

**EIVA**

# **NAVISUITE PERIO**

# **USER MANUAL**

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## Introduction

This document is intended to guide the user through the configurations and usage of NaviSuite Perio.

NaviSuite Perio allows you to accurately deploy multiple virtual buoys (up to 250 via a single transmitter) for AIS aids to navigation (AtoN) at a fraction of the cost of physical buoys. It offers a unique approach to navigational aiding by enabling you to deploy a high number of any buoy type as virtual buoys so they appear correctly on AIS displays on nearby vessels. This is an alternative or a supplement to the deployment of physical buoys.

NaviSuite Perio is a resource for marking the deepest part of narrow sailing channels, temporary construction sites or sudden dangers, such as the marking of a wreck that presents a danger to traffic.

NaviSuite Perio is a software package that requires a subscription licence, a hardware setup of at least a computer running Windows and an AIS transceiver radio and antenna. These are all purchasable from EIVA.

# 1 NaviSuite Perio project

## 1.1 Getting started

The software package requires a subscription license available at [www.eiva.com](http://www.eiva.com). Find and download the latest software version at <https://download.eiva.com/>.

Run the installer.

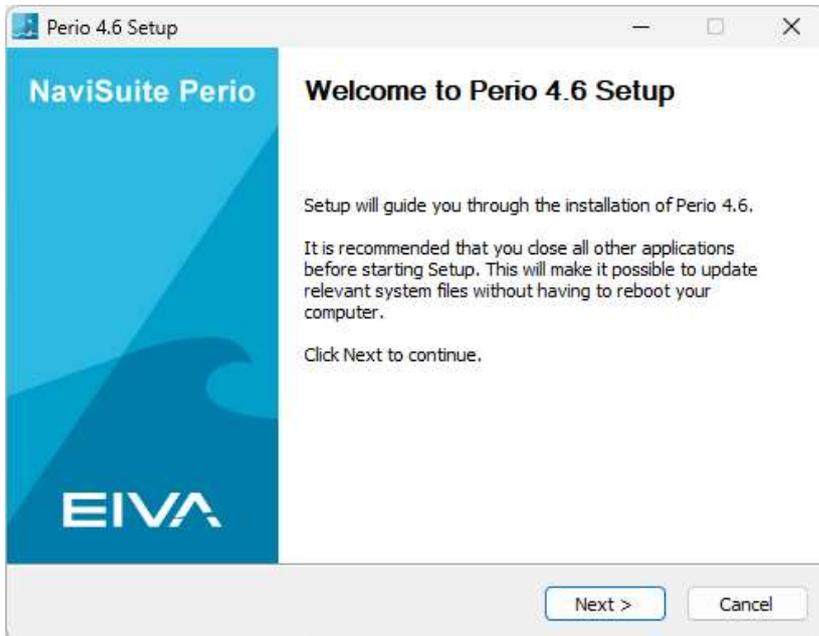


Figure 1 NaviSuite Perio installation guide

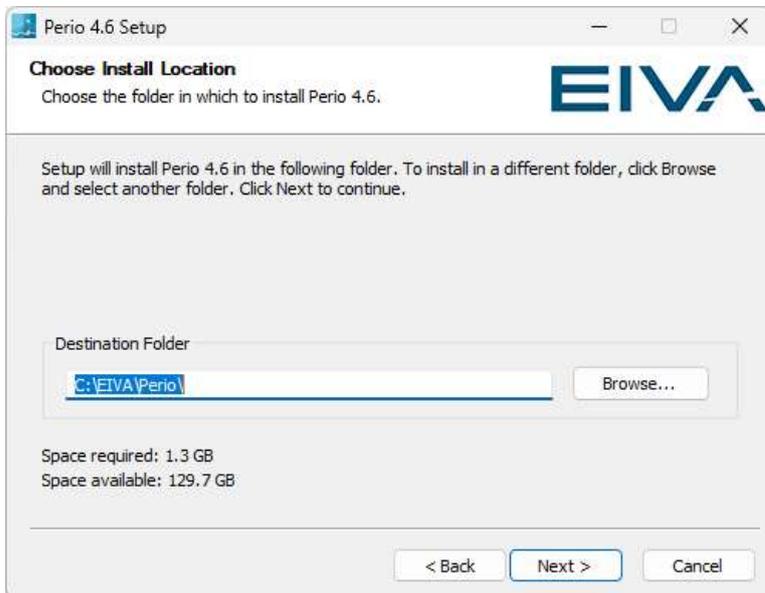


Figure 2 Select the default directory path

## 1.2 Setting up a new project

To start a new NaviSuite Perio project, open the software from the desktop by clicking the shortcut icon or manually start the software from file explorer.



Figure 3 NaviSuite Perio icon

Enter the 9-digit license key you purchased from EIVA. When the empty NaviSuite Perio project has started, you will find a **Project Tree** and **Properties** tab on left side of the display. The **Project Tree** and the **Properties** tabs contain the main configurations for the project.

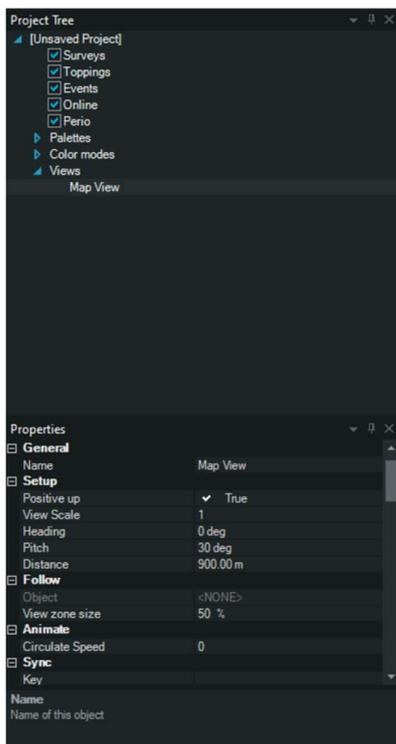


Figure 4 Project Tree and Properties tabs

The centre of the display contains the **Map View** which gives the user a graphical display of the project. To change location, use the mouse (left, right and wheel button, and scroll function to zoom in and out) or the keyboard using the arrow keys or the A, S, W, D keys.

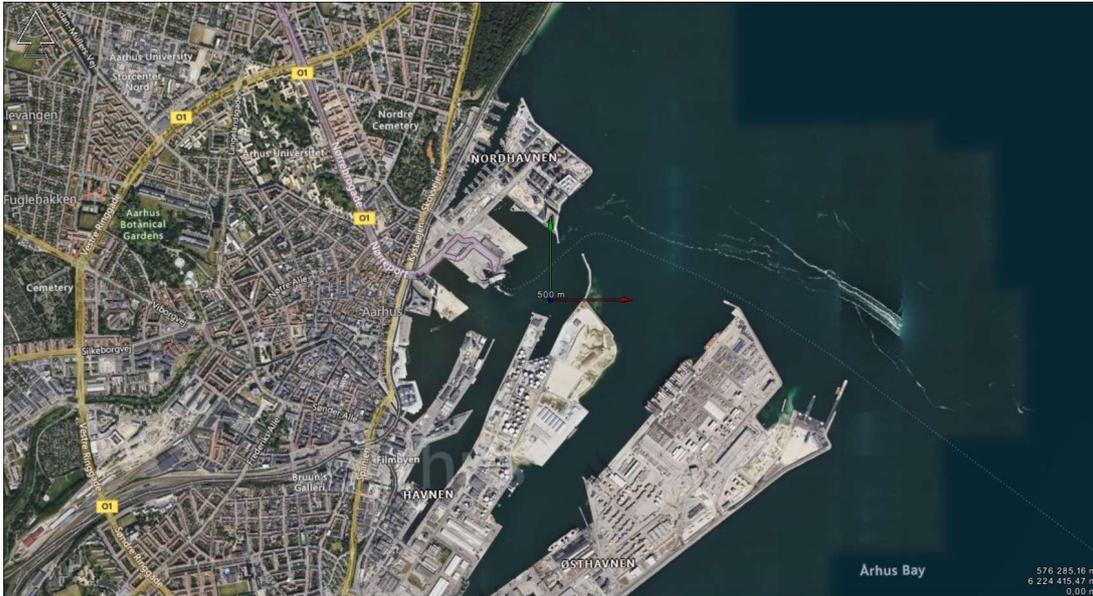


Figure 5 Map View with the Bing Satellite background map

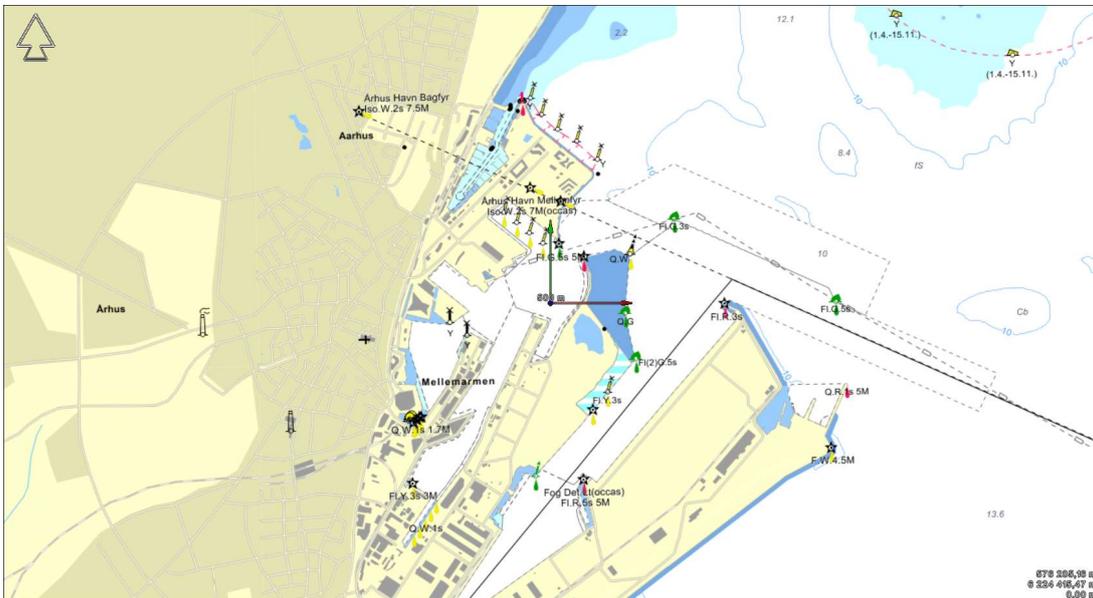


Figure 6 Map View with the Enviro Ocean background map

At the top of the display, you will find a toolbar that contains different view options to mainly control the **Map View**.

The main features include:

- Alternating between 2D and 3D view
- Aligning the view to north being up
- Insert a background map and a ruler

The **Save** button saves the project, however, all NaviSuite Perio specific items (buoys, radios, etc) are saved automatically every time an action is taken (eg creating a buoy).

If at any time the user wants to back up their NaviSuite Perio setup, the PerioConfig.XML (by default, located at *C:\ProgramData\EIVA\Perio\Config*) should be copied to the desired backup location. This file includes all items related to Perio and is the only thing required to restore a NaviSuite Perio project.



Figure 7 Toolbar in NaviSuite Perio

## 1.3 Alarm Window

An **Alarm Window** will pop up providing information on a specific tasks' success state. The window may be moved by dragging and dropping it. It may be configured according to the user's preferences.

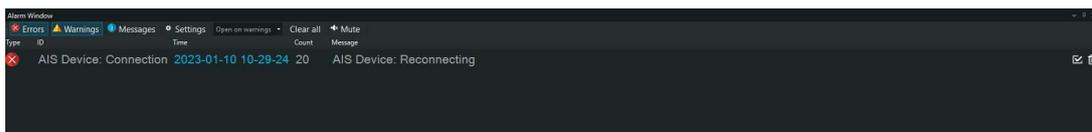


Figure 8 Alarm Window providing information of a job status when performing tasks in NaviSuite Perio

## 1.4 Create new group

A group is a collection of items, such as radios, that are physically close to each other.

From the **Project Tree**, right click the NaviSuite Perio master node and click **Add Group**.

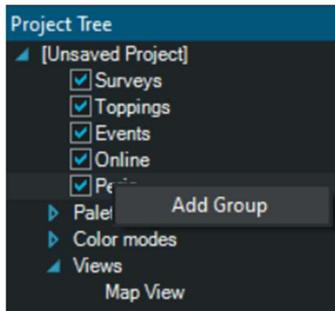


Figure 9 Right click the master node to add a group

In the **Create Group** prompt window, input the following parameters:

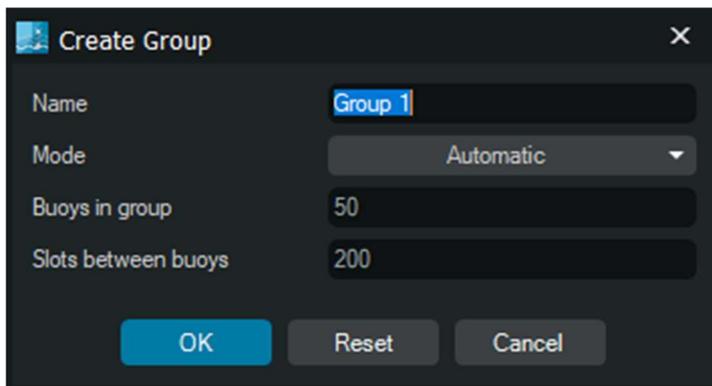


Figure 10 Creating a group

- **Name**
  - By default, set to Group 1. If the NaviSuite Perio system is used to broadcast buoys to different areas of a harbour for example, this gives the user a way to distinguish between groups by the name.
- **Mode**
  - By default, set to **Automatic**. From the drop-down tab, **Manual** may be selected. Manual mode gives the user the freedom to manually type in the broadcasting interval and timing.
  - Select **Manual** when the buoy configurations have been provided by local authorities.
  - When a specific configuration is not provided, select **Automatic** to evenly distribute the buoys and avoid conflicts.
- **Buoys in group – Automatic mode**
  - The number of buoys in this group. By default, it is set to 50.
  - As NaviSuite Perio handles the distribution of the buoys in automatic mode, the user should give an indication of how many buoys it should

expect to handle for a group in total. This ensures the best possible distribution of the buoys for the total bandwidth.

- **Note:** The number needs to be either equal or above the total number of buoys in the group, as NaviSuite Perio will not allow the user to create more buoys than this. This parameter does not exist for manual mode.
- At least 200 slots are required between each buoy (37.5 slots = 1 second). With this information the group can compute unique channel information for each buoy.
- **Slots between buoys – Automatic mode**
  - By default, set to 200. Some radios are restricted from handling lower intervals than 200, so this is the minimum slot interval.
  - **Note:** Because this parameter does not exist for manual mode, it is important to consider the restrictions of the radio equipment when configuring the distribution of buoys to avoid conflict of intervals.

A group contains three collection nodes. The **AIS Devices** node, the **Virtual Buoys** node, and the **Synthetic Buoys** node. These will contain their respective items when created.

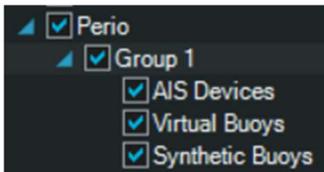


Figure 11 Group nodes

## 2 AIS devices

To add an AIS device, right click on the **AIS Devices** node and click **Add Device**.

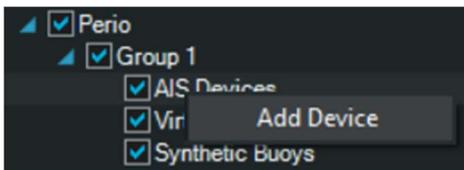


Figure 12 Add AIS device

This will open a prompt. Fill in the prompt with the correct information and a radio will be created.

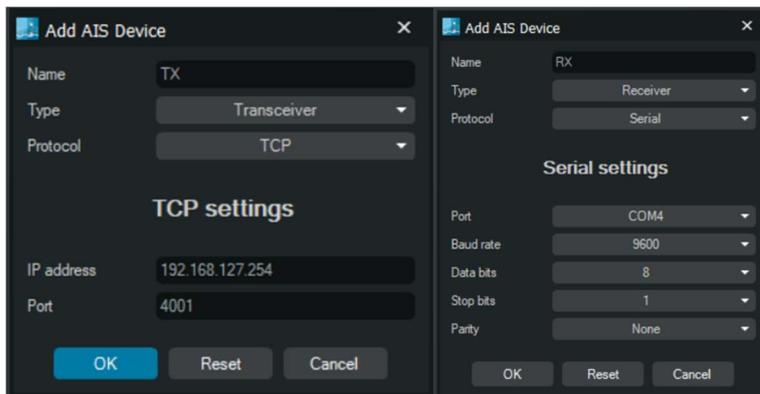


Figure 13 Add AIS Device prompts for both Transceiver and Receiver

- **Name**
  - By default, set to **AIS Device**. The user may relate this to the type of radio generated, for example **RX** (receiver).
- **Type**
  - From the drop-down tab the user gets to choose between a **Transceiver** or **Receiver** radio.
- **Protocol**
  - By default, set to **TCP**, but the user may choose **Serial** from the drop-down tab. Fill in the following port/com settings accordingly.

A radio has three possible states indicated by its colour in the **Project Tree**. Red indicates the radio is not connected, yellow indicates the radio is connected, but the radio has not told NaviSuite Perio that it has received position fix yet, and green means everything is as expected.



Figure 14 Light states for AIS devices

To have quality control of your buoys, you need a setup with two transceivers, or a transceiver/receiver setup, to confirm the broadcast of buoys.

## 3 Buoys

NaviSuite Perio is restricted to broadcasting only Message 21 via AIS.

The International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA) defines a marine Aid to Navigation (AtoN) as 'a device, system, or service, external to a vessel, designed and operated to enhance safe and efficient navigation of all vessels and/or vessel traffic.'

For more information and details of what exactly Message 21 includes, visit <https://www.navcen.uscg.gov/ais-aton-report>.

### 3.1 Create single buoy

The two subcategories of buoys are **Synthetic** and **Virtual**. Synthetic buoys represent physical objects, such as a real buoy, a wreck or islets, whereas virtual buoys are completely virtual objects. The two categories make it easier for the user to organise the buoy types.

To create any of the two types of buoys, right click on the node **Virtual Buoy** or **Synthetic Buoy** and click **Create Buoy**.

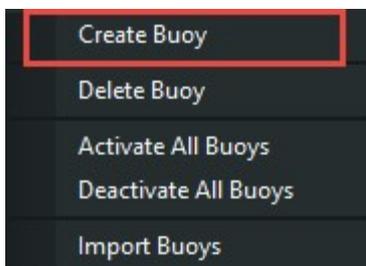


Figure 15 Create a buoy by right clicking the Virtual Buoy or Synthetic Buoy node

Depending on the group's mode (see [Create new group](#)), the user will need to fill in the following information needed for the buoy (confer Message 21, IALA standard):

- **MMSI**
  - MMSI (Maritime Mobile Service Identity) is a 9-digit reference number that is used to identify marine vessels, buoys, etc, in different radio systems and AIS-equipment. The number is unique and is provided from a national authority.
- **Buoy name**
  - A way to name the individual buoys in the NaviSuite Perio system.

- **Longitude**
  - By default, this has the values from the target in the **Map View**. May be user defined.
- **Latitude**
  - By default, this has the values from the target in the **Map View**. May be user defined.
- **Type**
  - By default, set to **Special Mark**. The drop-down tab gives the user a long list of predefined alternative buoy types.
- **Power**
  - By default, set to 5W. The user should be aware of potential local requirements for power usage.
- **Position Accuracy**
  - By default, set to <10m. May be changed to >10m if position accuracy is more than 10m.
- **Starting hour channel A**
  - Defines the starting hour during the day. Only values between 0 and 23 are accepted.
- **Starting minute channel A**
  - Defines the starting minute in the specified hour above. Only values between 0 and 59 are accepted.
- **Starting slot channel A**
  - Defines the starting slot of the minute specified above. As 1 second has 37.5 slots, only values between 0 and 2250 are accepted (ie 60 seconds \* 37.5 = 2250).
- **Broadcasting interval channel A:**
  - Slot interval between every broadcast of the buoy's position. As some radios are restricted to 200 slots, the minimum interval the user may type in is 200.
    - For example, if 300 is typed in, the broadcasting time interval of the buoy's position would be  $300 / 37.5 = 8$  seconds.
  - Parameters for channel B are identical to channel A, but a radio cannot broadcast both at the same time. Therefore, depending on the equipment used, the starting slot for channel B should be different to the starting slot for channel A.

If more than one transceiver is present, the user does not choose which radio a buoy is added to, rather NaviSuite Perio handles this. The software attempts to distribute buoys as evenly as possible within the group. In the **Properties** view you can see connection info of the transceiver and the number of buoys it has. The radio's number of buoys is split into two fields: **Number of external buoys** and **Number of internal buoys**. External buoys are the number of buoys the radio has reported to NaviSuite Perio. Internal buoys are the number of buoys NaviSuite Perio believes it has.

A buoy has three states indicated by colour (white, red and green):

- White indicates that the consistency of the buoy has not yet been checked
- Red indicates that no signal has yet been received from the buoy
- Green indicates that a signal has been received from the buoy and everything is good

**Note:** In the case that there is only one radio, there is no way to quality control (QC) the broadcast of the buoy, so the buoy will stay red.

### 3.2 Create multiple buoys

By right clicking the **Group** node and selecting **Buoy Clicker** in the drop-down tab, the user will enter a clicking mode.

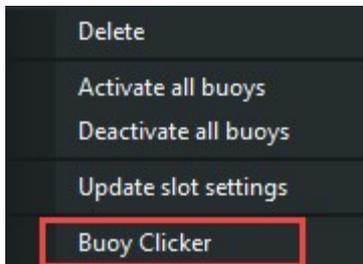


Figure 16 Before adding multiple buoys with the Buoy Clicker update slot settings

When Buoy Clicker is clicked a prompt window will open to select shared **Name** (each buoy will then have a **\_x**, where x is the number of buoy in sequence), **MMSI**, type of buoy, broadcasting power, and if the buoys should be in the **Virtual** or **Synthetic** subgroup.

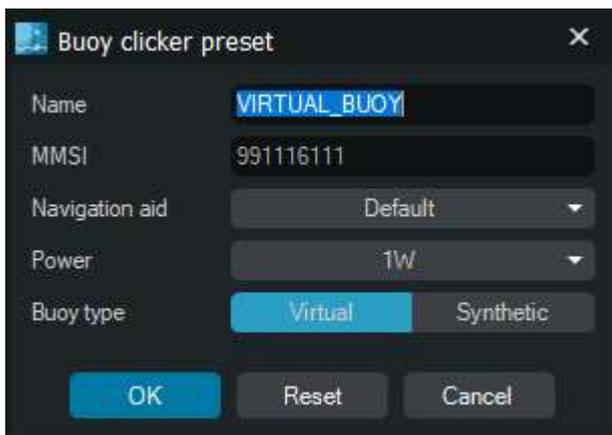


Figure 17 Prompt window for Buoy Clicker

Wherever the user left clicks on the **Map View**, a new buoy will be created with the position of the clicked point. To stop the clicking mode press the Esc button on the keyboard.

### 3.3 Update slot settings

If the user did not add enough buoys when the automatic group was created (see [Create new group](#)), the user can update the group settings by right clicking the **Group** node and selecting **Update slot settings**. This will open a prompt window where **Buoys in group** may be updated as well as the **Slots between buoys**. When the settings are changed, NaviSuite Perio will redistribute the buoys on the radio(s).

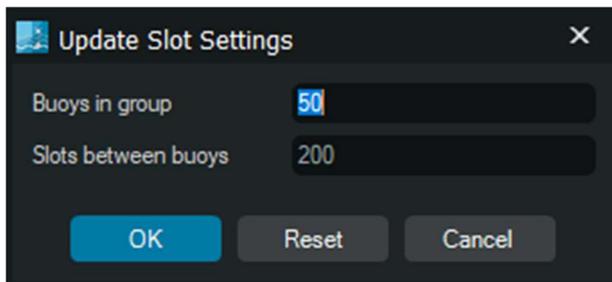


Figure 18 A maximum number of buoys on the group, and a slot interval between buoys helps NaviSuite Perio distribute the channels

### 3.4 Edit buoy

If the user needs to reconfigure a buoy, it is possible by right clicking the **Buoy** node and clicking **Edit**. The **Buoy Name**, **Longitude**, **Latitude**, **Type**, dimensions (**Dimension A-D**), **Power** and **Position Accuracy** may be changed.

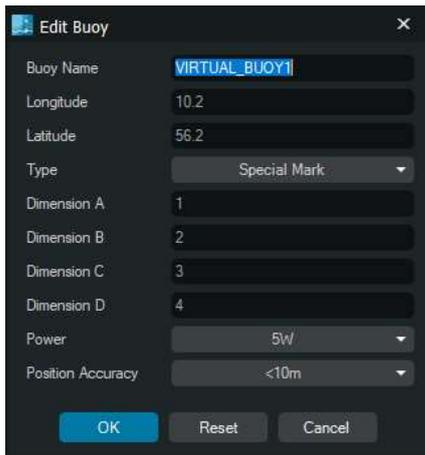


Figure 19 Edit Buoy window

### 3.5 Delete buoy

By right clicking a buoy's node, the user can select to delete it. The user can also delete it by left clicking the node and then pressing the delete key on the keyboard. When successfully deleted, a notification is shown in the **Alarm Window** and the buoy count on the broadcasting radio is updated.

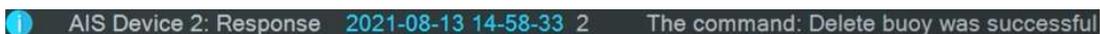


Figure 20 Successful removal of a buoy in the Alarm Window

### 3.6 Activate/deactivate buoys

The user can activate and deactivate buoys either individually or by group.

To activate/deactivate individual buoys, right click the buoy node and click **Activate buoy** or **Deactivate buoy**. To activate/deactivate all buoys in a group, right click the group node and click **Activate all buoys** or **Deactivate all buoys**.

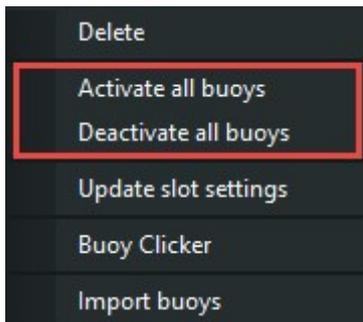


Figure 21 Activate or deactivate all buoys in a group

### 3.7 Always on

If the user has specific buoys that should always stay on, it is possible to configure the buoy for this by right clicking its node.

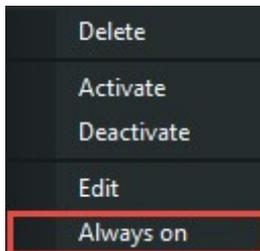


Figure 22 Always on function for buoys

This is convenient if certain buoys in a group should only be activated when, for example, a vessel is going in or out of a harbour, while others should stay on always. In this scenario, the user can activate all buoys when a vessel is coming in, and when the vessel is gone, deactivate all buoys. This will leave all buoys set to **Always on** still being broadcasted, while turning off the buoys used only in the vessels' presence.

Buoys that are selected as **Always on** have an (A) extension in their name on the buoy node (see Figure 23)

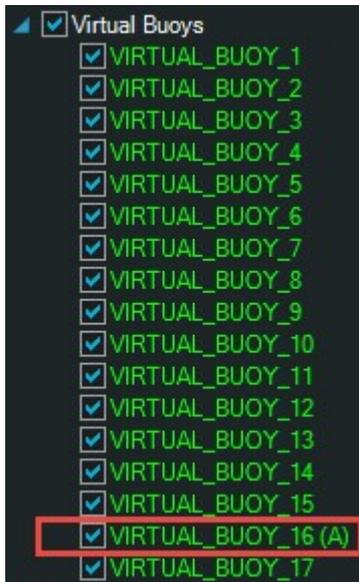


Figure 23 Buoys set to Always on have an (A) extension in their name

### 3.8 Import buoys

If the user would like to import buoys from a .CSV file, it is possible by right clicking the Virtual Buoys or Synthetic Buoys node.

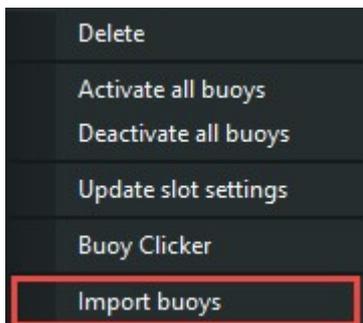


Figure 24 Import buoys from a .csv file into the group

The .CSV file has two possible formats the user can follow, depending on whether it is a manual or automatic group.

#### 3.8.1 Import buoys to an automatic group

The format in the .CSV file for importing buoys into an automatic NaviSuite Perio group should follow:

*MMSI,Buoy Name,Longitude,Latitude,Type,Dimension A,Dimension B,Dimension C,Dimension D,Power,Accuracy*

- **Buoy Name** needs to fit these rules: upper case only, no spaces, \_ is allowed and max 20 characters
- **Type** is the *id* of the AIS buoy type
- **Power** can be: *1w, 2w, 5w, or 12.5w*
- **Accuracy** can be: *<10m or >10m*
- **Longitude** and **Latitude** are decimal degrees, ie *DD.DDDDD*

Examples of this could be:

111222336,VB4,4.746,0.057,30,1,1,1,1,1W,<10m

111222337,VB5,4.846,0.057,30,1,1,1,1,1W,<10m

111222338,VB6,4.946,0.057,30,1,1,1,1,1W,<10m

### 3.8.2 Import buoys to a manual group

The .CSV file for importing buoys into a manual NaviSuite Perio group should follow this format:

*MMSI, Buoy,Name,Longitude,Latitude,Type,Dimension A,Dimension B,Dimension C, Dimension D,Power,Accuracy,Starting Hour A,Starting Minute A,Starting Slot A,Broadcasting Interval A,Starting Hour B,Starting Minute B,Starting Slot B,Broadcasting Interval B*

- **Buoy Name** needs to follow these rules: upper case only, no spaces, \_ is allowed, max 20 characters
- **Type** is the *id* of the AIS buoy type
- **Power** can be: *1w, 2w, 5w, or 12.5w*
- **Accuracy** can be: *<10m or >10m*
- **Longitude** and **Latitude** can be: *DD.DDDD, DD MM.mmmm, or DD MM SS.ssss*

Examples of this could be:

111222354,VB2,4.546,0.057,30,1,1,1,1,1W,<10m,0,0,2200,6000,0,2,700,6000

Or

111222355,VB3,4 38 45.6,0.057,30,1,1,1,1,1W,<10m,0,1,150,6000,0,2,900,6000

## 4 AIS device redundancy

If a radio at some point loses connection to NaviSuite Perio, it will turn red under the **AIS Devices** node, and the **Alarm Window** will notify the user that NaviSuite Perio is attempting to re-establish a connection.



Figure 25 Alarm Window showing NaviSuite Perio attempting to reconnect to the lost AIS Device 2

In theory, the radio could still be broadcasting the assigned buoy(s), however if the assigned buoy(s) of the lost AIS device turns red under the **Virtual Buoy / Synthetic Buoys** node, it indicates that NaviSuite Perio is not receiving any signal from the lost radio's buoys. This shows the radio is not broadcasting, as well as a connection issue between NaviSuite Perio and the radio. In the attempt to rebroadcast the buoy(s), NaviSuite Perio will move the buoy(s) to the least loaded radio(s) in the group. When the transfer is successful the following notification will be shown in the Alarm Window.



Figure 26 AIS redundancy

When there are more than two functional radios, the buoy(s) will turn green again when NaviSuite Perio can confirm a signal is received again.

If there is only one functional radio, NaviSuite Perio cannot perform QC to confirm a signal is received from another radio broadcasting the buoy, therefore the buoy stays red.