Sonardyne
SOUND IN DEPTH

UM-8275-EO

User Manual for Echo Observer for Syrinx

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Third party and open source software used with this product is listed in the "About" section of this software; see *Section 4.3.4.9*.

Contacting the Sonardyne Support Team

24-hour Emergency Telephone Helpline: +44 (0) 1252 877600

The Sonardyne 24-hour helpline is answered at the UK Headquarters during normal office hours (08:00 to 17:00). Outside these hours, your call is automatically transferred to an agency, which logs the details of your emergency and alerts the appropriate Sonardyne personnel.

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If you require non-emergency product support, please contact your nearest Sonardyne office. Alternatively, contact the Sonardyne Head Office:

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Note

Email and telephone support is available during normal UK office hours (08:00 to 17:00).

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Amendment History

The amendment history records all amendments and additions made to this manual.

Issue	Revision	Date	Comments	Section	Page
A	1	03/12/2020	Initial Issue	All	All

Section 1 – Introduction

1.1 About this Manual

This user manual describes the safe installation, operation and maintenance of the Echo Observer for Syrinx (EOS) software application.

This manual assumes the reader is familiar with Syrinx operation and the Syrinx User Manual.

1.1 Intended Audience

This user manual contains information and guidance for personnel operating a Syrinx DVL in ADCP or DVL+ADCP mode.

1.2 Related Publications

The following publications can be referred to in conjunction with this manual.

Table 1-1 Related Publications

Publication	Title
Sonardyne Safety Manual	*Operational and Safety Precautions*
UM-8275	*User Manual for Syrinx DVL*

1.3 Conventions used in this Manual

Table 1-2 Conventions used in this Manual

Format	Convention
Boldface Type	User input, menu options, keys, e.g. Click **OK**
Arrow (**>**)	Selection of an additional menu item e.g. **File>Save**
Italic Type	References to figures, tables and text within this manual and other publications

Section 2 – Technical Description

2.1 Introduction

Echo Observer for Syrinx (abbreviated to EOS in this manual) is a lightweight software application designed to run on a desktop PC. Its core purpose is to provide Syrinx or SPRINT-Nav users, who have upgraded to Acoustic Doppler Current Profiling (ADCP) firmware, with the ability to:

- Configure a live Syrinx for operation
- Collect ADCP data from a live Syrinx
- Log ADCP data from a live Syrinx
- Load previously collected ADCP data (with or without a live Syrinx connection)
- Inspect, visualise, and QC ADCP data; and
- Export the ADCP data.

Figure 2-1 shows the live ('online') workflow of EOS when a connection to Syrinx/SPRINT-Nav is present.

Figure 2-1 Echo Observer connected to Syrinx

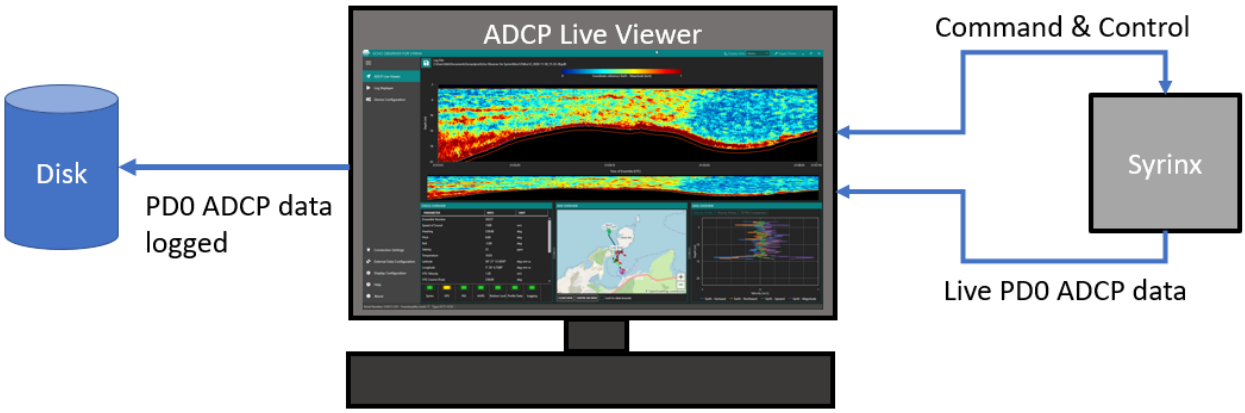
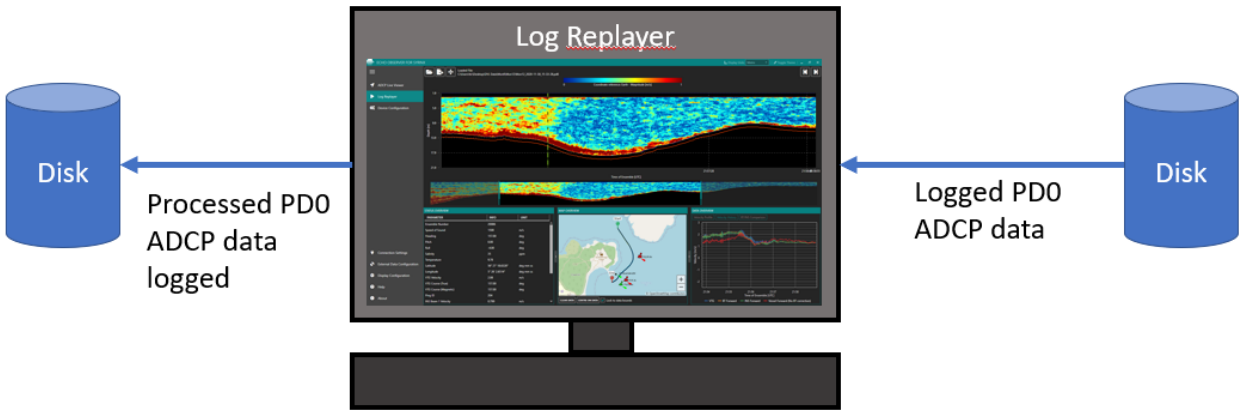


Figure 2-2 shows the workflow of EOS when there is no connection to Syrinx/SPRINT-Nav, i.e. 'offline' mode.

Note

All offline mode facilities, such as data inspection and export, are also available in online mode.

Figure 2-2 Echo Observer with no connection to Syrinx



EOS is compatible with the Windows®10 operating system and a PC with at least a dual core, 2 GHz processor. The application is supplied as a Windows installer and once installed, occupies approximately 3 MB disk space and requires 200 MB RAM when running.

Section 3 – Software Installation

3.1 Introduction

EOS is supplied on a USB media and should be installed on a Windows PC running the Windows®10 operating system.

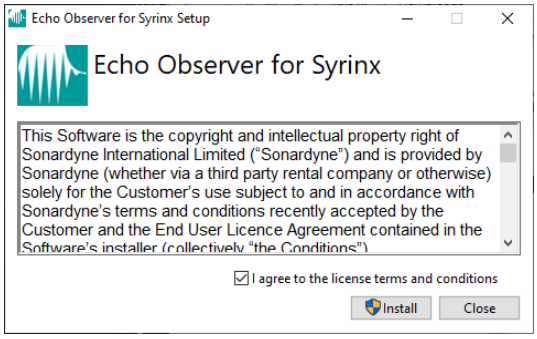
3.2 Installation Procedure

To install EOS:

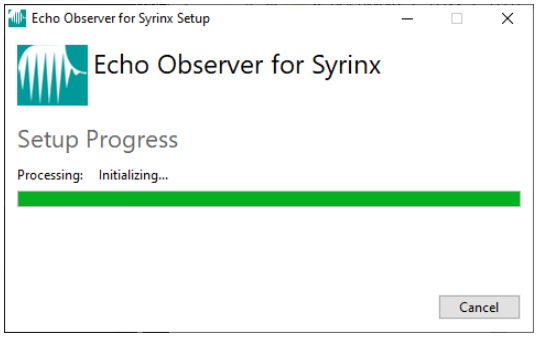
Note

Close any previous versions of EOS that are open before installing a new version.

1. Navigate to and double-click the EOS installation file.
2. When prompted, agree to the licence terms and conditions and then click **Install**.



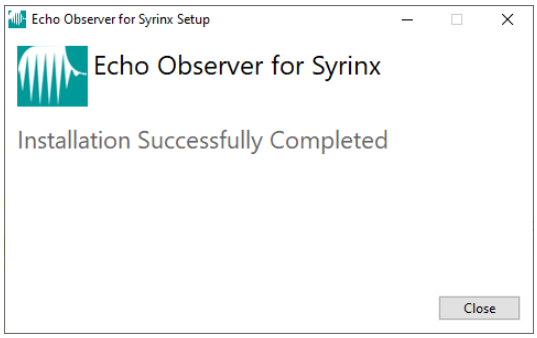
3. On the **User Account Control** window, click **Yes** to allow the installer in install EOS, or **No** to abort the installation.
4. A **Setup Progress** window will display the software installation status.



Note

During the installaion the installer will attempt to download Open Street Map (OSM) image tiles from the internet. If no internet connection is available, EOS will be installed but these tiles will not be displayed in the Map Overview.

5. The following window will confirm that EOS has been successfully installed.



Section 4 – Operation

4.1 Opening EOS

To open EOS:

- Click **START > Sonardyne Echo Observer > Echo Observer**, or
- In the Windows **Search** option, start typing **Echo Observer** and click the icon in the search results.

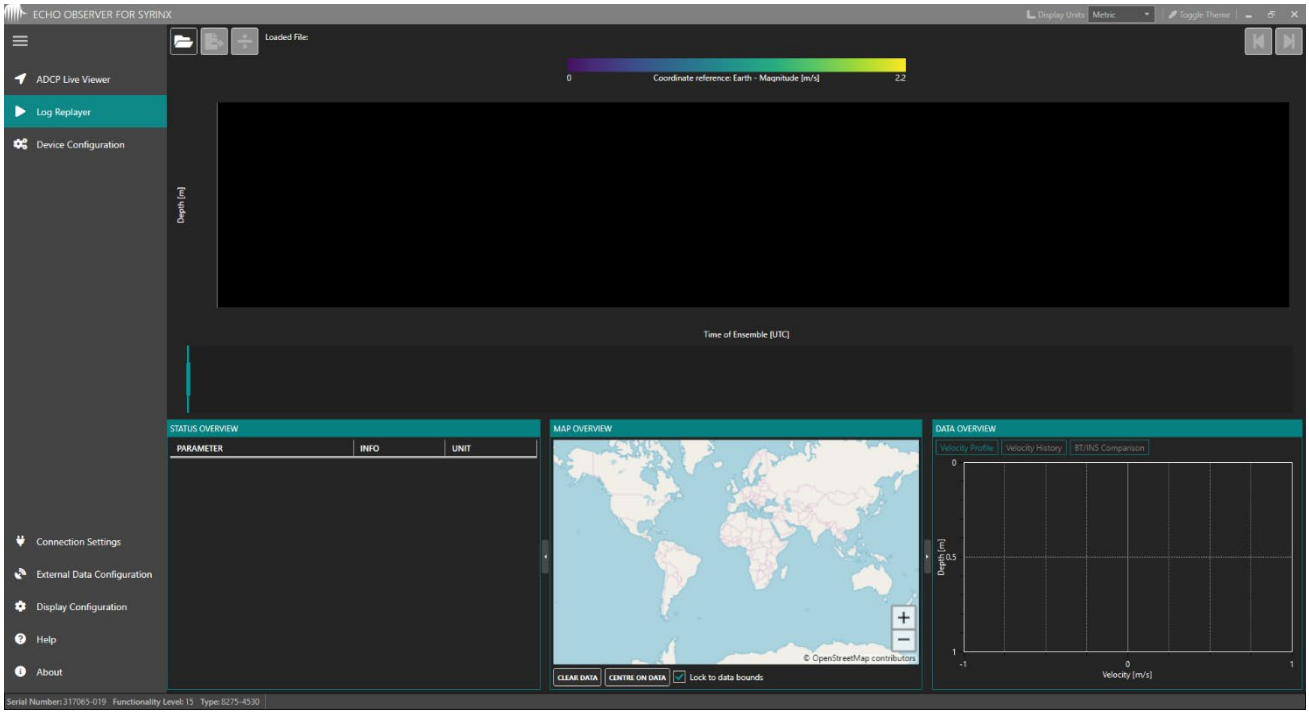
Note

EOS can be pinned to the taskbar or saved as a desktop shortcut.

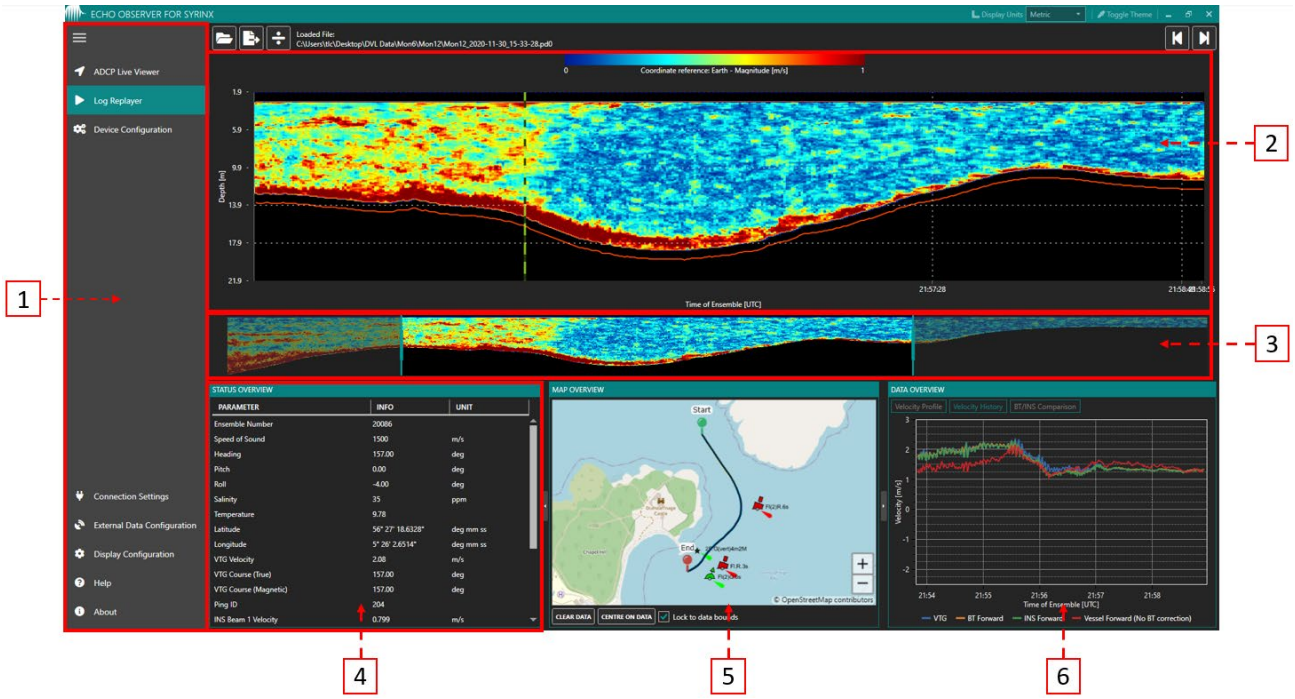
4.2 EOS Overview

4.2.1 Main Window

When first opening EOS, the **ADCP Live Viewer** window is displayed as shown below.



The EOS Log Replayer window is shown below with a description of the individual panes.

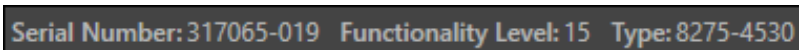


EOS Pane	Description
[1] Configuration Options (*Section 4.3*)	Allows switching between live and replay mode, configure how EOS connects to Syrinx, configure how external sources of data (such as NMEA strings) are sent to Syrinx, configure the graphical displays, and present Help and About EOS information windows
[2] Waterfall Display (*Section 4.4*)	Displays a fixed number of profile velocities as they are captured live from Syrinx or read from a file downloaded from Syrinx
[3] Mission Waterfall Display (*Section 4.5*)	Displays all profile velocity data captured live from Syrinx or read from a file downloaded from Syrinx
[4] Status Overview (*Section 4.6*)	Displays selected textual information received from the most recent ping (in Live Mode) or a selected ping in (in Replay mode)
[5] Map Overview (*Section 4.7*)	Displays the Latitude and Longitude of Syrinx during a mission, and the water magnitude and direction at points during the mission
[6] Data Overview (*Section 4.8*)	This pane has three options: 1. Displays water profiles from the most recent ping (in Live Mode) or a selected ping (in Replay mode) 2. Displays a history of vessel and water speeds, derived from Syrinx itself (via bottom track or ADCP measurements), GPS data, and/or inertially derived velocities 3. Displays a beam-frame comparison between bottom track velocities and inertially derived velocities

In addition to the descriptions above, a small number of extra utilities and information are available as described below.

4.2.2 Syrinx Hardware Information

The Syrinx serial number, functionality level and hardware build type are displayed in the bottom left of the EOS window, as shown below.



This information is only populated once a connection has been established with Syrinx.

4.2.3 Graphical Theme

The graphical theme of EOS can be toggled between night and day mode using the 'Toggle Theme' button at the top right of the EOS window, as shown below.

4.2.4 System Units

The units used throughout EOS can be switched between Metric and British Imperial. To select a system of units, use the selector at the top right of the EOS window, as shown below.

4.2.5 Pane Resizing

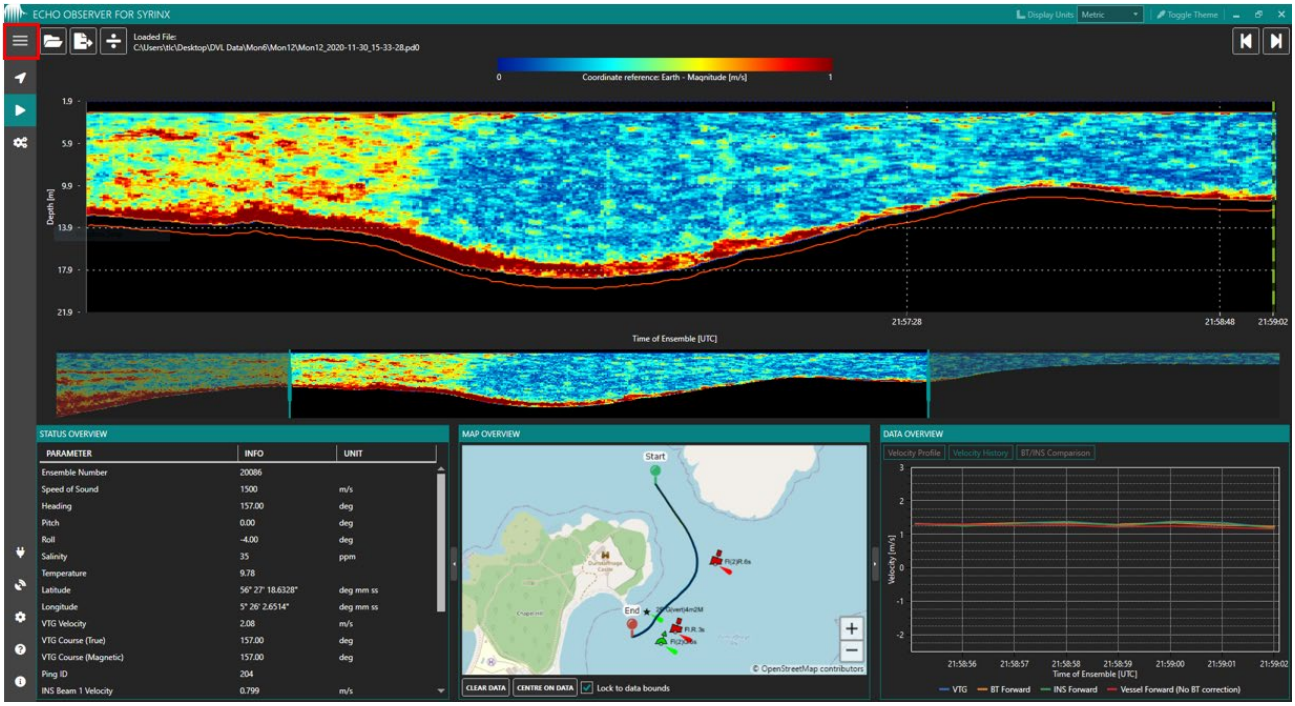
The width of the **Status Overview**, **Map Overview**, and **Data Overview** panes can be adjusted by dragging their inner borders (marked with red arrows).

4.3 Configuration Options

4.3.1 Introduction

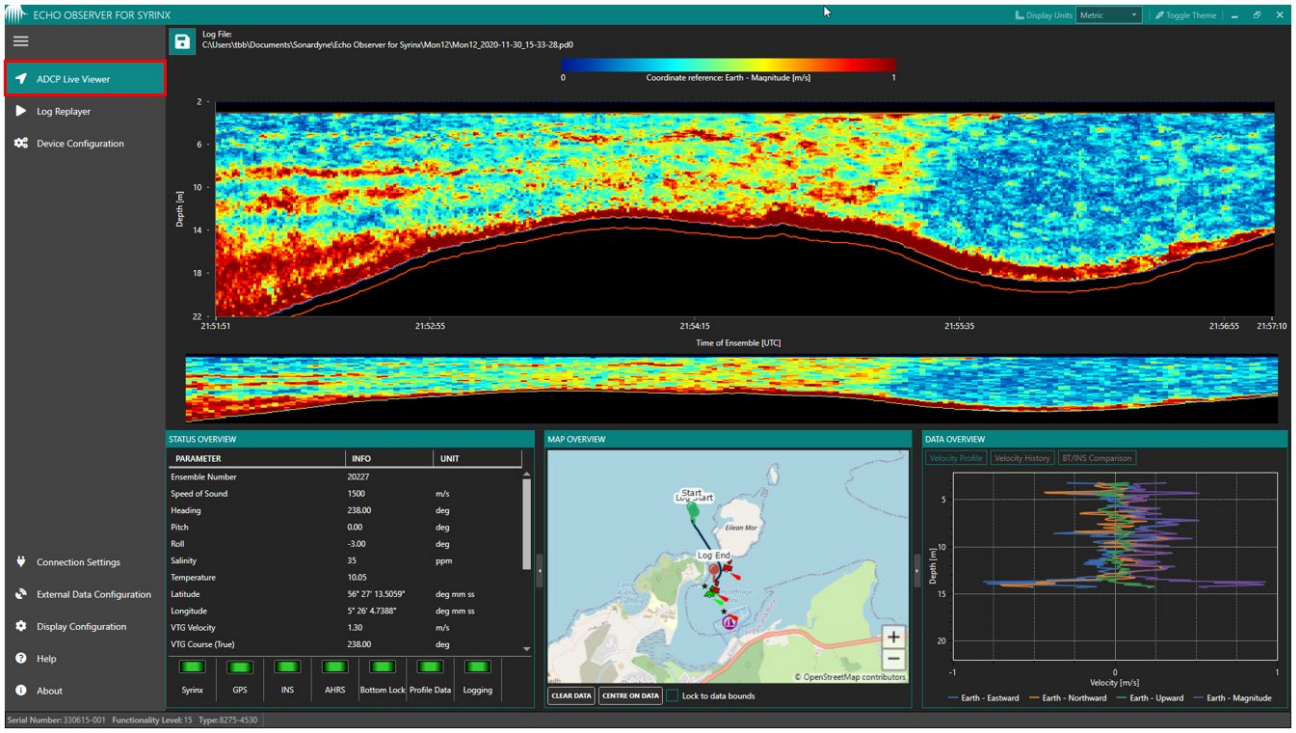
The configuration options pane contains tabs that change the information displayed in the EOS window. This pane can be horizontally shrunk to maximise the available space for the Waterfall plots, the Status Overview, the Map Overview, and the Data Profile panes.

Click ☰ to minimise configuration options in the left pane. The EOS window is shown below.



4.3.2 ADCP Live Viewer

Click ADCP Live Viewer to show a live display of received PD0 profiling data on the 'Waterfall' display (as shown below). Connection to Syrinx or SPRINT-Nav must first be established before live data can be displayed; *Section 4.3.4* describes how to connect EOS to Syrinx or SPRINT-Nav. The most recent profile velocities appear on the right-hand side of the plot; older profiles appear to the left. The plot updates with every PD0 ensemble received. In this way, the plot 'scrolls' from right to left as new data is added.

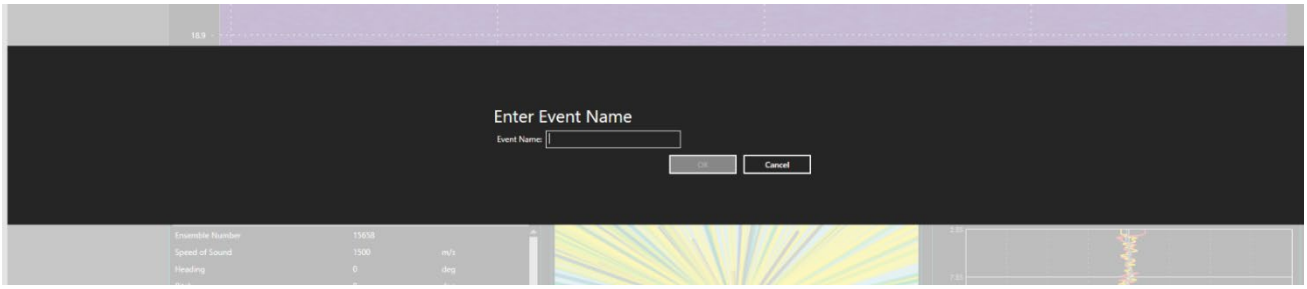


The Status Overview, Map Overview and Data Profile panels all update as each new PD0 ensemble is received.

4.3.2.1 Logging

Once a mission is underway, the data can be logged.

To begin logging, click  . A window will open allowing the **Event Name** of the logged data to be entered.



The Event Name is a text string by which missions can later be identified. When the **Event Name** has been entered, click **OK** to begin logging. Data received prior to clicking **OK** will not be logged. Click **Cancel** to exit without starting to log data.

By convention, all Log files created by EOS are stored in a directory labelled by the Event Name. For example, if the Event Name is **Survey1**, log files for this event will be stored in **C:\Users\USERNAME\Documents\Sonardyne\Echo Observer for Syrinx\Survey1**. All logged files are appended with a date and timestamp, allowing new logs that are created with the same Event Name to be identified by date and time, e.g. **Survey1_2020-03-18_14-29-15.pd0**.

Note

If logging is enabled in EOS, PD0 ADCP data will still be automatically logged to the device for retrieval later if necessary. Consult the Syrinx User manual for information on how to download data from the device.

4.3.2.2 System Monitoring

The ADCP Live Viewer window contains a set of status LEDs beneath the Status Overview pane.

Once connection to Syrinx is established, each LED provides a visual summary of the status of a particular component of the ADCP system. More information on the status of each component can be seen in the tool tips. These are accessed by hovering the mouse over the item of interest.

The LED status is described below:

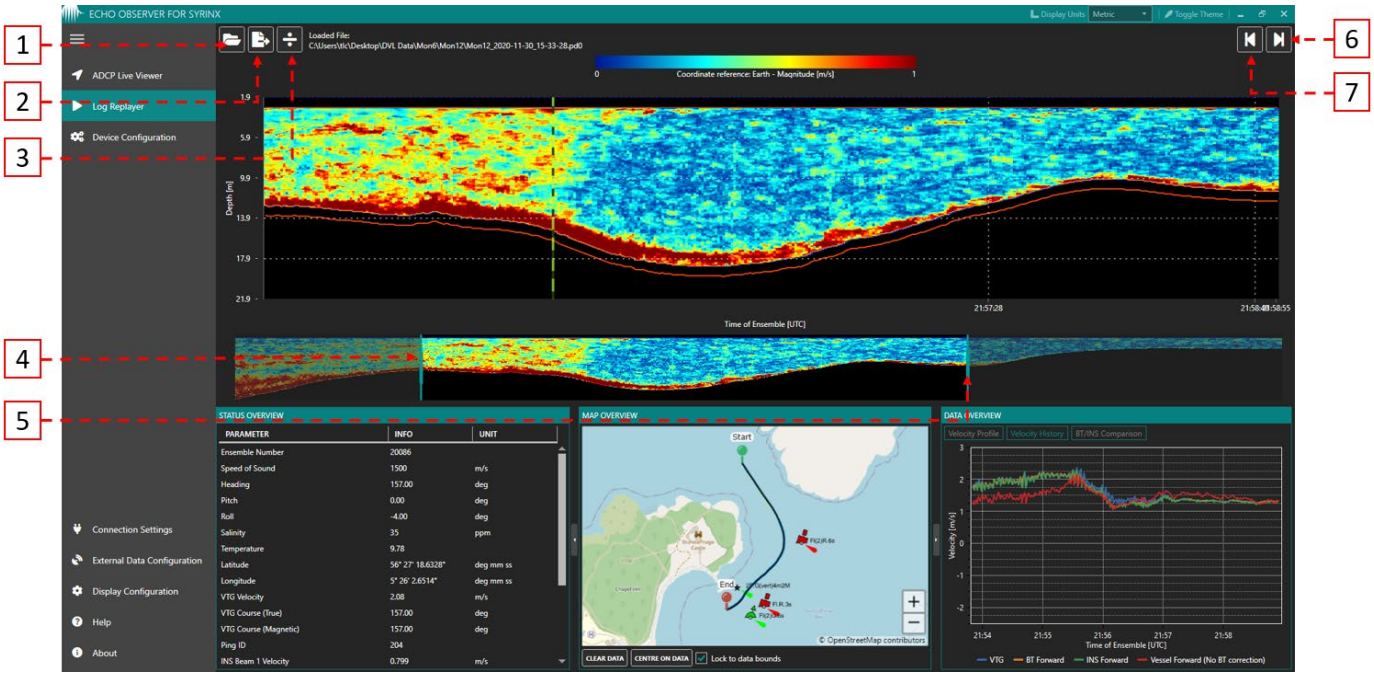
Component	LED	Description
Syrinx		Cannot connect to Syrinx
		Can connect to Syrinx, but no ADCP data is being received – this normally indicates a configuration problem. Hovering the mouse pointer over the LED shows text describing the reason for the configuration problem
		Connected to Syrinx and receiving PD0 ADCP data

Component	LED	Description
GPS		Syrinx is disconnected GGA and/or VTG data has not changed in the last ten ensembles The PD0 ensembles do not contain a NMEA GGA leader NMEA GGA leaders have been received but the FixQuality field is Invalid The GGA Latitude is invalid, i.e. Latitude > +90° or Latitude < -90° The GGA Longitude is invalid, i.e. Longitude > +180° or Longitude < -180°
		NMEA GGA leaders have been received but the FixQuality = Estimated and valid coordinates The latitude and longitude fields in the PD0 data have been populated by an external navigation system such as SPRINT
		PD0 NMEA GGA leaders have been received, the FixQuality shows a valid fix, and the Latitude and Longitude are both valid
INS		Syrinx is disconnected No LNAV messages have been received by Syrinx in the last five seconds LNAV data has not changed in the last ten ensembles The field SonardyneVariableLeader.ValidInsData flag is not set
		LNAV messages are being received by Syrinx
		Note: GPS data should only be fed into either Syrinx (if the device is a standalone Syrinx unit) or SPRINT-Nav, not both.
AHRS		Syrinx is disconnected AHRS data has not changed in the last ten ensembles PD0 ensembles do not contain the Sonardyne Variable leader The field SonardyneVariableLeader.ValidAhrsData flag is not set
		PD0 ensembles contain the Sonardyne Variable leader and the field SonardyneVariableLeader.ValidAhrsData flag is set
Bottom Lock		Syrinx is disconnected Bottom lock has not been achieved on any beams No data is being received
		Between one and three beams have achieved bottom lock
		Bottom lock has been achieved on all four beams
		Hovering the mouse pointer over the bottom track LED shows text describing which beams have a valid bottom lock
Profile Data		Good profile data is defined by 2/3 of the depth cells (from the first bin to the bottom tracking distance) have a correlation score of more than 10%
		Syrinx is disconnected No beams have good profile data The Correlation Score PD0 data section is missing
		Between one and three beams have good profile data
		All four beams have good profile data
		Hovering the mouse pointer over the bottom track LED shows text describing which beams have a valid bottom lock
Logging		Syrinx is disconnected The received data is not being logged Hovering the mouse pointer over the LED will display a message informing the user that data is not being logged
		EOS is logging PD0 data If the mouse pointer is then hovered over the Logging LED, the name of the logged file will be displayed

4.3.3 Log Replayer

Clicking this option allows data to be displayed from a pre logged PD0 file. The file could be data logged by EOS, or a file downloaded directly from Syrinx or SPRINT-Nav. *Figure 4-1* and description below shows the main EOS display when **Log Replayer** is selected.

Figure 4-1 Log Replayer Window



Label	Icon	Purpose	Description
[1]		Load PD0 file (*Section 4.3.3.1*)	Click icon to open dialog for opening a PD0 file into EOS
[2]		Export PD0 file (*Section 4.3.3.2*)	Click icon to open dialog for exporting a PD0 file from EOS
[3]		Split PD0 file (*Section 4.3.3.3*)	Click icon to split an open PD0 file into smaller files
[4]		Rewind to start	Click icon to rewind selected ensemble range to start of file
[5]		Fast-forward to end	Click icon to fast-forward selected ensemble range to end of file

4.3.3.1 Load PD0 file

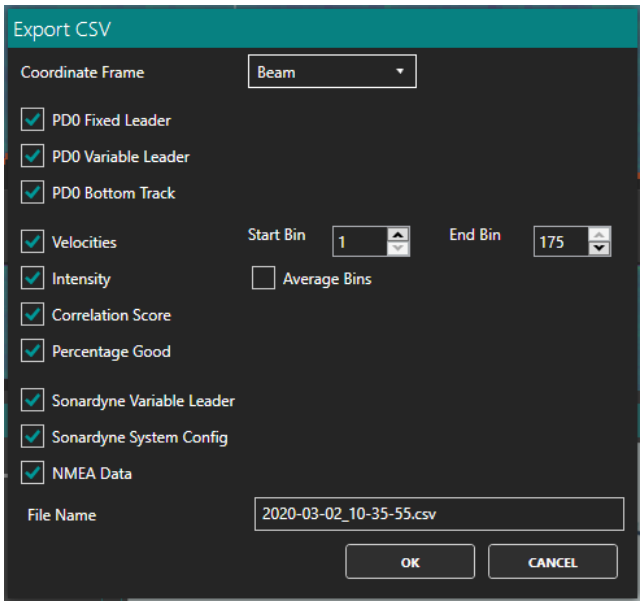
To import a file, click . Navigate to and select the file to import.

Note

Only PDO format data can be imported.

4.3.3.2 Export PD0 File

To export a PD0 file to csv format data, click  . An export window will open and allow you to customise the exported data as shown below. For a full description of the meaning of each PD0 field, see the Syrinx User Manual.



The **Coordinate Frame** drop-down list indicates the frame of reference to which the PD0 velocities, intensities, correlation scores, and percentage good fields should be transformed.

Select a check box to include the corresponding section of PD0 data in the exported .csv file.

For PD0 velocities, intensities, correlation scores, and percentage good fields, it is possible to specify which bins should be exported in the .csv file using the **Start Bin** and **End Bin** options. If the **Average Bins** check box is selected, all bins within the **Start Bin** and **End Bin** range will be averaged to produce a single averaged bin.

The output name of the file must be entered in the **File Name**. The exported .csv file will be saved to a subdirectory named **export** in the location where the input .pd0 file is stored.

For example, the log files for the event **Survey1** are be stored in **C:\Users\USERNAME\Documents\Sonardyne\Echo Observer for Syrinx\Survey1**. The logged file in this location is **Survey1_2020-03-18_14-29-15.pd0**. If this file is exported as a .csv format file, it will reside in **C:\Users\USERNAME\Documents\Sonardyne\Echo Observer for Syrinx\Survey1\export**.

Once the desired content and file name have been specified, click **OK** to begin export, or **CANCEL** to cancel the export operation.

During export, a progress window displays the status and allows the export to be cancelled.

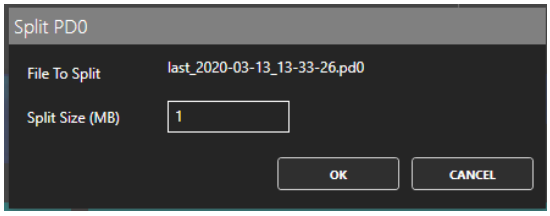
After the export has completed, a Windows File Explorer window will open at the location of the exported file.

4.3.3.3 Split PD0 File

If a previously logged file is large, it is possible to split it into smaller files to allow easier inspection of interesting events.

To split a large PD0 file into smaller files:

1. Load a PD0 file (see *Section 4.3.3.1*).
2. Click  .
3. The **File To Split** shows the filename of the currently loaded file.
4. Enter the **Split Size (MB)** (the size does not have to be an integer number of megabytes) and then click **OK**.



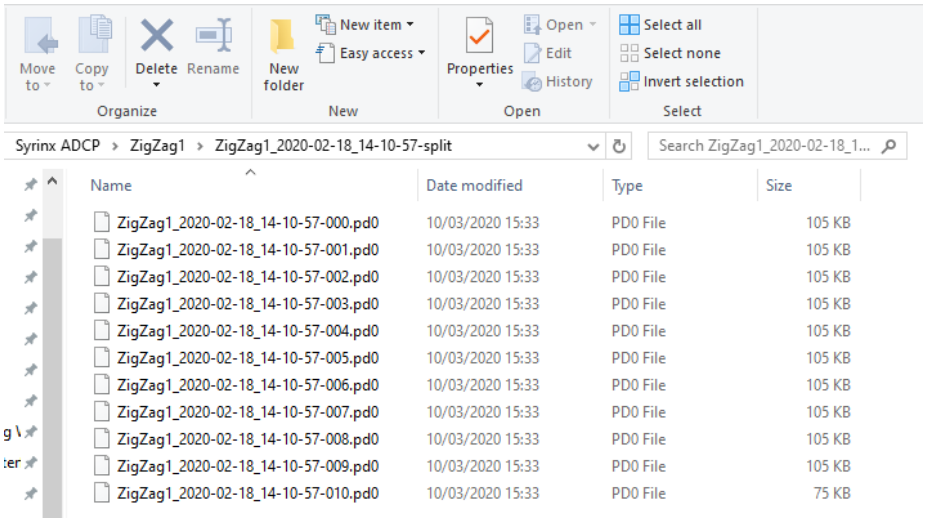
5. By default, the split files will be saved to a directory at the location of the input file.

   The name of this directory is the same as that of the input file, but with '-split' appended and the '.pd0' file extension of the input file removed.

   For example, the log files for the event **Survey1** are be stored in **C:\Users\USERNAME\Documents\Sonardyne\Echo Observer for Syrinx\Survey1**. The logged file in this location is **Survey1_2020-03-18_14-29-15.pd0**. If this file is split, the split files will be located in the directory **C:\Users\USERNAME\Documents\Sonardyne\Echo Observer for Syrinx\Survey1\Survey1_2020-03-18_14-29-15-split**.

6. A Windows File Explorer window will open at the location of the split files.

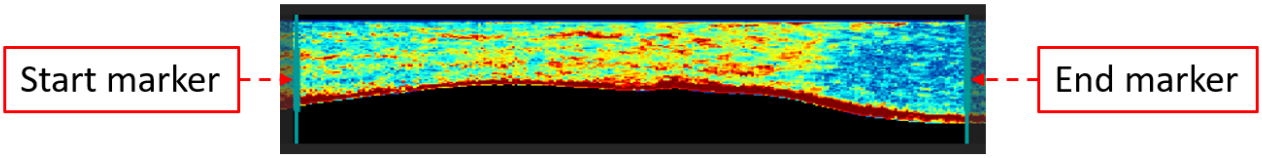
   The names of the split files are the same as the input file, but with the .pd0 file extension prepended with a hyphen and an integer. The integer indicates where the content of the split file originates from in the input file.



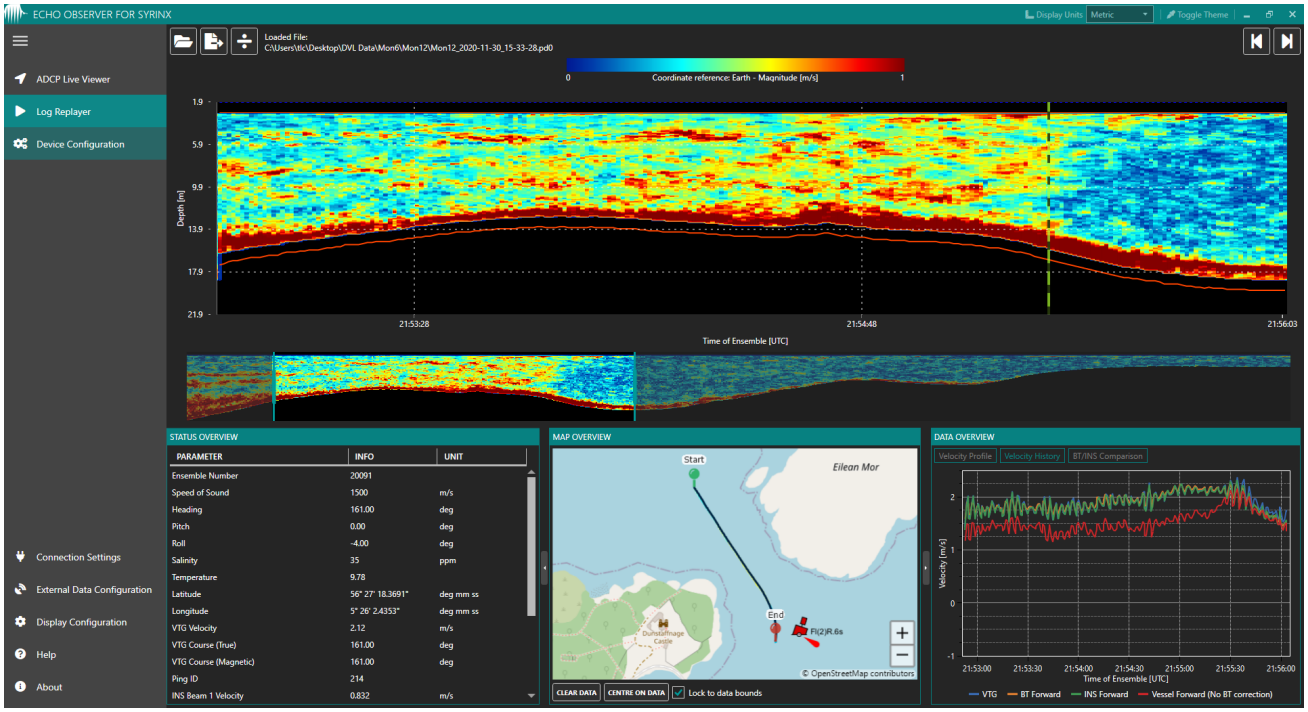
In this example above, ZigZag1_2020-02-18_14_10_57.pd0 is 1,157KB in size, and is split into 0.1MB files. The resultant split file ZigZag1_2020-02-18_14_10_57-004.pd0 refers to a 0.1 MB size file whose data is a copy of 0.1KB of the input file, starting 0.4KB into the original file.

4.3.3.4 Mission Waterfall Control

With **Log Replayer** selected, the Mission Waterfall plot shows a (decimated) view of the profile data for the entire file. The data presented in the Waterfall display is a subset of the data shown in the Mission Waterfall plot. The range of data displayed in the Waterfall display is delineated with a start and stop marker in the Mission Waterfall plot shown below.



Clicking and dragging on either limit marker allows a range of profile data from the Mission Waterfall plot to be displayed in greater detail in the Waterfall plot. When the range is selected or changed, the Map Overview and Velocity History (in the Data Profile panel) update to show only the ensemble data for the range specified in the Mission Waterfall plot. The figure below shows an example of selecting a small range of data from a large file:



After a range of data has been selected using the stop and start markers, different sections of data with the same range (i.e. number of ensembles) can be inspected by dragging the selected region in the Mission Waterfall plot.

Alternatively, the rewind and fast forward icon  can be used to set the position of the selected range of ensembles to the start or the end of the file.

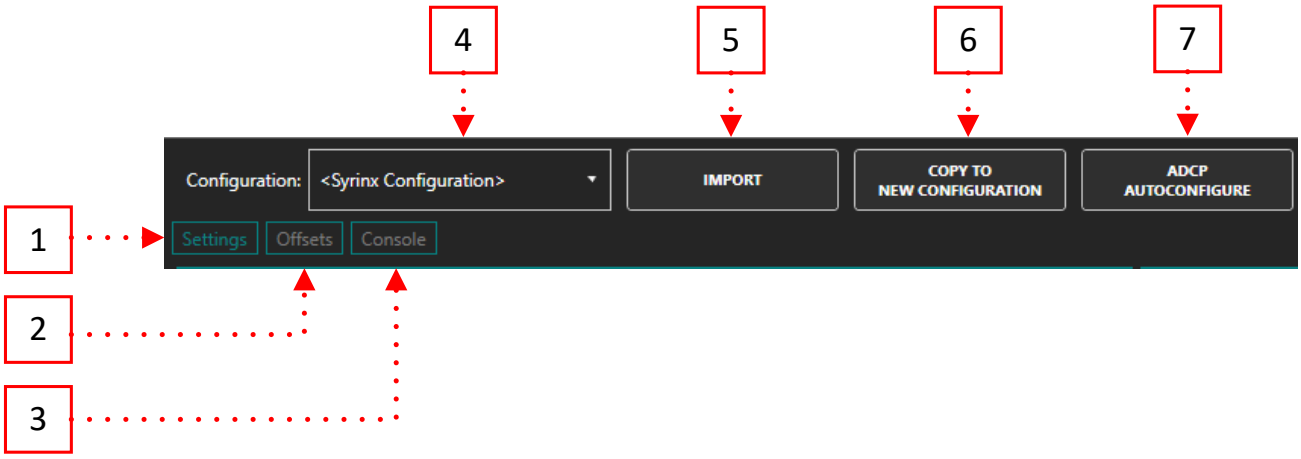
Individual PD0 ensembles can be inspected by clicking on the ensemble of interest in the Waterfall plot. When an ensemble is selected, the Status Overview and Beam Profile (in the Data Profile panel) update to show information specific to the selected ensemble.

4.3.4 Device Configuration

The Device Configuration pane allows a variety of operating parameters to be configured for Syrinx.

There are three panels available from Device Configuration: Settings, Offsets and Console. Each panel acts as an interface to configure the device once a connection has been established. Tabs to access the Settings, Offsets or Console panels are shown below.

Figure 4-2 Syrinx configuration management



Once set by a user, the Settings and Offsets can be stored to a Syrinx Configuration file. Syrinx Configuration files are managed by a set of icons at the top of the Device Configuration window. The Syrinx Configuration file management buttons are labelled 4-8 in *Figure 4-2*.

Label	Icon	Purpose	Description
[1]	Settings	Show Settings	Click to show the Settings menu
[2]	Offsets	Show Offsets	Click to show the Offsets menu
[3]	Console	Show Console	Click to show the Console
[4]	<Syrinx Configuration>	Select configuration	Click the dropdown to select a configuration to load
[5]	IMPORT	Open configuration	Click the icon to import a configuration from a location on your PC
[6]	COPY TO NEW CONFIGURATION	Copy configuration	Click the icon to copy the current configuration to a file on your PC
[7]	ADCP AUTOCONFIGURE	Autoconfigure for ADCP	Click the icon to autoconfigure for ADCP operations

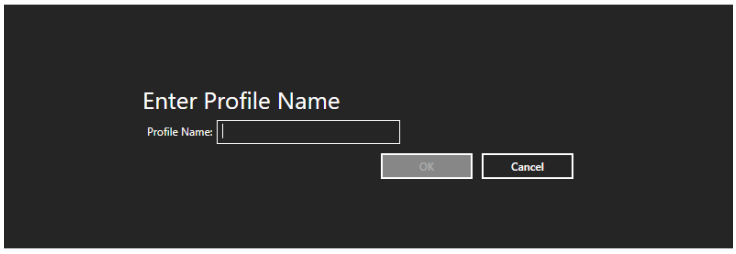
4.3.4.1 Syrinx Configuration Management

EOS provides a mechanism to view, edit and store Syrinx configurations off-device, allowing you to upload your configuration to Syrinx later.

The **Configuration** drop-down list contains a selection of Syrinx Configurations stored on the installation PC. A new installation of EOS already contains a default Syrinx Configuration. When a configuration is selected, the Settings and Offsets panes are updated to use the loaded configuration values.

If a Syrinx Configuration file is received from a different PC (e.g. via email or FTP), it can be opened by clicking **IMPORT**; see *Figure 4-2*. This action will open a Windows File Explorer window – use this window to navigate to the Syrinx Configuration file and then open it.

After the configuration has been opened in EOS, it may be edited as appropriate. When the necessary adjustments have been made, the updated settings can be saved to disk by clicking **COPY TO NEW CONFIGURATION**; see *Figure 4-2*. A popup window will appear inviting the user to enter a configuration name:



Once a new configuration name has been entered, click 'OK' to copy the settings data to a new file.

This will store the settings as an xml file in the **C:\ProgramData\Sonardyne\Echo Observer for Syrinx\DeviceConfigurations** folder. These settings can then be restored at a later date if necessary.

4.3.4.2 Settings

Click the **SETTINGS** tab (see *Figure 4-2)* to change **Syrinx Settings**, such as the Configuration Mode (e.g. Bottom Track, ADCP etc.) and the Trigger Mode (e.g. Free running, Trigger on +ve edge). See the Syrinx user manual for a full description of the meaning and permitted range for each parameter.

The **ADCP Settings** pane contains specific fields for controlling the ADCP parameters of Syrinx, such as the number of profile bins and their width. See the Syrinx user manual for a full description of the meaning and permitted range for each parameter.

If any of the Syrinx or ADCP settings do not match the value stored on Syrinx itself, due to e.g. a pending Settings change, the entry box will be highlighted orange. The on-Syrinx value will then be shown below the entry box.

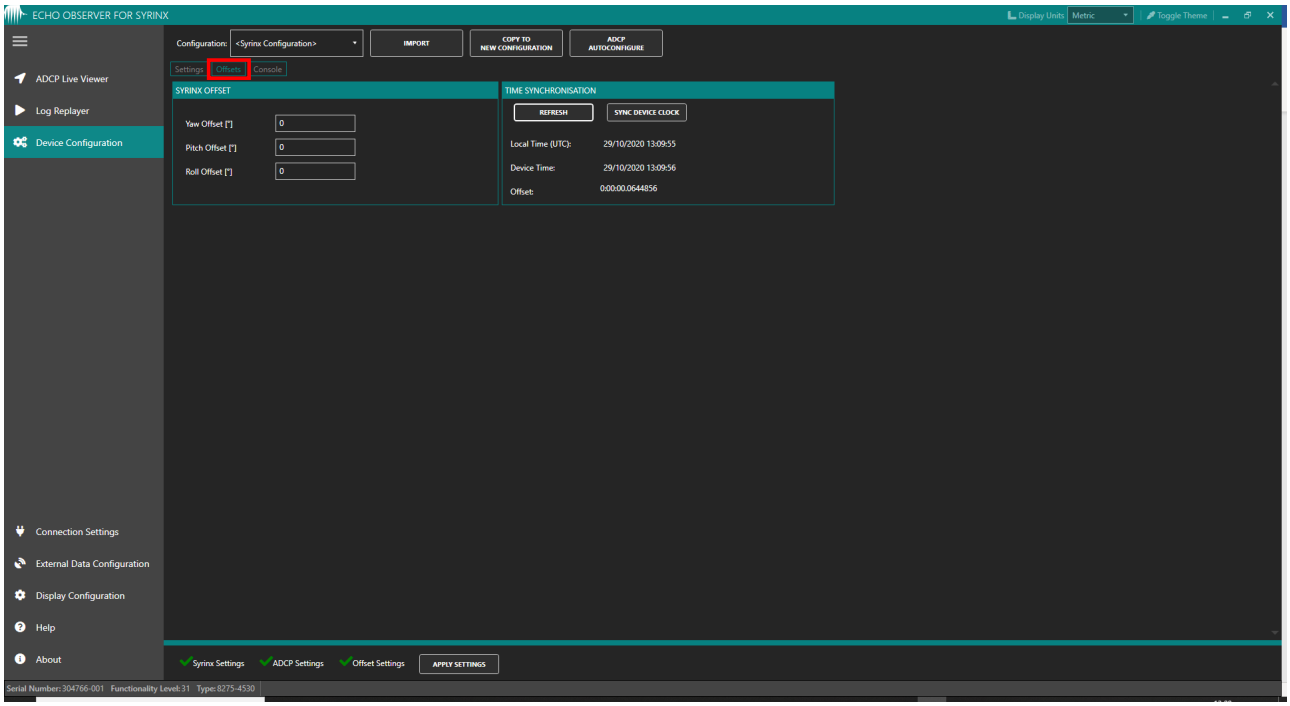
Once all Settings been configured as desired, click **Apply Settings** at the bottom of the pane to apply the settings to the device.

4.3.4.3 Offsets

Click the **OFFSETS** tab to change:

SYRINX OFFSET – this section contains entry boxes for yaw, pitch, and roll offsets (all in degrees), and for GPS X, Y and Z offsets (all in metres). See the Syrinx user manual for a more detailed description of these terms.

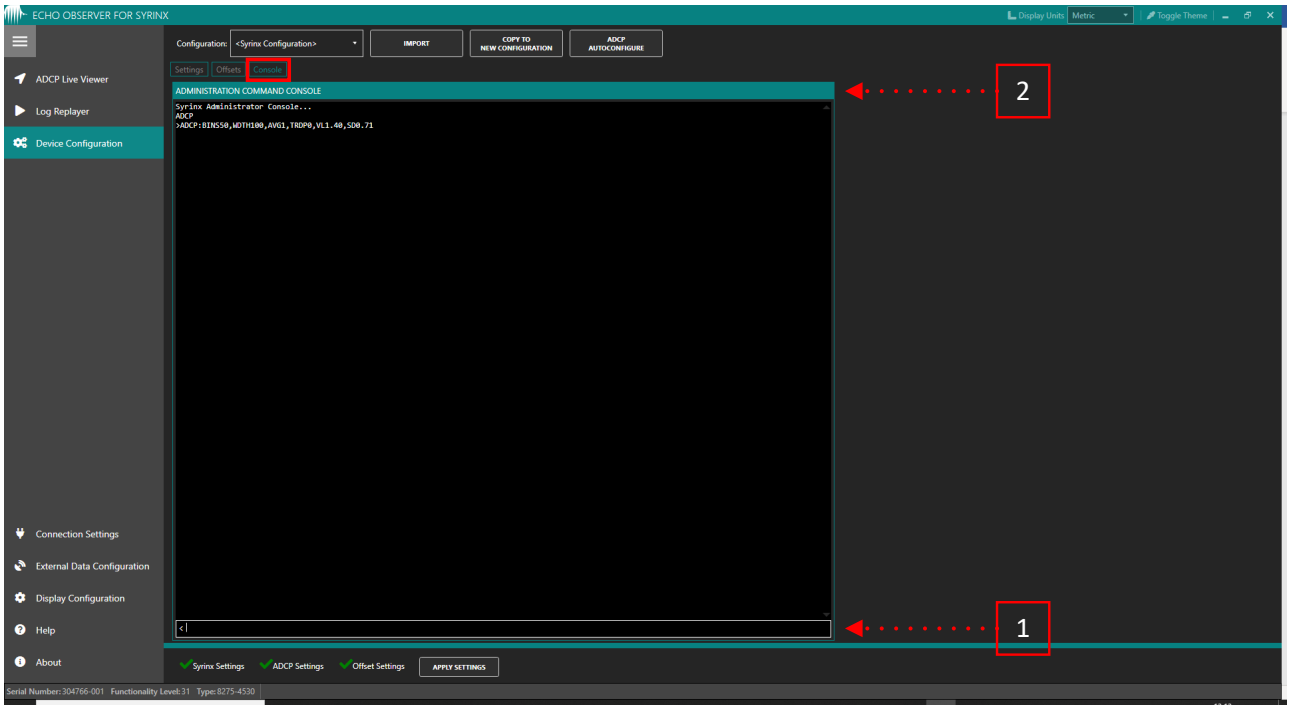
TIME SYNCHRONISATION – this section contains two buttons, REFRESH and SYNC DEVICE CLOCK. The first refreshes the Local UTC time, the Device time, and the difference between them displayed below. The second synchronises the device time with the local time from the host PC.



After all Offsets have been adjusted as desired, click **Apply Settings** at the bottom of the pane to apply the offsets to the device.

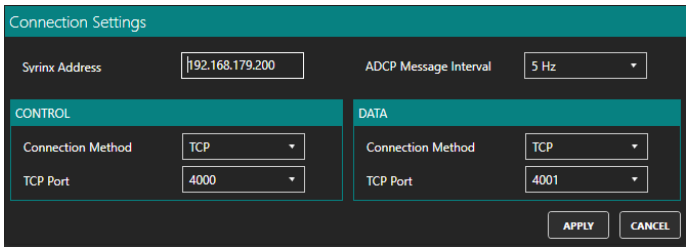
4.3.4.4 Console

Click the CONSOLE tab to allow commands to be entered using the terminal command line labelled 1 in the figure below; responses will be received if EOS is connected to Syrinx. Historic commands and their responses are displayed in the **ADMINISTRATOR COMMAND CONSOLE** window, labelled 2 in the figure below. See the Syrinx user manual for a more detailed description of the available commands.



4.3.4.5 Connection Settings

Click **Connection Settings** to open the **Connection Settings** and configure connection settings; the IP address of Syrinx (**Syrinx Address**) can be changed along with the output PD0 message rate (**ADCP Message Interval**).



The connectivity options are divided into two categories: Control and Data.

Control messages are used to configure the device. These messages can be issued to Syrinx via serial, TCP client or UDP multicasting port.

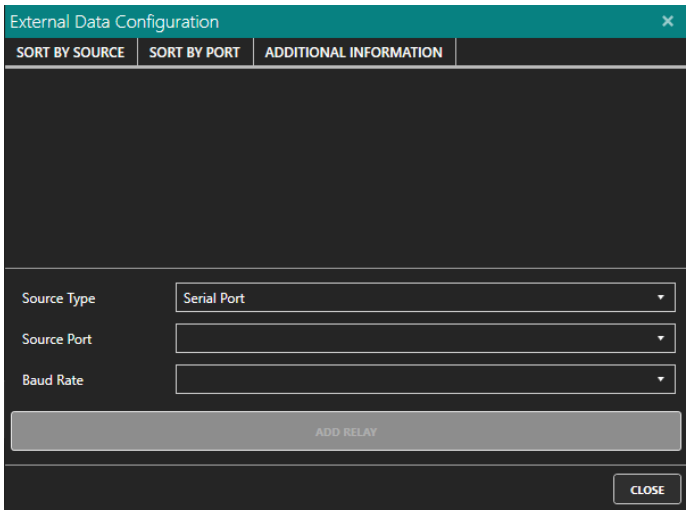
Similarly, PD0 ensembles can be configured such that Syrinx will stream them out over a serial, TCP server or UDP multicasting port.

In both control and data message cases, the underlying protocol and baud rate or port number must be specified to configure the system.

4.3.4.6 External Data Configuration

Click **External Data Configuration** to open a window (shown below) to set up a proxy service for passing messages between the EOS host PC and Syrinx.

These messages could include NMEA strings such as GGA and VTG strings received over a serial port.



The message source type can be a Serial port, TCP server or UDP multicast listener. The baud rate, for serial port connections, the source IP address and port for TCP client connections, or the multicast address and port for UDP multicast connections, can all be adjusted as appropriate.

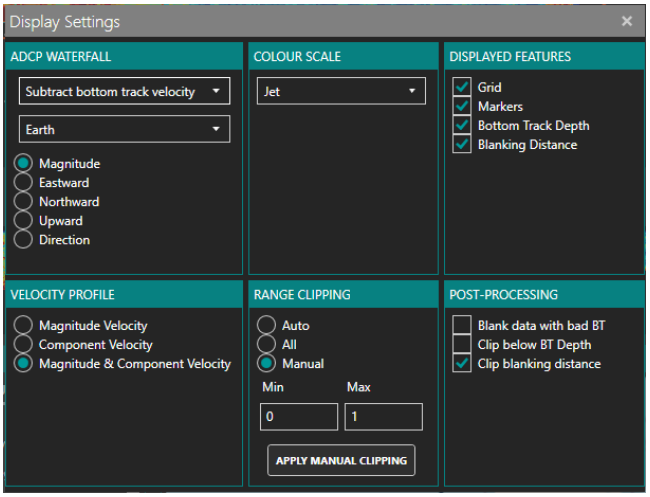
After the source of external data has been configured, click **Add Relay** to add the relaying connection. Data from this connection will be forwarded to Syrinx via the data port defined in 'Connection Settings' panel described above. A poorly configured proxy for external data can be removed by clicking the cross icon next to the connection.

Note

Only NMEA strings may be proxied from this interface – any other message types or formats will be rejected.

4.3.4.7 Display Configuration

Click **Display Configuration** to open the **Display Settings** and configure the way the data is presented.

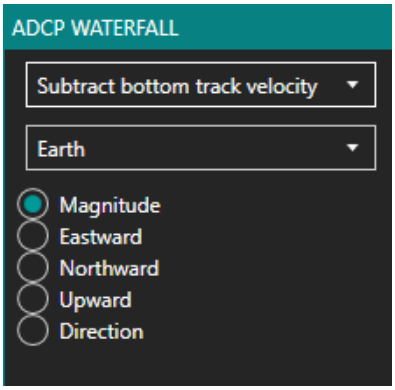


There are six display components which can be changed independently:

- ADCP Waterfall
- Colour Scale
- Displayed Features
- Velocity Profile
- Range Clipping
- Post-Processing

ADCP Waterfall

This allows the Waterfall and Mission Waterfall displays to be customised.



Note

The velocity data in the Beam Profile section of the Data Profile tab also changes when these options are selected.

Select velocity processing method to compensate for vessel speed; options are:

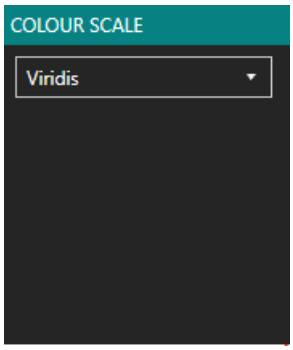
- **No velocity subtraction** – measured velocities are displayed.
- **Subtract bottom track velocity** – velocities are displayed with bottom tracking vessel velocity subtracted, i.e. the 'true' water velocity.
- **Subtract INS velocity** – velocities are displayed with inertial vessel velocity subtracted, i.e. the 'true' water velocity. Note: this functionality only works with a SPRINT-Nav system.
- **Subtract GPS velocity if no BT** – if bottom-tracking is not available, velocities are displayed with VTG velocity subtracted, i.e. the 'true' water velocity. This functionality only works if VTG NMEA strings are streamed into Syrinx or SPRINT-Nav.

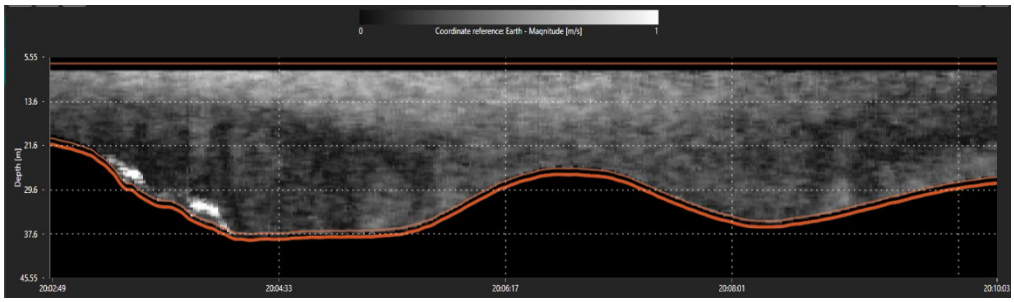
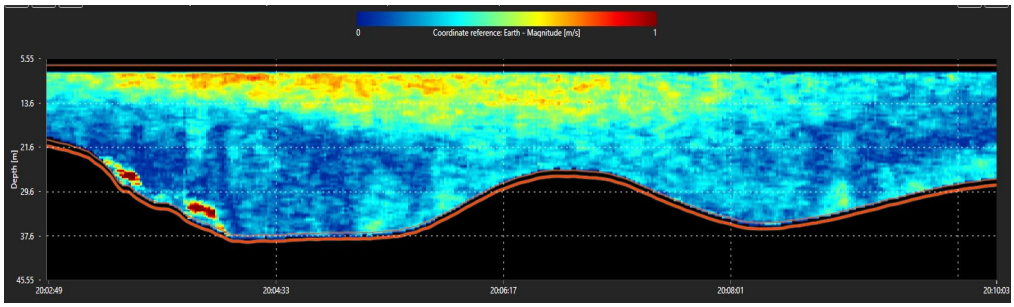
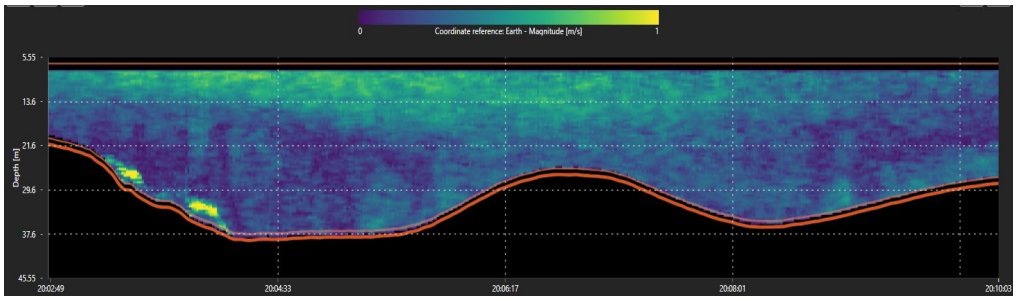
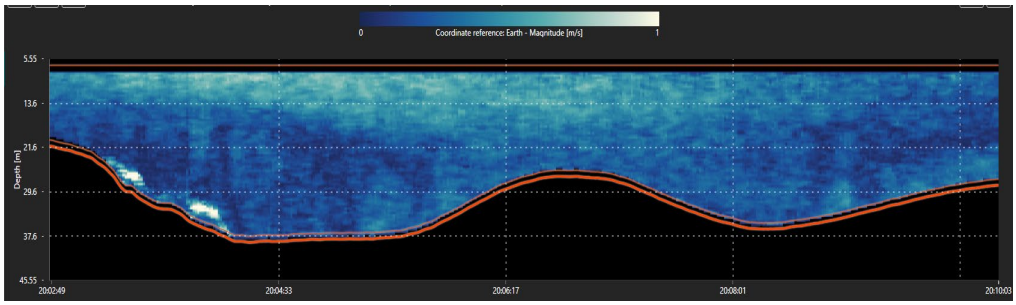
Select frame of reference; see the Syrinx user manual for a full description of each. Different options for displaying water velocities are available depending on the frame of reference chose. The different frames of reference are listed below, while the options for plotting velocities in a particular frame of reference are listed beneath each:

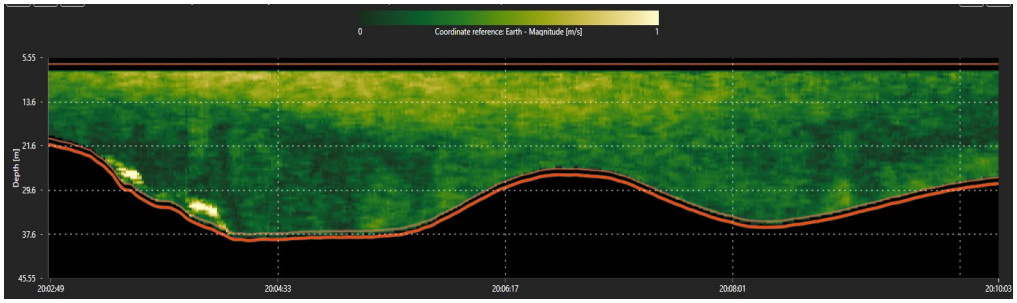
- **Beam**
  - Beam 1
  - Beam 2
  - Beam 3
  - Beam 4
- **Instrument**
  - Magnitude
  - X
  - Y
  - Z
- **Vessel**
  - Magnitude
  - Forward
  - Starboard
  - Upward
- **Earth**
  - Magnitude
  - Northward
  - Eastward
  - Upward
  - Direction

Colour Scale

The colour scale of the Waterfall and Mission Waterfall plots can be changed by selecting one of the following options:

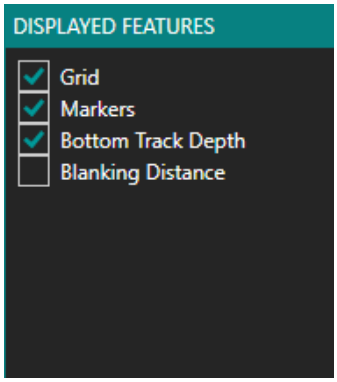


Colour	Example Waterfall
Greyscale	
Jet	
Viridis	
VelocityBlue	

Colour	Example Waterfall
VelocityGreen	

Displayed Features

The Waterfall plot can be customised to show or hide a variety of features of the data by selecting from the options shown below.

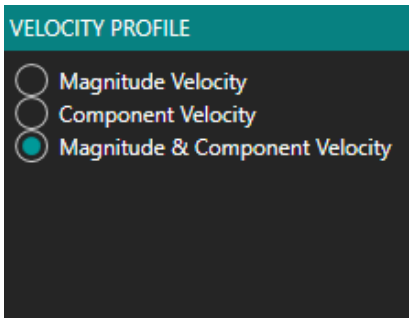


The options are:

- **Grid** – show/hide the grid lines on the Waterfall plot.
- **Markers** – in Log Replay mode, show/hide the marker for a selected ping.
- **Bottom Track Depth** – show/hide the red markers indicating the seabed.
- **Blanking Distance** – show/hide the red markers indicating the blanking distance.

Velocity Profile

The Velocity Profile plot can be customised to display different components of water velocity by selecting the from the options shown below.

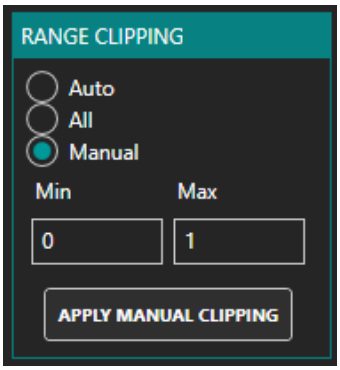


The options are:

- **Magnitude Velocity** – show the velocity magnitude only (any reference frame except Beam frame).
- **Component Velocity** – show the different components of the water velocity only (e.g. Northward, Eastward, and Upward in Earth frame).
- **Magnitude & Component Velocity** – show both the velocity magnitude and the velocity components.

Range Clipping

The colour scale of the Waterfall and Mission Waterfall plots can be adjusted to better visualise features in the data by selecting from the options shown below.

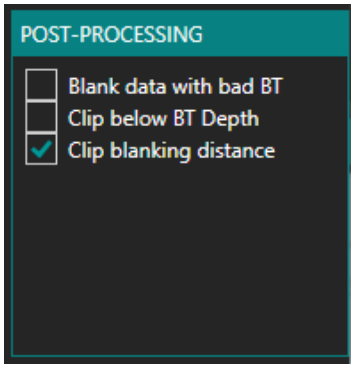


The options are:

- **Auto** – automatically adjust the colour scale so that velocity outliers do not influence the colour scale range.
- **All** – adjust the colour scale so that all velocity values are represented on the colour scale.
- **Manual** – fix a minimum and maximum velocity value to be displayed. Smaller/Larger velocities outside this range are displayed as the lower/upper limit of the colour scale. The Min and Max velocities to be displayed are entered in the Min and Max entry boxes. To set the clipping range manually, enter the desired range and click the ‘Apply Manual Clipping’ button.

Post Processing

Certain sections of data can be omitted from the Waterfall and Mission Waterfall plots by selecting from the options shown below.



The options are:

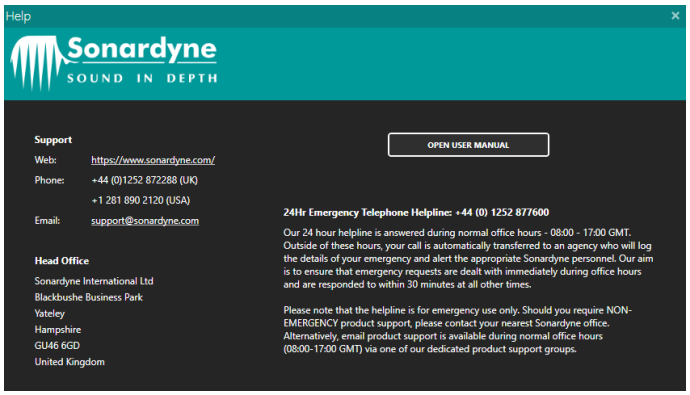
Blank data with bad BT – ignore all profile data for which there was no bottom lock; such data are shown in black/white on the Waterfall plots depending on the colour Theme selected.

Clip below BT Depth – ignore all profile data below the bottom track depth; such data are shown in black/white on the Waterfall plots depending on the colour Theme selected.

Clip above blanking distance – ignore all profile data inside the blanking distance; such data are shown in black/white on the Waterfall plots depending on the colour Theme selected.

4.3.4.8 Help

Click **Help** to view Sonardyne Support details. Click **Open User Manual** to open the EOS user manual (i.e. this document in PDF format).

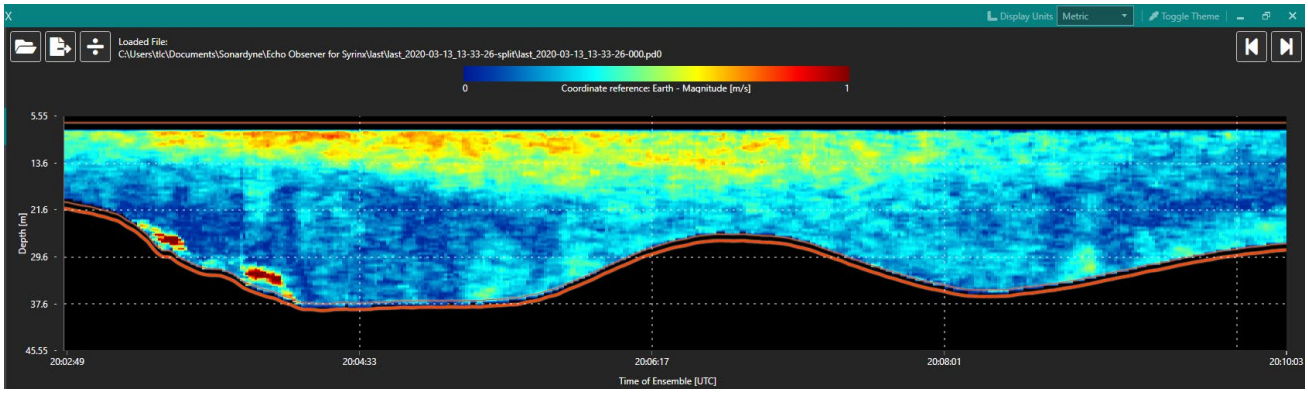


4.3.4.9 About

Click **About** to view the software version and licensing details.

4.4 Waterfall Display

The Waterfall display shows the water speed in each ensemble as a function of UTC time of ensemble (x axis), and depth (y axis). The colour scale of the display indicates the speed of the water. As shown below, the mapping between colour and velocity is shown above the Waterfall display, along with the frame of reference of the velocity, the component of the velocity, and the units of the velocity measurement.



For both Live ADCP Viewer and Log Replayer mode, the most recent ensembles appear at the right-hand side of the plot, while the oldest data appears to the left.

Right-clicking the Waterfall display will show a set of context menus to control the frame of reference and component of ADCP data to be displayed. The options are similar to those in **Display Configuration > ADCP WATERFALL** (though without the velocity subtraction options).

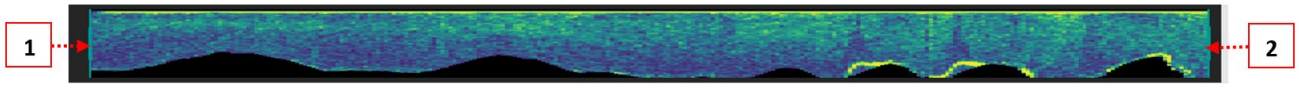
A variety of other options are available for changing the properties of the ensemble velocities in the Waterfall display and selecting to display different ancillary features. See *Section 4.3.4.7* for a full description on the available options accessible through the Display Configuration panel.

If the **Clip below BT depth** and/or **Clip at blanking distance** are selected in **the Display Configuration** panel, the corresponding sections of the data will be set to black or white (depending on whether **Day** or **Night** theme is selected; see *Section 4.2.1*.

4.5 Mission Waterfall Display

The Mission Waterfall display gives a representation of all data logged to date in a mission (in Live ADCP Viewer mode), or in a file (in Log Replayer mode).

Vertical blue bars, labelled 1 and 2 below, can be used to select a portion of data from the mission to display in more detail in the Waterfall Display.

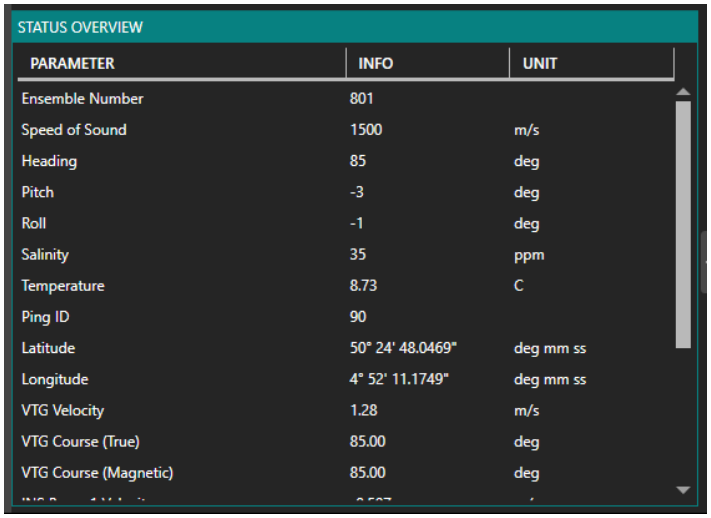


If the **Clip below BT depth** and/or **Clip at blanking distance** are selected in **the Display Configuration** panel, the corresponding sections of the data will be set to black or white (depending on whether **Day** or **Night** theme is selected; see *Section 4.2.1*.

4.6 Status Overview

The Status Overview displays data for the latest ensemble received (in Live ADCP Viewer mode), or for the selected ensemble (in Log Replayer mode). The data is presented in a three-column format, with the name, value and units for each parameter displayed.

Figure 4-3 Status Overview



Each parameter is a field in a PD0 ensemble. The table below lists the displayed parameters, their (metric) units, the section in which they are stored in a PD0 ensemble together with a brief description.

Parameter	Unit	PD0 Section	Description
Ensemble number	N/A	RDI Variable Leader	Integer ID of an ensemble
Speed of Sound	m/s	RDI Variable Leader	Speed of sound wave in water
Heading	Degrees	RDI Variable Leader	Vessel heading
Pitch	Degrees	RDI Variable Leader	Vessel pitch
Roll	Degrees	RDI Variable Leader	Vessel roll
Salinity	ppm	RDI Variable Leader	Water salinity
Temperature	C	RDI Variable Leader	Temperature of water
Ping ID	N/A	Sonardyne Variable Leader	8-bit ensemble number
Latitude	Deg mm ss	RDI General NMEA binary format (GGA)	Vessel Latitude
Longitude	Deg mm ss	RDI General NMEA binary format (GGA)	Vessel Longitude
VTG Velocity	m/s	RDI General NMEA binary format (VTG)	Vessel speed
VTG Course (True)	degrees	RDI General NMEA binary format (VTG)	Vessel course
VTG Course (Magnetic)	degrees	RDI General NMEA binary format (VTG)	Vessel course
INS Beam 1 velocity	m/s	Sonardyne Variable Leader	Expected beam 1 vessel speed from INS
INS Beam 2 velocity	m/s	Sonardyne Variable Leader	Expected beam 2 vessel speed from INS
INS Beam 3 velocity	m/s	Sonardyne Variable Leader	Expected beam 3 vessel speed from INS

Parameter	Unit	PD0 Section	Description
INS Beam 4 velocity	m/s	Sonardyne Variable Leader	Expected beam 4 vessel speed from INS
INS Heading	Degrees	Sonardyne Variable Leader	Heading from INS
INS Pitch	Degrees	Sonardyne Variable Leader	Pitch from INS
INS Roll	Degrees	Sonardyne Variable Leader	Roll from INS

4.7 Map Overview

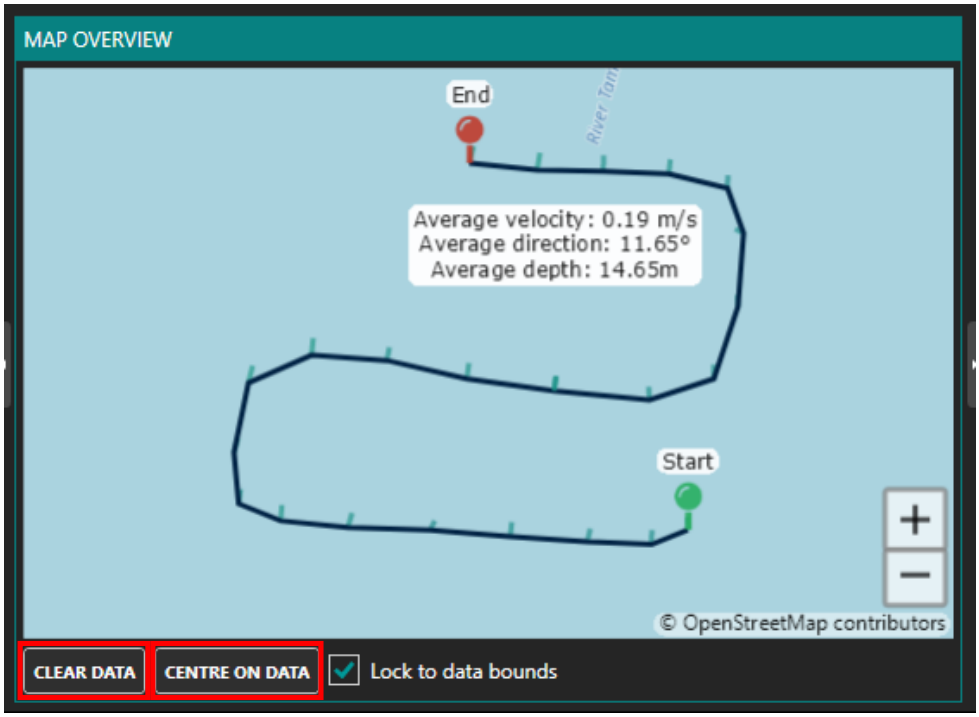
The Map Overview displays the Latitude and Longitude course tracked by the vessel and an indication of the magnitude and direction of the water flow. For the vessel course to be displayed, Syrinx must be receiving NMEA GGA strings or another Syrinx compatible source of positional data. The course is overlaid on OpenStreetMap tiles which show geographic features of the area surveyed.

Figure 4-4 shows the Map Overview panel populated with representative data. Different parts of the map can be inspected by left clicking and dragging the mouse. Similarly, the mouse wheel can be used to zoom in/out of the map.

In Live ADCP Viewer mode, a fixed number of positions and velocities are plotted. The first and last of these points are marked with a green Start and Red End marker. The positions and velocities are updated as EOS receives further ensembles from Syrinx.

In Log Replayer mode, all positions within the range selected in the Mission Waterfall plot are displayed.

Figure 4-4 Map Overview



The labelled items in *Figure 4-4* can be customised as follows:

CLEAR DATA – in Live mode, click this to clear all data from the screen. This option only works if logging is not enabled.

CENTRE ON DATA – click this to centre the map view on the data. This is useful if the map has been dragged to a specific part for inspection.

Lock to data bounds –this forces the map to display only the range of ADCP data collected; it is not possible to drag the map elsewhere.

The plus and minus icons can be used to zoom in/out of the map; alternatively, use the mouse spin wheel to zoom in/out of the map

Clicking on a velocity stick on the map results in the velocity data being displayed for that stick. The data displayed is the (World Frame) average velocity, direction, and depth. The averaging is performed over the central 50% of profile data bounded by the bottom track depth and the blanking distance. For example, if the blanking distance is 1 m and the bottom track depth is 21 m, the data used for averaging are the cells between 6 and 16 m depth.Data Overview

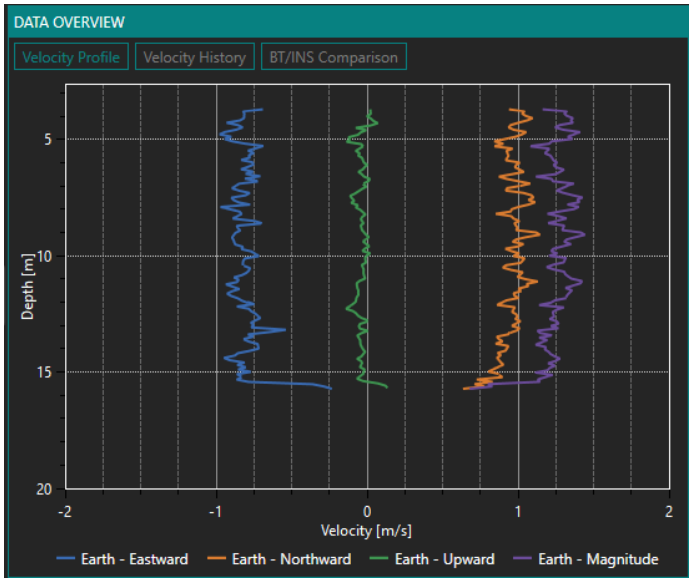
The Map Overview pane contains three tabs and are described below:

- Velocity Profile
- Velocity History
- BT vs INS

4.7.1 Velocity Profile

The Velocity Profile displays water velocities as a function of depth. *Figure 4-5* shows an example of the plot for beam frame velocities without vessel velocity subtraction.

Figure 4-5 Velocity Profile



All components of the velocity are shown for the frame of reference selected either in Display Configuration or by right-clicking the Waterfall plot. Velocity components are colour coded.

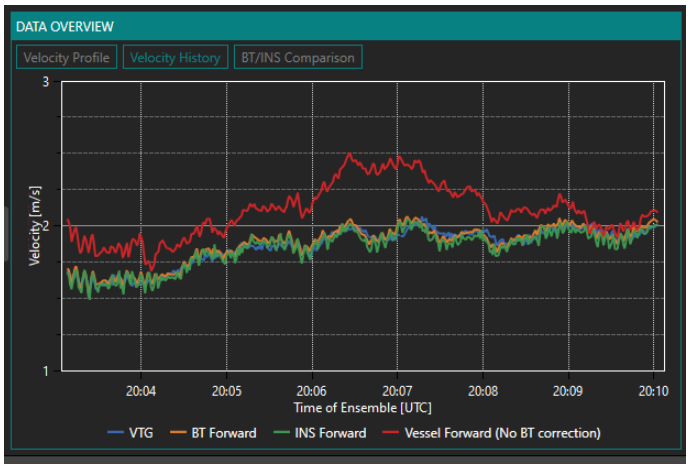
Different components can be added or removed from the plot by clicking on their label in the legend. Clicking (and holding) on part of a profile component displays a menu showing the component, velocity and depth of the data clicked.

If any vessel velocity subtraction options are enabled from Display Configuration, the velocities in the Beam Profile plot will be updated accordingly, i.e. they will display the estimated water velocities with vessel velocities subtracted.

4.7.2 Velocity History

The velocity history plot displays vessel forward velocities as a function of time; see *Figure 4-6*. In paused ADCP Live Viewer or Log Replay mode, the range of data can be selected using the range markers on the Mission Waterfall plot. In ADCP Live Viewer mode, a fixed number of ensembles are plotted.

Figure 4-6 Velocity History



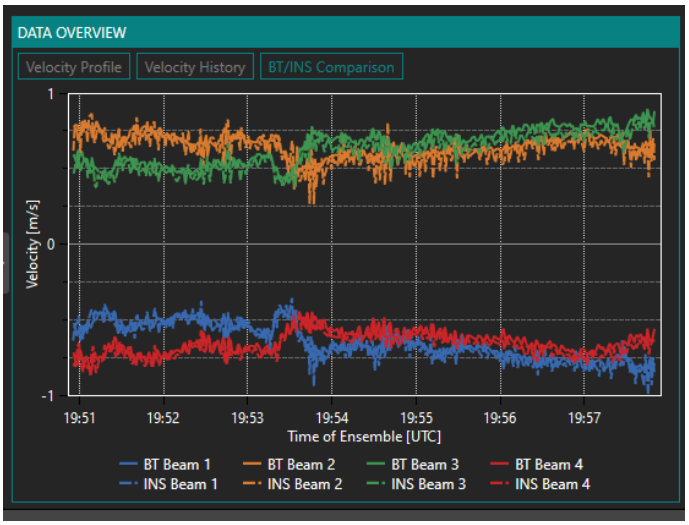
By default, the **VTG**, forward going bottom track (**BT Forward**), and average forward going water velocities (**Vessel Forward**) are shown. If a SPRINT-Nav is used with inertially aided ADCP enabled, the forward going inertial estimate of bottom track velocity (**INS Forward**) is also shown.

The different velocity estimates are colour coded. Different components can be added or removed from the plot by clicking on their label in the legend.

Clicking (and holding) on the plot displays a popup window showing the velocities of all displayed components at the time of the ensemble.

4.7.3 Bottom tracking and Inertial Velocity History (BT vs INS)

This BT vs INS displays the beam frame velocities measured by bottom tracking pings against those expected from INS input velocities; this feature is only relevant when a SPRINT-Nav device is used. In paused ADCP Live Viewer or Log Replay mode, the range of data can be selected using the range markers on the Mission Waterfall plot. In ADCP Live Viewer mode, a fixed number of ensembles are plotted.



The different velocity estimates are colour coded; solid lines correspond to bottom track velocities, while dashed lines correspond to inertial velocity estimates. Different components can be added or removed from the plot by clicking on their label in the legend.

Clicking (and holding) on the plot displays a popup window showing the velocities of all displayed components at the time of the ensemble.

Definitions

Term	Definition
ADCP	Acoustic Doppler Current Profiler
AHRS	Attitude and Heading Reference System
DVL	Doppler Velocity Log
EOS	Echo Observer for Syrinx
GPS	Global Positioning System
INS	Inertial Navigation Sensor
NMEA	National Marine Electronics Association
TCP	Transmission Control Protocol
UDP	User Datagram Protocol
VTG	Vector Track and speed over Ground

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