATITUDE STD	Position Std. Dev. / Latitude Std. Dev. (m)	0.01 to 500	0.01
LONGITUDE STD	Position Std. Dev. / Latitude Std. Dev. (m)	0.01 to 500	0.01
ALTITUDE STD	Position Std. Dev. / Altitude Std. Dev. (m)	0.01 to 500	0.01
SPEED XV1 [2]	Linear speed / XV1	-250 to 250	0.01
Mean value	Linear speed / XV1 / Mean (m/s)	-250 to 250	0.01

Product output parameters	Name and location in simulation page	Range[7]	Step
Period	Linear speed / XV1 / Period (s)	0 to 100	0.01
Amplitude	Linear speed / XV1 / Amplitude (m/s)	-250 to 250	0.01
SPEED XV2 [2]	Linear speed / XV2	-250 to 250	0.01
Mean value	Linear speed / XV2 / Mean (m/s)	-250 to 250	0.01
Period	Linear speed / XV2 / Period (s)	0 to 100	0.01
Amplitude	Linear speed / XV2 / Amplitude (m/s)	-250 to 250	0.01
SPEED XV3 [2]	Linear speed / XV3	-250 to 250	0.01
Mean value	Linear speed / XV3 / Mean (m/s)	-250 to 250	0.01
Period	Linear speed / XV3 / Period (s)	0 to 100	0.01
Amplitude	Linear speed / XV3 / Amplitude (m/s)	-250 to 250	0.01
NORTH SPEED [2]	Linear speed / XV1 (m/s)	-250 to 250	0.01
EAST SPEED [2]	Linear speed / XV2 (m/s)	-250 to 250	0.01
VERTICAL SPEED [2]	Linear speed / XV3 (m/s)	-250 to 250	0.01
NORTH SPEED STD	Speed Std. Dev. / North Std. Dev. (m/s)	0.01 to 10	0.01
EAST SPEED STD	Speed Std. Dev. / East Std. Dev. (m/s)	0.01 to 10	0.01
VERTICAL SPEED STD	Speed Std. Dev. / Vertical Std. Dev. (m/s)	0.01 to 10	0.01
SPEED NORM [3]	**Computed**	**N/A**	**N/A**
TRUE COURSE [4]	Attitude / Heading (°)	0 to 360	0.001
LONGITUDINAL SPEED NORM [5]	**N/A**	**N/A**	**N/A**
SYSTEM STATUS 1 [6]	**Computed**	**N/A**	**N/A**
SYSTEM STATUS 2 [6]	**Computed**	**N/A**	**N/A**
SENSOR STATUS 1 [6]	**N/A**	**N/A**	**N/A**
SENSOR STATUS 2 [6]	Status / Sensor	**N/A**	**N/A**
ALGO STATUS 1 [6]	Status / Algo	**N/A**	**N/A**
ALGO STATUS 2 [6]	**Computed**	**N/A**	**N/A**
USER STATUS	**Computed**	**N/A**	**N/A**

(1) Rotation rate inputs of the simulation page will be used as both Heading Roll Pitch rates and body rotation rates to limit the number of inputs in the page.

(2) Linear speed inputs of the simulation page will be used as geographical speeds, body speeds and heave, surge and sway speeds to limit the number of inputs in the page.

(3) Speed norm is computed as $\text{sqrt}(VN^2+VE^2)$

(4) True course value will be assigned the input heading value

(5) The Longitudinal speed norm is only used by the Posidonia protocol and will be replaced by speed norm. This output data will thus no longer be available in output protocols.

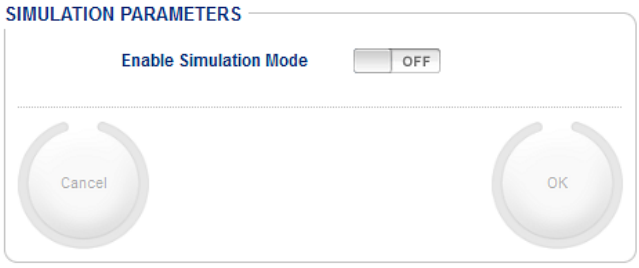
(6) Status can be assigned with predefined values via check box and list box

(7) Limitations were chosen using Inertial system limitations. Output resolutions correspond to a “dual use” product. The saturation levels (altitude/depth, speed, rotation rate, acceleration) are the maximum encountered on our products.

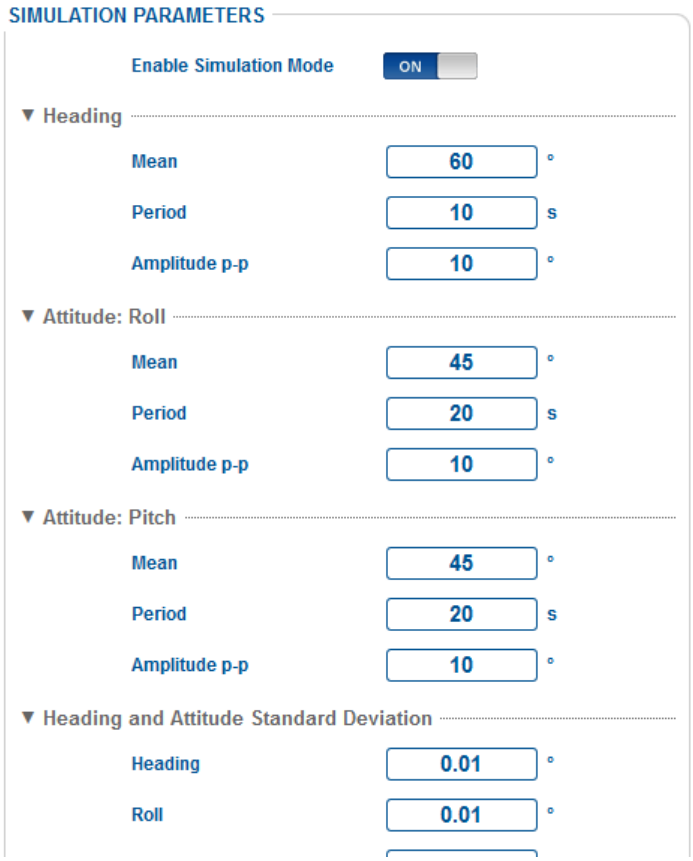
Procedure

Step	Action

1. **Click on the SETUP** menu then **select the SIMULATION MODE** option. The following page is displayed:



2. In the **SIMULATION PARTAMETERS area,** click on the Enable Simulation mode switch **until displaying ON**. Then the page is displayed completely as below:



3. **Enter and/or notch the parameters** to be simulated.

4. **Click on the OK button** to save the settings. The message “simulation mode” is displayed in the Status area of the control page to warn that the system output data is not lived.

5. End of procedure.

To disable the simulation mode, unselect the **Enable Simulation Mode** option then click **OK**. The protocol outputs the real data and the interface too.

5.13 Managing the Passwords

A password management mechanism has been integrated to the Web-based User Interface to avoid unexpected device parameter changes.

Important

Only the administrator can manage the passwords.

This feature is available only on the product products based on the kernel version: QNX v2.13 or higher. Refer to section 7.1 to check the versions currently downloaded into your unit.

Three different user roles can be selected to manage security access:

- **Navigator**: the navigator can only view the system computed data by taping in the address bar of the web browser the following link:
  http://192.168.36.1xx/control_expertview/
  xx being the two last numbers of the product serial number.
- **Operator**: the operator can view the system computed data and control basic system settings, but is not allowed to change the mechanical or installation settings.
- **Administrator**: the administrator can view and modify all system parameters and can also perform maintenance tasks such as system upgrades (firmware updates).

The list of the access rights per role is defined in Table 6.

Table 6 - Access rights for each security role

	Administrator	Operator	Navigator
Control page	✓	✓	×
Navigation data page	✓	✓	✓
Options page	✓	✓	×
Position fix	✓	✓	×
Navigation parameters	✓	✓	×
Data logging page	✓	✓	×
Events Viewer page	✓	✓	×
Mechanical Installation page	✓	×	×
Input setting page	✓	×	×
Output setting page	✓	×	×
Network setting page	✓	×	×
Maintenance page	✓	×	×
DVL calibration page	✓	×	×
Warning configuration page	✓	×	×
Configuration management page	✓	×	×
Advanced position filtering page	✓	×	×

Activation rules

Access control is disabled by default. The administrator will need to configure passwords to activate security mechanisms in the dedicated password setup page (see procedure below).

Passwords are activated page by page. Once activated, you will be asked to log in before the page can be displayed.
Navigator and Operator passwords cannot be created if the administrator password does not exist.
When only an administrator password is defined, any user can freely connect to the system and use it as an operator, so long as he does not access the administrator restricted pages, where a login is required.
If an operator/navigator password is set, you will need to login before being able to use the system as an operator/navigator. The login page asks for both role and password.
Once an access control has been granted, it remains valid until the browser is closed or the browser cache is cleaned (the password session time management depends on the browser options).

Operator/ Navigator

If the operator or navigator user cannot remember its password or if he wants to modify it, he should ask to the administrator to change it.

Administrator

If the administrator has lost the administrator password: refer to the Advanced Configuration document (Ref.: MU-INSIII-AN-004).

Important

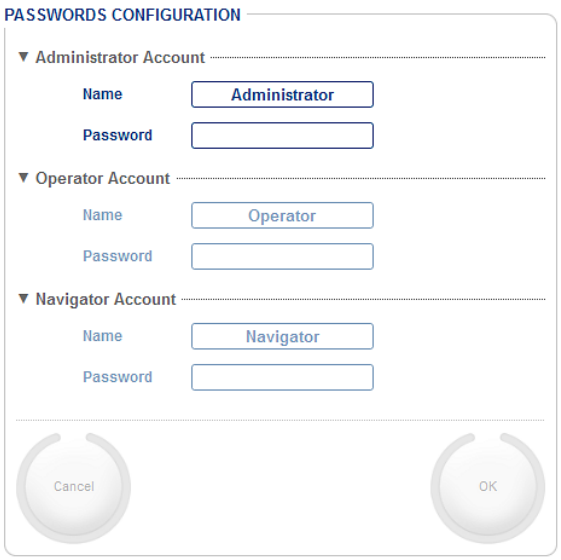
To log out the web-based interface, press **Ctrl**+**Shift**+**Del** keys in order to delete the browser history. Then the next user must press the F5 function key to load the page again and to get the password input window relative to his user role.

Important

The password shall contain only alpha-numeric characters.
The length of the password shall be 15 characters maximum, and shall be a multiple of 3.
If those constraints are not fulfilled, the product will require a password reset as it is described in the INS-Advanced Configuration document (Ref.: MU-INSIII-AN-004).

Procedure

Step	Action
1.	**Click on the SETUP** menu then **select the PASSWORDS** option. The following page is displayed.



2.	First, configure the **Administrator Account by entering** a **Name** (login) then a **password** (15 alphanumerical characters maximum). Enter the Administrator password again to confirm it in the Confirmation text box.
3.	**Click on the OK button** to save the settings.
4.	**If needed**, configure the **Operator Account by entering** a **Name** (login) then a **password** (15 alphanumerical characters maximum). Enter the Operator password again to confirm it in the Confirmation text box.
5.	**Click on the OK button** to save the settings.
6.	**If needed**, configure the **Navigator Account by entering** a **Name** (login) then a **password** (15 alphanumerical characters maximum). Enter the Navigator password again to confirm it in the Confirmation text box.
7.	End of procedure.

6 MONITORING THE Product OPERATION

6.1 Enabling the Quay Mode

The quay mode can be enabled to freeze the EM log speed. It must be disabled before sailing.

Important

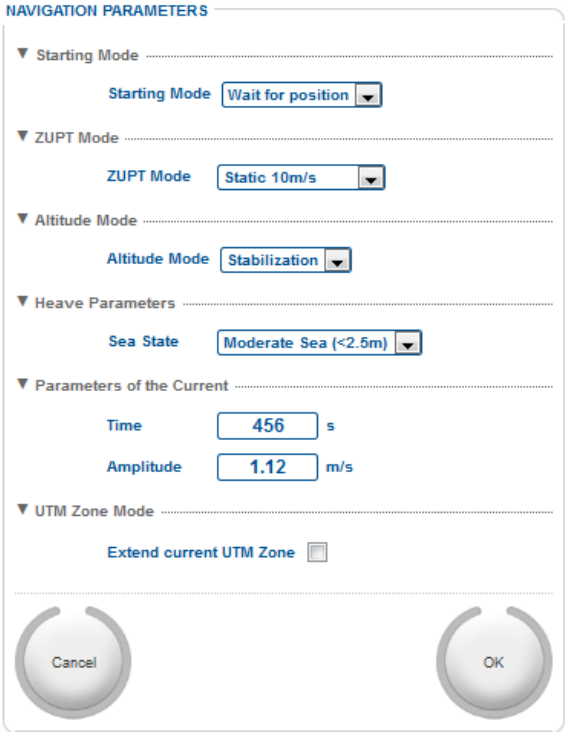
Before sailing, do not forget to disable the quay mode:

1- Before leaving the quay, switch zupt off on the control page.

2- After leaving the harbor, switch em log on.

Procedure

Step	Action
1.	**Click on the SETUP** menu then **select the NAVIGATION PARAMETERS** option. The following page is displayed.



2.	Select **Static 10 m/s** in the ZUPT mode.
3.	Click on the **OK** button to save the settings.
4.	Click on the **CONTROL** menu then click on the logo if needed.
5.	In the **EXTERNAL SENSORS** area, **switch EM Log OFF** then **switch ZUPT ON**.

6.	End of procedure.

6.2 Monitoring the Product Settling Time

For more information about the start-up procedure, refer to Principle & Conventions document (Ref.: MU–INS&AHRS–AN–003).

6.2.1 PRODUCT START

The product starts 10 s after powering on (there is no ON/OFF switch).
During this phase in the **CONTROL** page (see Figure 4):

- No data is displayed
- The logo flashes

Figure 4 - Web-based User Interface during the start phase

6.2.2 PRODUCT ALIGNMENT

The alignment process starts according to the **Starting mode** saved into PROM (refer to section 5.3).

- In case of “Restore attitude” starting mode, the product restores the position and attitude saved during the preceding power outage then initializes the algorithm with these data.

  In this mode the static alignment is very fast as it lasts less than 30 seconds, the message ‘Fast Alignment’ appears in the system status of the control page.

Figure 5 - Web-based User Interface in case of “restore attitude” starting mode

- In case of “Wait for position” starting mode, the product waits for the first valid position data to start the alignment sequence.
-

Figure 6 - Web-based User Interface while waiting for position

- Then the inertial product performs an initial alignment which starts by a coarse alignment. During this phase heading, roll and pitch data are computed and sent but have not reached full accuracy. The initial alignment phase (coarse alignment) lasts about 5 minutes.

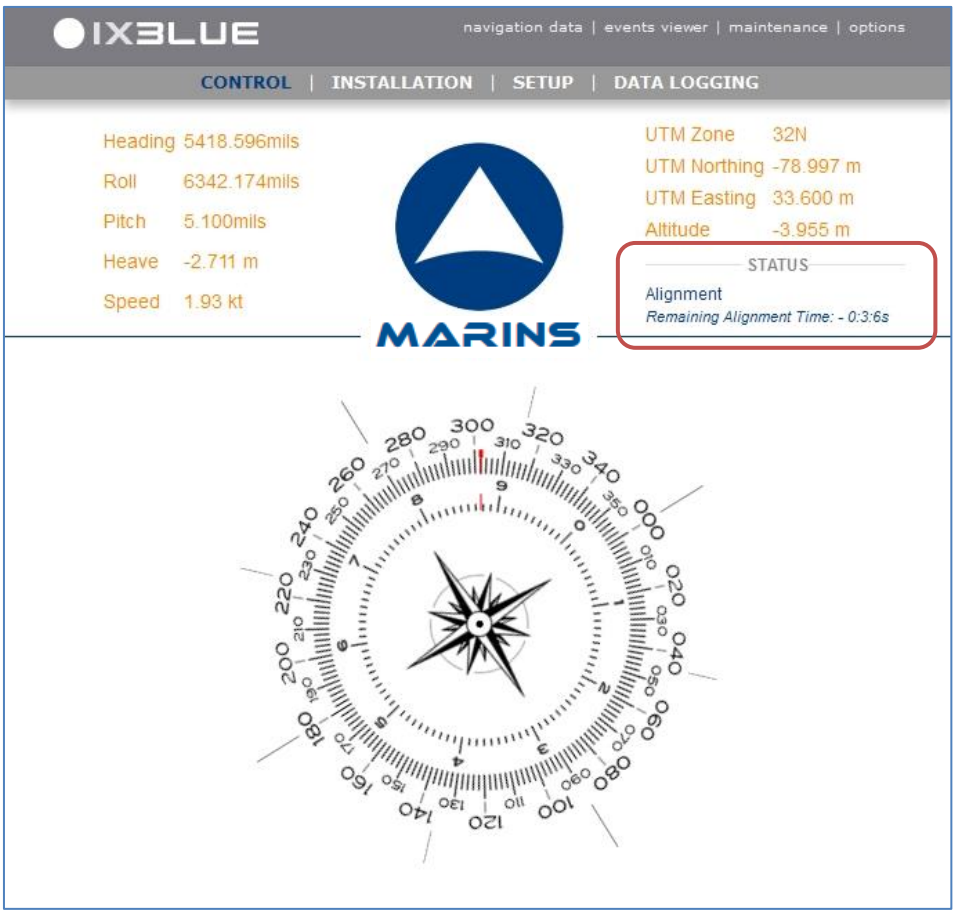


Figure 7 - Web-based User Interface during the coarse alignment

- During the fine alignment phase, the “Fine alignment” flag is ON and is displayed in the system Status area. The heading standard deviation value appears below the flag “Fine alignment”. Both flags disappear as soon as fine alignment is achieved.

  The fine alignment is ended automatically by the product when the heading covariance is below 0.1 degree for INS products and fixed time for AHRS products. "Fine alignment" information is displayed in the STATUS area, see Figure 8 below. There is no limitation of linear velocity or turn rate during fine alignment.

Figure 8 - Web-based User Interface during the fine alignment
(there is no ‘Fine alignment’ flag for QUADRANS)

6.2.3 PRODUCT NAVIGATION

At the end of the fine alignment process, the product is ready for navigation with optimal performances (see Figure 9).

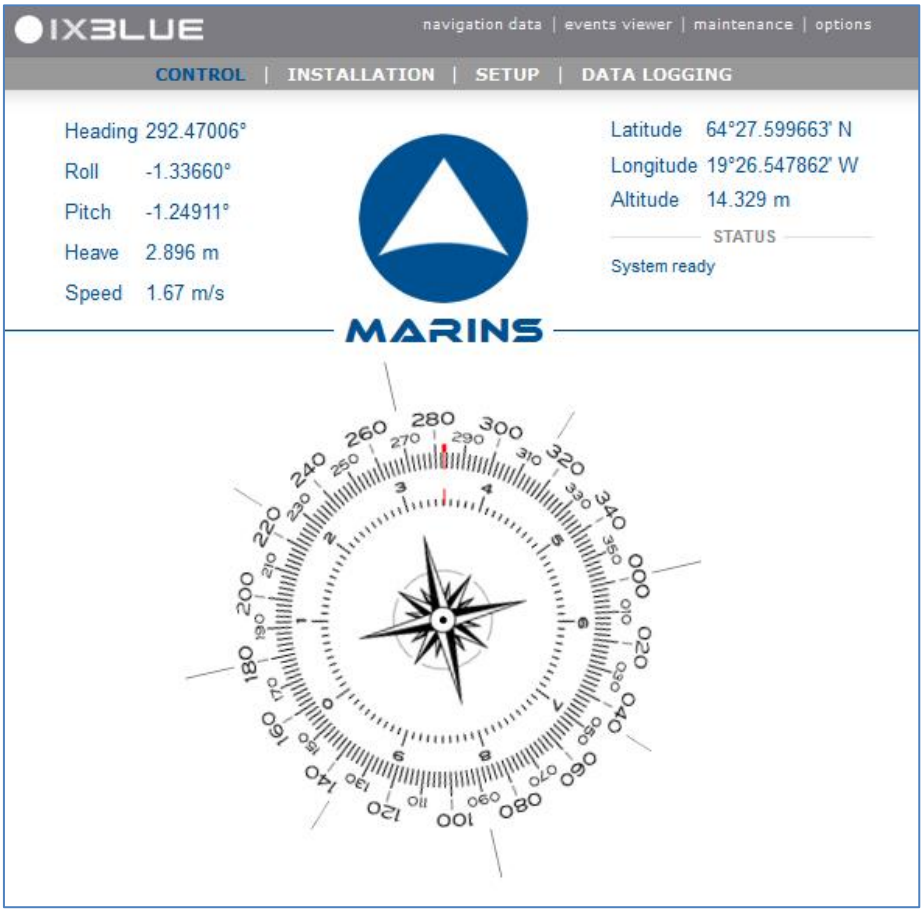


Figure 9 - Web-based User Interface for product in navigation mode

During navigation, the product uses its own inertial sensors together with external sensors, when they are available, to provide optimal estimates of position, speed, attitude and heading. Refer to the Product User Manual to check the list of sensors that can be used with your product (either separately or simultaneously). When no external sensor is available, the product switches automatically to “pure inertial mode” and keeps providing position, speed, attitude and heading estimates.

If a DVL sensor is used, it is recommended to perform DVL Sensor automatic calibration at first mission. The procedure is described in INS - Application Note - INS Calibration with RDI Workhorse DVL (Ref.: MU-INSAPN-AN-001) and should be performed once and for all.

6.3 Viewing the Status Messages

Product system status is indicated by the logo color and is textually displayed in the system status area (see Figure 10 below).

The detailed INS status about the input, output, system and status of external sensors are displayed in Detailed Status pop-up window.

Figure 10 - Data and status display in Web-based User Interface

INS has a built-in status and error test that provides alarms and displays messages in the System Status area when status is changed or when errors are detected (see Figure 11).

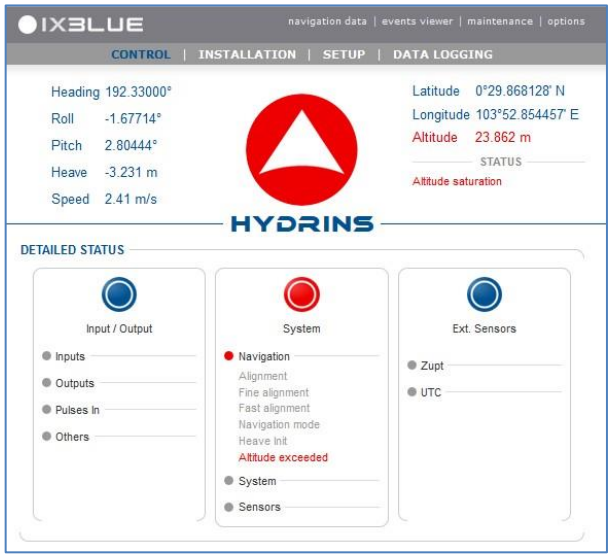


Figure 11 - INS Status display when an error occurs

On error occurrence, the detailed status pop-up window replaces the Compass.

Data which accuracy may be affected by the error are red-displayed in the data area.

6.3.1 SYSTEM STATUS MESSAGES

Message in blue: information message

Message in orange: warning message

Message in red: error message

Message	Meaning
System initializing	product is in the initialization phase
Alignment	product is in its coarse alignment phase
System ready	product is ready for navigation with optimal performances
Fine Alignment	product is in its fine alignment phase
System warning	There is a system warning
Altitude saturation	The altitude is higher than the product maximum altitude limitation[1]
Speed saturation	The speed is higher than the product maximum speed limitation1 The algorithm is frozen. Restart the product
System error	An error has occurred
Connection Lost	The Ethernet connection with the product is lost

6.3.2 DETAILED STATUS MESSAGES

- Message in blue: information message
- Message in orange: warning message
- **Message in red**: error message

To get the detailed status descriptions, refer to the Interface Library document: MU-AHRS-AN-003 for AHRS products or MU-INSIII-AN-001 for INS products.

[1] The saturation values are described in the *Interface Library* document *(Ref.: MU-INSIII-AN-001 for INS products and MU-AHRS-AN-003 for AHRS products)*

6.4 Viewing the Navigation Data

Navigation data computed by the product are displayed and updated in the Control page, see figure below:

- The data area
- The compass area (for the heading data)
- The navigation data by clicking on the **navigation data** menu on the upper right corner of the Web-based User Interface.

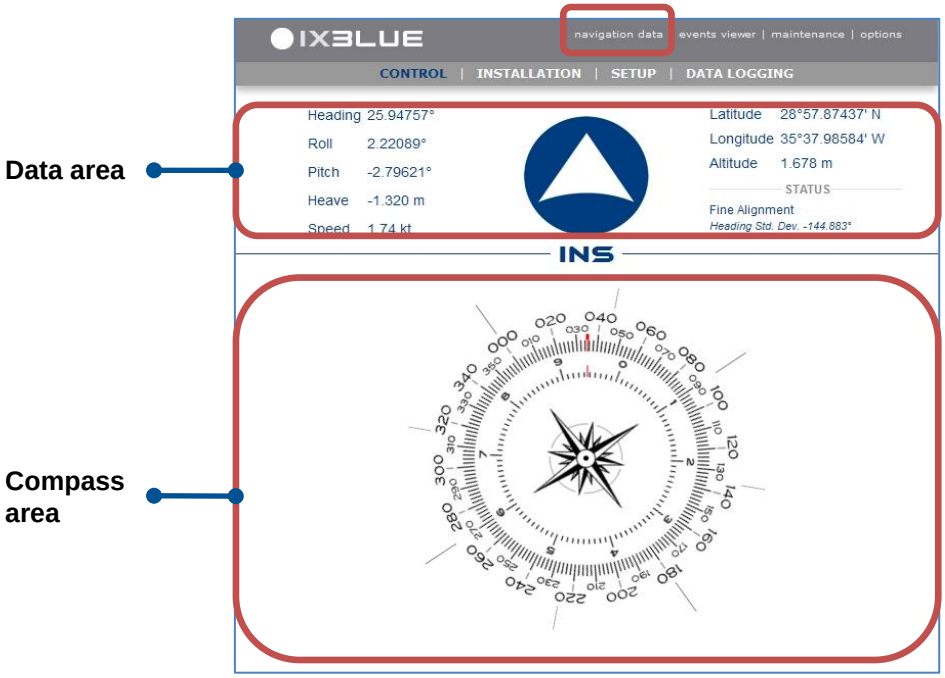


Figure 12 – Control Page

Data area

The Control page always displays:

- At the left of the logo, the computed Heading, Roll, Pitch, Heave and speed data
- At the right of the logo, the positions (Latitude and longitude or UTM Northing and Easting), and altitude (or depth for subsea product) data.

  The estimation of altitude/depth cannot be done by pure inertial means: the error would increase exponentially. The altitude/depth of the product is stabilized (either by external sensor data or artificially) to prevent this exponential growth of the depth error. Refer to section 5.5 for details about altitude/depth calculation.

Navigation data

All the navigation data computed and received by the product are displayed in the Navigation Data pop-up window (see Figure 13 next page) by clicking on the **navigation data** menu on the top right of the Web-based User Interface (see Figure 10).

The conventions used to compute the product data are explained in the Inertial Products - Principle & Conventions document (Ref.: MU-INS&AHRS-AN-003).

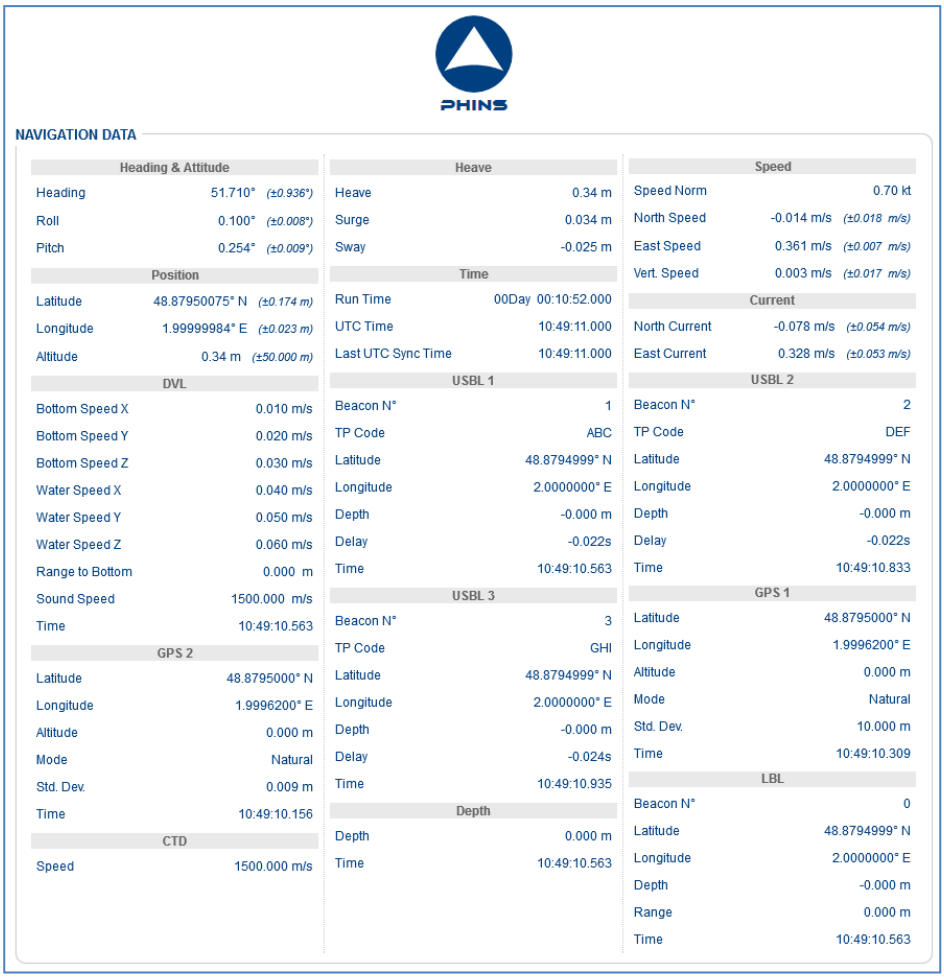


Figure 13 - Navigation data pop-up window
(example of PHINS with several sensor inputs)

INS or AHRS computed data:

- **Heading & Attitude** data with their associated standard deviations (these standard deviations are available only for some products)
- **Position** data with their associated standard deviations (these standard deviations are available only for some products)
- **Heave, surge, sway** (available only for some products)
- **North, East, Vertical, Norm** speeds in knots with their associated standard deviations (these standard deviations are available only for some products)
- **North and East currents** in m/s with their associated standard deviations (available only for some products)

Time data:

- product **Run time** (since last powering on)
- **UTC time** and last UTC synchronization time, if available

Sensors Data

External sensor information is displayed only if the sensor is configured in the input page. The sensors data is displayed in the Navigation Data separate window (see Figure 13), this includes:

GPS (GPS1 and GPS2 if any, depending on the product type) data:

- **Latitude, Longitude and Altitude data**
- **Std Dev**.: it corresponds to the standard deviation of the position data
- **Time**: it is the validity time of the last GPS data. In case of GPS drop-out, or GPS shielding, GPS data is not updated and the last valid data from the GPS are displayed.
- **Mode**: it corresponds to the quality factor. Its description is given in the INS -Interface Library document (Ref.: MU-INSIII-AN-001) or AHRS-Interface Library document (Ref: MU-AHRS-AN-003).
- **Delay**: it indicates the drift between last GPS frame reception time and validity time contained in that frame. It should be less than 200ms in typical cases. Values larger than 1s or negative values usually come from a bad time synchronization configuration (PPS + Time instead of Time + PPS, or large network propagation time for example).

LBL data (if any, depending on the product type):

- Beacon N°
- Beacon Latitude, Longitude and Depth
- Beacon **Range**
- **Time**: it is the validity time of the last LBL data.
- **Delay**

USBL data (USBL1, USBL2 and USBL3 if any, depending on the product type):

- Beacon ID and Transponder code (Tp Code)
- Beacon Latitude, Longitude and Depth
- **Delay** in seconds
- **Time**: it is the validity time of the last USBL data.

CTD data (if any, depending on the product type):

- CTD Sound of speed

Depth sensor data (if any, depending on the product type):

- **Depth** in meters
- **Time**: it is the validity time of the last depth sensor data.

DVL data (if any, depending on the product type):

- **The Bottom** track **speeds**: these are the speed inputs from the sensor, measured at sensor position in the sensor reference frame.

- **The Water** track **speed** data directly input from sensor, measured at sensor position in the sensor X, Y, Z reference frame.
- Range to bottom
- Sound speed in DVL
- **Time**: it is the validity time of the last DVL data.

EM Log data (if any, or EM Log1 and EM Log 2 data, depending on the product type):

- **Longitudinal Speed**: it is the speed in knots
- **Time**: it is the arrival time of the last log EM data

Compass

It presents a visual representation of the heading. The outer circle provides the degree units (2°- scale); the inner circle provides the hundredth of degree.
Two red lines, one for each circle, help you to read the heading.

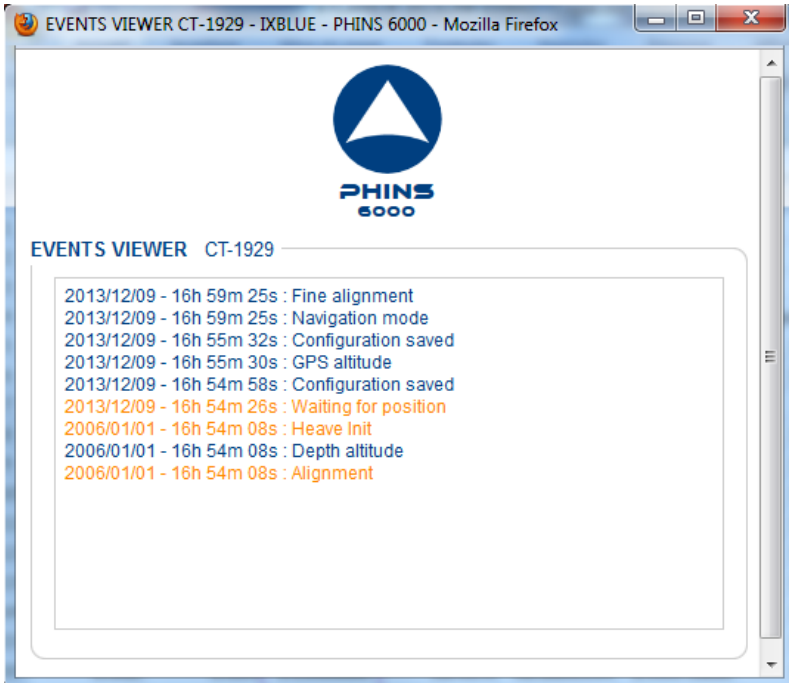
Figure 14 - Heading compass display

6.5 Viewing the Events Messages

Event viewer records all important events and system messages that occurred since last system reboot.

The system status and the error messages generated by the product can be followed in the events viewer window by clicking on the **events viewer** menu.

See hereafter an example of event viewer window.



6.6 Recording Data

This section does not concern MARINS product.

Important

For long-term data logging, the web-based data logger may not be suitable as browser memory usage can become high after a while.
in this case, it is recommended to use an external dedicated tool to log system outputs.
IXBLUE data logger tool is available on the product CD-ROM in the softwares directory.

Please note that the data logging takes time (35 s) to start in Tcp Client. The data logging does not work in UDP /UDP Broadcast and UDP Multicast with Java jre 8u73.

6.6.1 External Data Logging

External data logging can be used for logging data directly on the PC.
The following data can be recorded:

- From the **Repeater** port: in this case the generated file is formatted with data separated by tabulations. It can be used with MS-Excel
- From another **A** to **E** (only to **B** for QUADRANS) port: in this case the output port configuration must be in **Ethernet or Serial + Ethernet**. The recorded data file is the raw version of the protocol selected for the chosen port without any particular formatting. It can be used to log data for post processing for example.

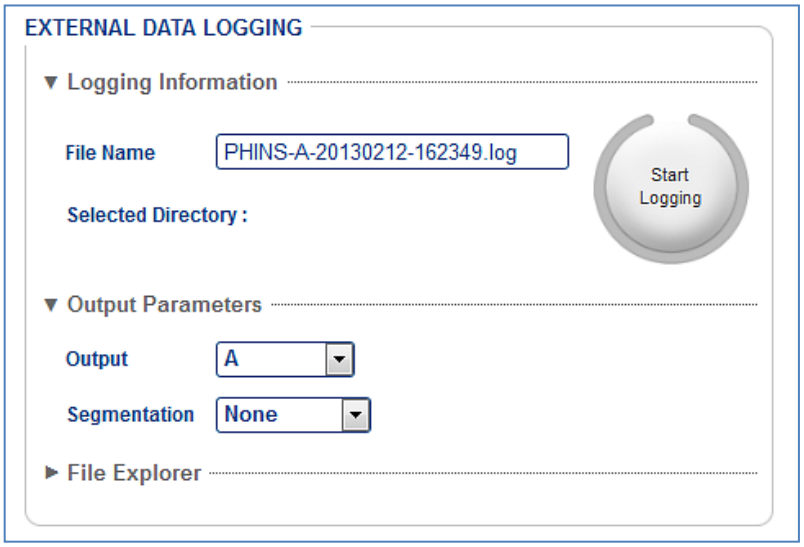
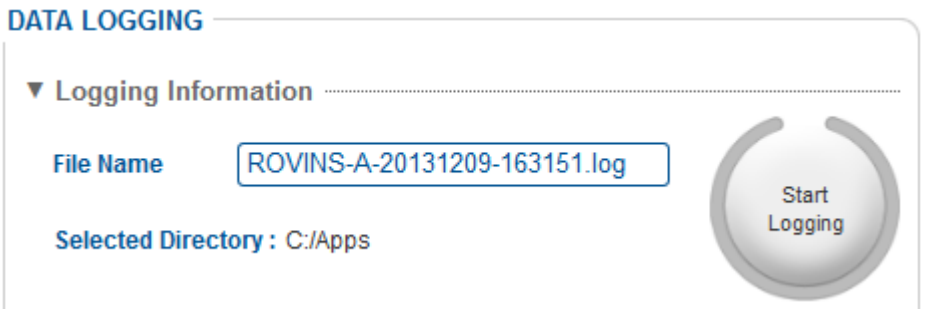
For recording, a file name is automatically generated using following format:
[PRODUCT]-[PORT]-[YYYY][MM][DD]-[HH][MM][SS].log
Where:

- PRODUCT is the product name (PHINS, ROVINS, etc.)
- PORT is the letter representing the output being recorded (i.e., **R** for Repeater port; **A, B, C, D, E** for the corresponding output stream)
- YYYY is the current year
- MM is the current month
- DD is the current day
- HH is the current hours
- MM is the current minutes
- SS is the current seconds

You can choose to have data files of constant and fixed size or temporal length.

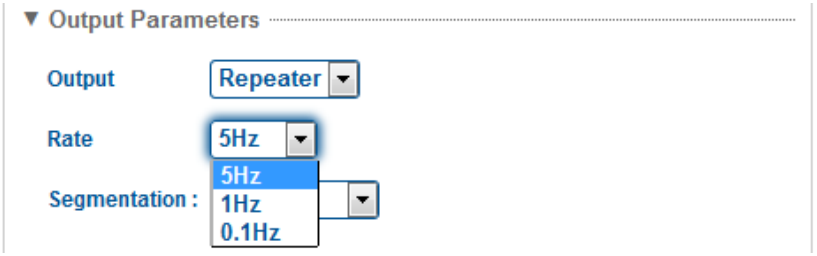
When the PC is connected to the product in PPP mode, the Data logging feature is still available, but will be very limited due to PPP low bandwidth (57 kBauds).

Procedure

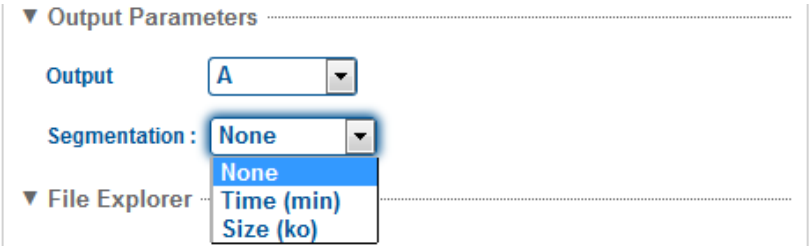
Step	Action
1.	Click on the **DATA LOGGING** menu. A security window may appear (the first time you click on this button after installing the Java Platform).
2.	Make sure the "Always trust content from this publisher" option is selected. **Click Run**. Then the following information are displayed: 
3.	If needed, you can **modify the filename** that is automatically generated by typing the new name directly in the dedicated box. It must be composed of alphanumeric characters without any space between characters.
4.	Click on the **File Explorer** label to browse and select the folder to record the selected data then click on the **Select** button to validate the directory choice. The selected directory is then displayed à the right of the “Selected Directory” label: 
5.	In the **Output Parameters** area **select** the output from which you want to record data in the **Output** drop-down list.

Step	Action

6. For the **Repeater** output only, choose the rate of the output flow in the scrolling list:

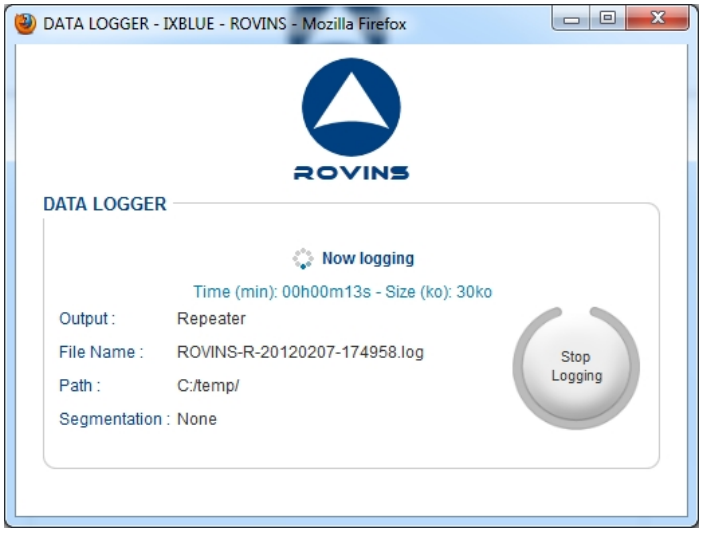


7. For all outputs, you can choose to have data files with:
   - **Fixed size:** choose Size (kop) in the Segmentation field then enter the chosen size in [Ko] in the text box located to the right side of Segmentation field.
   - **Fixed temporal length:** choose Time (min) in the Segmentation field then enter the chosen temporal length in minutes in the text box located to the right side of Segmentation field.



8. Click on the **Start Logging** button to start the record.
   The logging starts in a separate DATA LOGGER window. It displays: the port being recorded, the file name of the logging and its path on the workstation.

   At any moment, you can stop the record by clicking on the **Stop Logging** button.



   Do not close the DATA LOGGER window otherwise you will stop the data logging.

9. **Repeat Steps 3 to 6 to log data** from other ports if necessary.
   Up to 6 (= Input A, B, C, D, E + Repeater port) simultaneous logging are possible.

10. End of procedure.

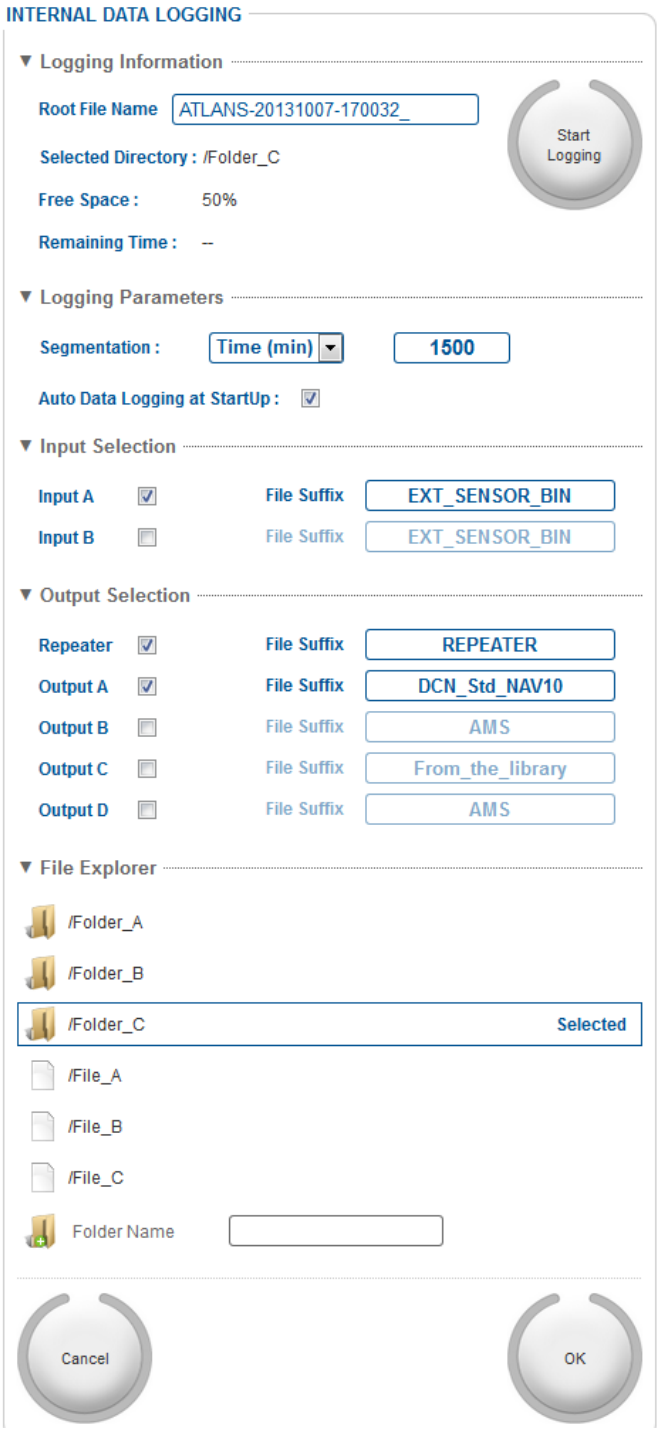
6.6.2 INTERNAL DATA LOGGING

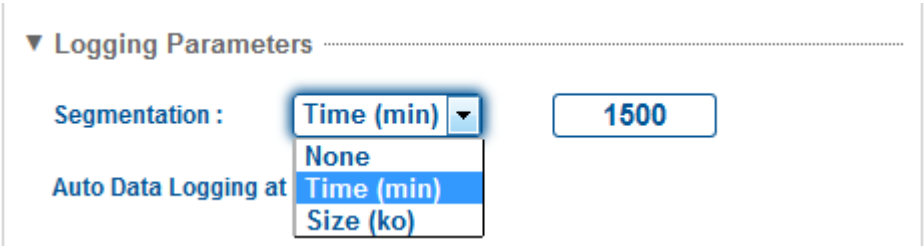
Internal data logging allows logging to the product without requiring a PC to be connected during the survey. It is available for products with an internal data logger.

Procedure

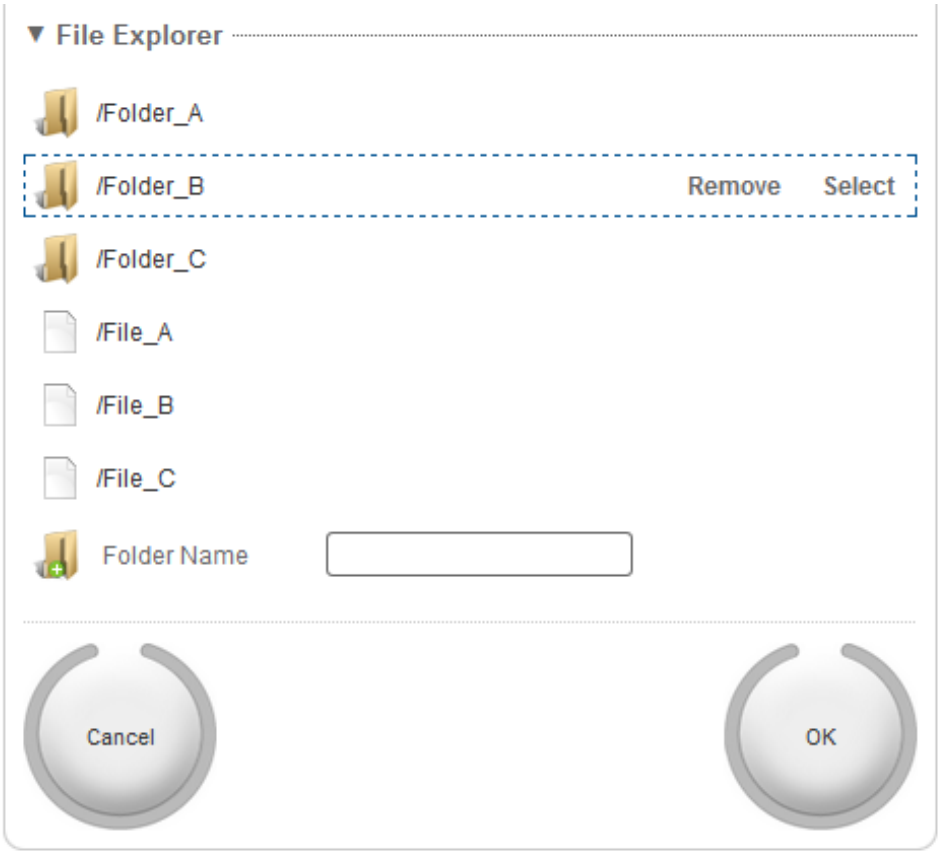
Step	Action

1. Click on the **DATA LOGGING** menu. The following information is displayed.



Step	Action
2.	If needed, in the **Logging Information** field, modify the **Root File Name** that is automatically generated by typing the new name directly in the dedicated box. It must be composed of alphanumeric characters without any space between characters. **Selected directory**: indicates the directory in the internal data logger **Free Space**: indicates the space (in percentage value) available in the internal data logger **Remaining Time**: indicates an estimation of the remaining time after logging start
3.	For the **Logging parameters**, you can choose the **Segmentation** type: • **Fixed size** - Size (ko): enter the chosen size in [ko] in the text box located to the right side of Segmentation field. • **Fixed temporal length** - Time (min): enter the chosen temporal length in minutes in the text box located to the right side of Segmentation field.  Tick **Auto Data Logging at Startup** if you want automatic data logging at startup. Wait for GPS to get the time used to create the Root File Name.
4.	In the **Output Selection** field, select the output (**Repeater**, **Output A** to **Output D**) from which to record data. A file suffix, associated to each type of selected output, is automatically added to the **Root File Name** of the **Logging Information** field.
5.	In the **Input Selection** field, select the input (**A** to **B**) from which to record the data. A file suffix, associated to each type of selected input, is automatically added to the **Root File Name** of the **Logging Information** field.

Step	Action
6.	Click on the **File Explorer** field to browse and select the folder to record the selected data.



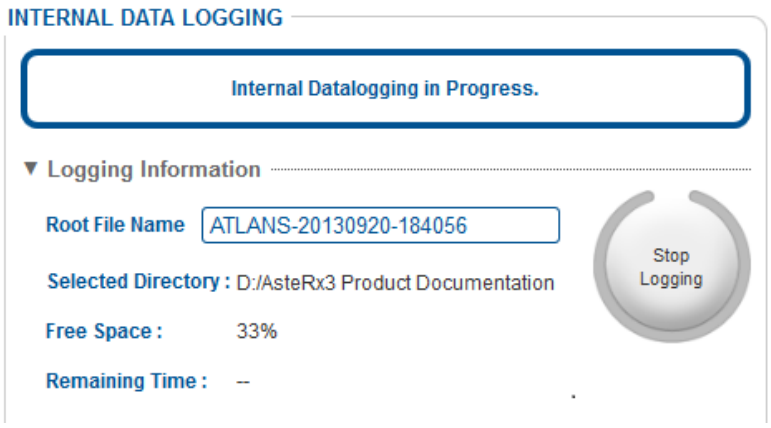
The **File Explorer** also allows deleting/creating folders and retrieving/deleting files.

7.	Click on the **Select** button to validate the directory choice. In the **Logging Information** field, the selected directory is displayed in front of **Selected Directory.**

Step	Action

8. Click on the **Start Logging** button to start recording all selected outputs (Repeater, Outputs A to D).

   The logging starts: an “Internal Data logging in Progress” message is displayed in the INTERNAL DATA LOGGING field.



   At any moment, you can stop the record by clicking on the **Stop Logging** button.

9. End of procedure.

When the PC is disconnected from the INS, the internal data logging continues. To retrieve the logged files:

- Connect the PC.
- Click on the the **Stop Logging** button.
- Browse the internal data log files system.
- Click on the files to be downloaded.

6.7 Modifying the Product Configuration

The Web-based User Interface can be used to modify the configuration during a survey. It enables to:

- Set a new position manually (refer to section 5.1)
- Activate/de-activate the external sensors (refer to section 5.8)
- Proceed to a soft restart of the product unit (refer to section 7.1)

It is highly recommended to check that the product is not in “ZUPT” mode in normal operation, when other sensors are available. The ZUPT switch must be OFF as shown on the figure below.

Figure 15 – ZUPT switch

7 MAINTENANCE TASKS

7.1 Getting Information about the System

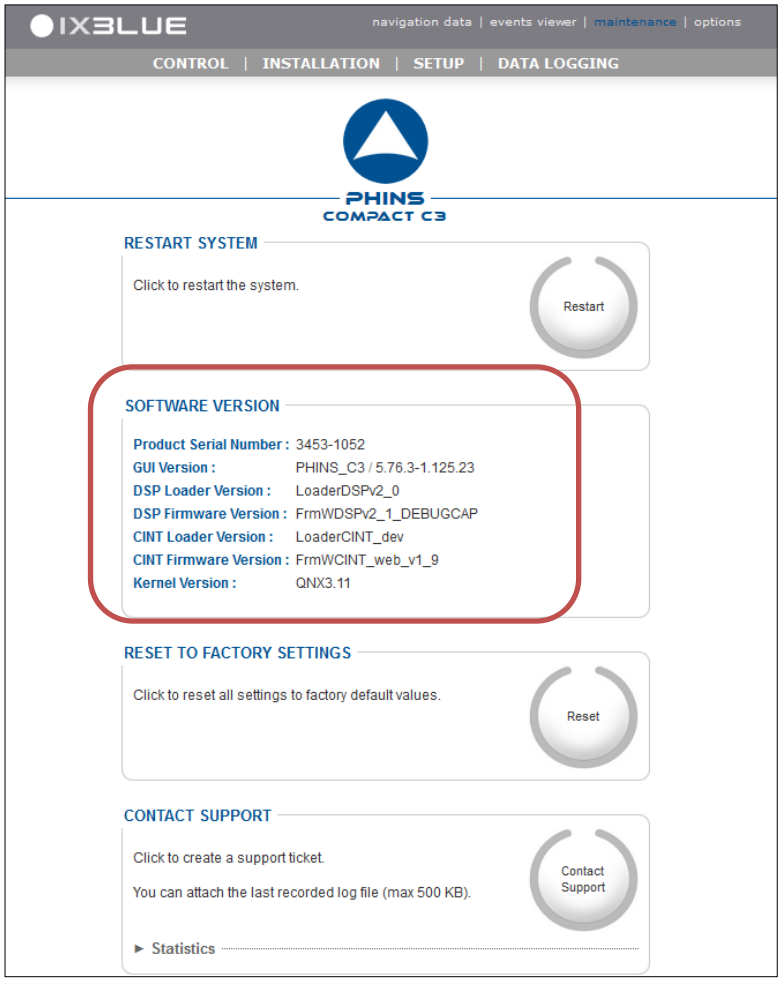
The maintenance page lists all the product software components:

- product serial number
- DSP loader and firmware version
- CINT loader and firmware version
- Kernel version

Procedure

Step	Action

1. Click on the **maintenance** menu. The following page is displayed with the system information.



2. End of procedure.

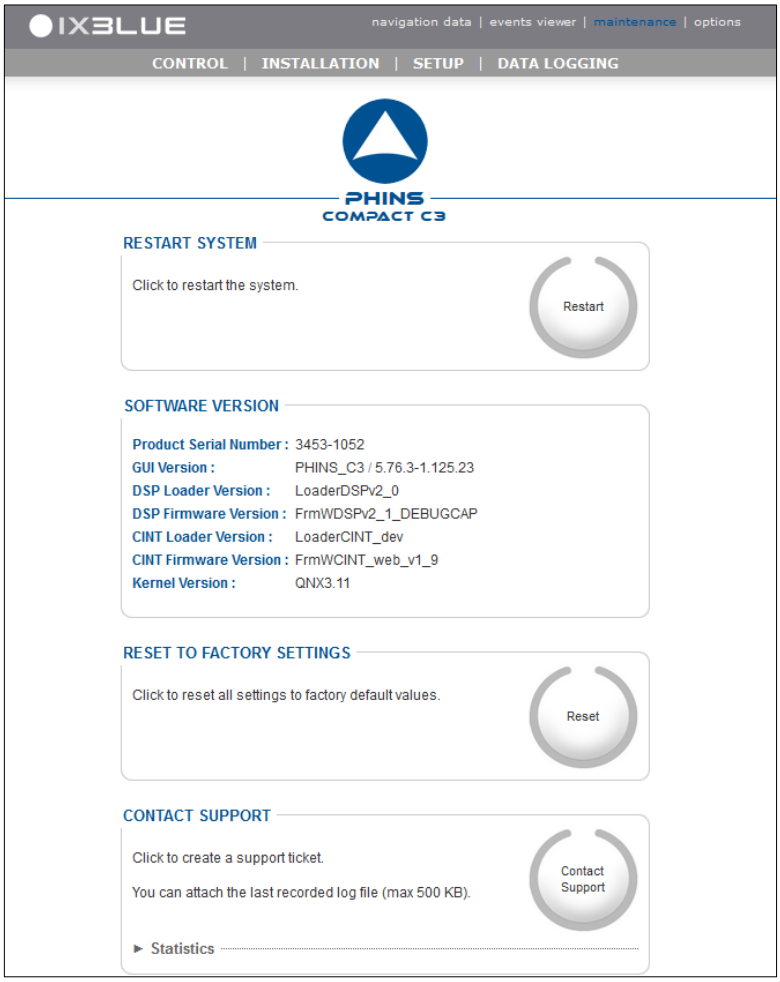
7.2 Restarting the Product

Important

This action will restart the product and the alignment sequence is repeated (refer to section 6.1).

Procedure

Step	Action
1.	Click on the **maintenance** menu. The following page is displayed.



2.	In the **RESTART SYSTEM** area, click on the **Restart** button. A confirmation window is displayed.
3.	Click **OK** to restart.
4.	End of procedure.

7.3 Updating the System

To update the system with one or several files, use the System Updater Tool.

Refer to the System Updater Tool User Guide (ref. MU-UPDTAPN-AN-001).

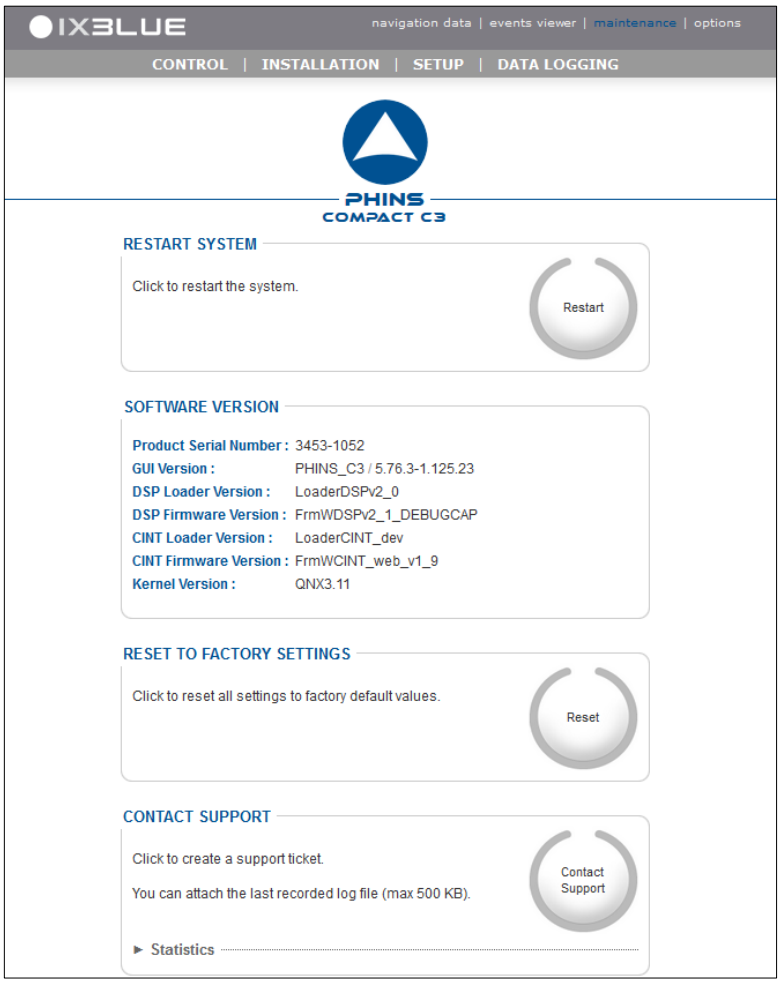
7.4 Resetting the Parameters to the Factory Default Values

Reload the factory default setting on the product overwrites the user settings except the network setting.

Procedure

Step	Action

1. Click on the **maintenance** menu. The following page is displayed:



2. In the **RESET TO FACTORY SETTINGS** area, click on the **Reset** button

3. End of procedure.

7.5 Activating the License Code (Only for ROVINS)

ROVINS must be activated before using.

To retrieve the activation code:

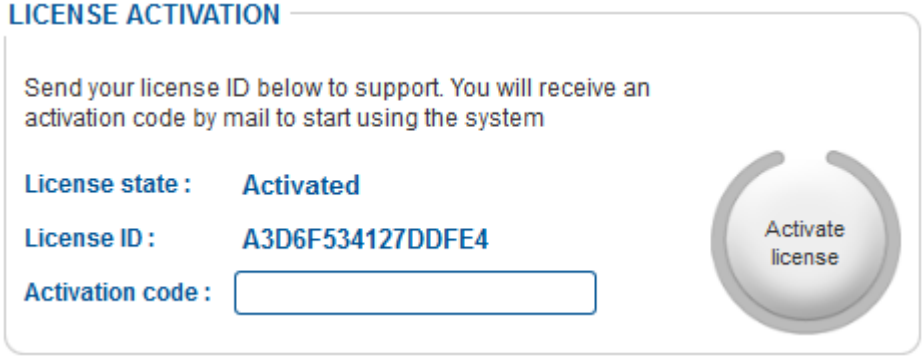
- Note the license ID in the LICENSE ACTIVATION area of the maintenance page
- Send a message to iXBlue support to ask for the activation code with the ROVINS license ID (refer to section 7.6)

Important

If ROVINS is not activated with the activation code, ROVINS will display null values for the position.

Procedure

Step	Action
1.	Click on the **maintenance** menu. The maintenance page is displayed.
2.	In the **LICENSE ACTIVATION** area, enter the **Activation code** provided by the iXBlue support.
3.	Click on the **Activate license** button. The "**License activated"** message is displayed in front of the **License state** field. The ROVINS unit is activated, the position is updated.
4.	End of procedure.



7.6 Displaying Maintenance Statistics

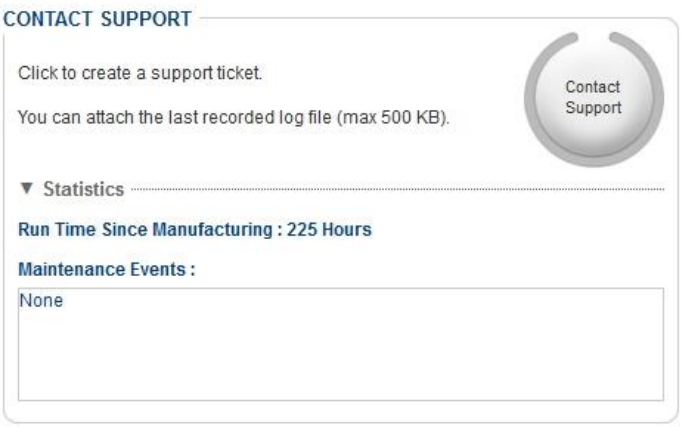
This section is applicable only to specific products.

Some information displayed in the Web-based User Interface can be useful to the Support team in case of problems occur:

- The Run Time since Manufacturing
- The list of the error messages and the associated cumulated time when they occurred (**Maintenance Events**)

Procedure

Step	Action
1.	Click on the **maintenance** menu. The maintenance page is displayed.
2.	In the **CONTACT SUPPORT** area, click on **Statistics**. The following window is displayed.

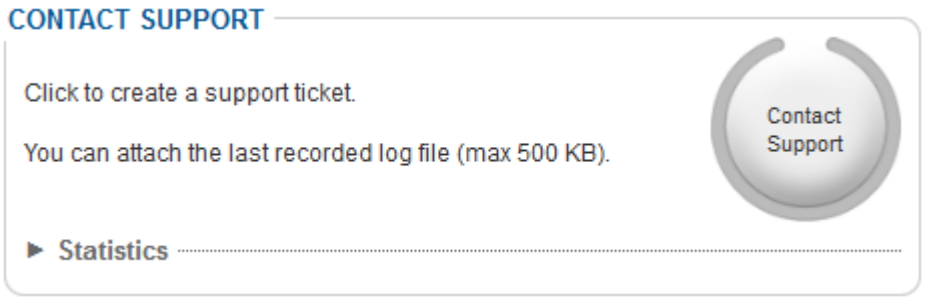
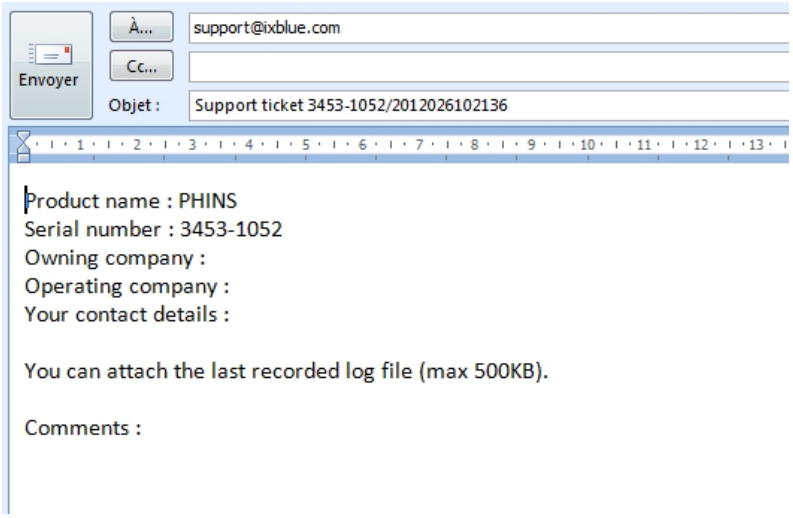


3.	You can copy-paste the maintenance events to the message field, which will be sent to iXBlue support.
4.	End of procedure.

7.7 Contacting iXBlue Support

For maintenance purpose, you can create a support ticket to send directly to iXBlue support through an email (assuming the computer is connected to the World Wide Web, and the setting of the email tool has been correctly done).

Procedure

Step	Action
1.	Click on the **maintenance** menu, the maintenance page is displayed.
2.	In the CONTACT SUPPORT area, click on **Contact Support**. 
3.	A mail message is created; it is addressed to the iXBlue support and automatically contains the ticket number, the product name and the product serial number.  Fill in the other fields and/or attach a file (500 ko) before sending the message.
4.	You can add comments in the created mail under the **Comments** text label before sending the message.
5.	End of procedure.