Tritech Genesis

Software Suite

Product Manual

0716-SOM-00001 Rev 08

Tritech

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General Public License ("GPLv2") Inquiries: Please direct all GPL inquiries to the following address:

Tritech International Ltd
Peregrine Road
Westhill Business Park
Westhill, Aberdeenshire
AB32 6JL, UK

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Warning Symbols

Throughout this manual the following symbols may be used where applicable to denote any particular hazards or areas which should be given special attention:

Note

This symbol highlights anything which would be of particular interest to the reader or provides extra information outside of the current topic.

Important

When this is shown there is potential to cause harm to the device due to static discharge. The components should not be handled without appropriate protection to prevent such a discharge occurring.

Caution

This highlights areas where extra care is needed to ensure that certain delicate components are not damaged or changes that will affect the operation and performance of the equipment.

Warning

DANGER OF INJURY TO SELF OR OTHERS

Where this symbol is present there is a serious risk of injury or loss of life. Care should be taken to follow the instructions correctly and also conduct a separate Risk Assessment prior to commencing work.

Help & Support

First please read this manual thoroughly (particularly the Troubleshooting section, if present). If a warranty is applicable, further details can be found in the Warranty Statement, 0080- STF-00139, available upon request.

Tritech International Ltd can be contacted as follows:

	Mail	Tritech International Ltd Peregrine Road Westhill Business Park Westhill, Aberdeenshire AB32 6JL, UK
	Telephone	+44 (0)1224 744111
	Email	support@tritech.co.uk
	Website	www.tritech.co.uk

Prior to contacting Tritech International Ltd please ensure that the following is available:

1. The Serial Numbers of the product and any Tritech International Ltd equipment connected directly or indirectly to it.
2. Software or firmware revision numbers.
3. A clear fault description.
4. Details of any remedial action implemented.

Contamination
If a product has been used in a contaminated or hazardous environment you must de-contaminate the product and report any hazards prior to returning the unit for repair. Under no circumstances should a product be returned that is contaminated with radioactive material.

The name of the organisation which purchased the system is held on record at Tritech International Ltd and details of new software or hardware packages will be announced at regular intervals. This manual may not detail every aspect of operation and for the latest revision of the manual please refer to www.tritech.co.uk.

Tritech International Ltd can only undertake to provide software support of systems loaded with the software in accordance with the instructions given in this manual. It is the customer's responsibility to ensure the compatibility of any other package they choose to use.

Installation and Software Setup

Introduction

Genesis is Tritech International's all in one software interface for controlling, displaying and recording data from its portfolio of sensors including multibeam & mechanical sonars, USBL positioning, bathymetric and echosounder devices. It can also be used to record data from cameras, Global Positioning (GPS) devices, motion reference (MRU) sensors and other third party device connections.

It boasts a modern, dynamic user interface with highly integrated features and builds upon decades of experience in providing an easy to use user interface for the wide variety of subsea sensors manufactured by Tritech International Ltd.

Devices can be dynamically added, configured and setup within the Genesis GUI. Genesis is available for Windows OS® only.

Software functionality, screen images and details are correct for version 1.10.4 of Genesis and may differ from earlier or later versions. The latest released version of Genesis is available from the Tritech website www.tritech.co.uk.

The Genesis software is under continuous further development to support new products, add new features and new functionality. Although some features and options may be visible on the software interface the functionality may be disabled for certain products and configurations.

Tritech welcome any suggestions for further functionality or features. These and any software bug reports can be sent to support@tritech.co.uk for consideration and / or resolution.

System Requirements

In order to install and run Genesis to its full potential, the PC hardware and operating system should meet the following system requirements:

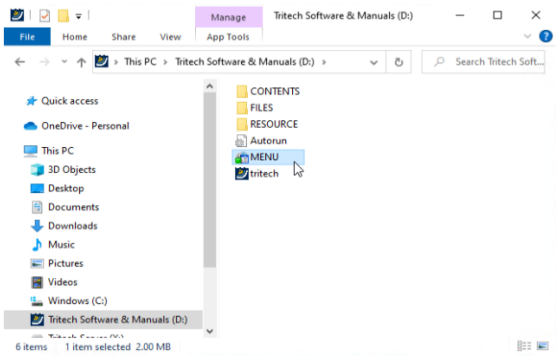
Specification	Minimum	Recommended
Processor	Intel i5™, 2 GHz Dual Core	Intel i7™, 8 Core
RAM	4 GB	8 GB+
Disk Space	500 MB free for program installation 500 GB (SSD recommended) for data recording and storage	
Graphics	3D hardware accelerated graphics	
Open GL	ver. 3.3	ver. 4.2 and above
Display	800x600 32 bit (True) Colour	1920x1080 32 bit (True) Colour
Operating System	Microsoft Windows 7 and later	
Network Interface	100BASE-TX Ethernet	1000BASE-T Ethernet
Serial Interface	RS232 or RS485 Hardware Based or USB Converter	

Genesis uses the OpenGL graphics library to display data from several of the supported hardware devices. It is important that the computer being used has the latest updates for its graphics drivers installed.

Genesis is written and tested on full and standard installations of Microsoft Windows™ with the default installation components. Custom, restricted or reduced feature installations of Microsoft Windows™ may not contain the Microsoft features and software components required for Genesis to run correctly. Windows may require to connect to the online “Windows Update” to install any features not present on the computer.

Software Installation

A Software and Manuals USB memory stick is supplied with the purchase of each Tritech product which includes the latest version of Genesis at the time of delivery. To ensure you are using the latest release of Genesis it is recommended you download the software from the Software Download area of the Tritech website www.tritech.co.uk.



File Explorer window showing the USB memory stick root folder.

Front page of the Software and Manuals USB menu system.

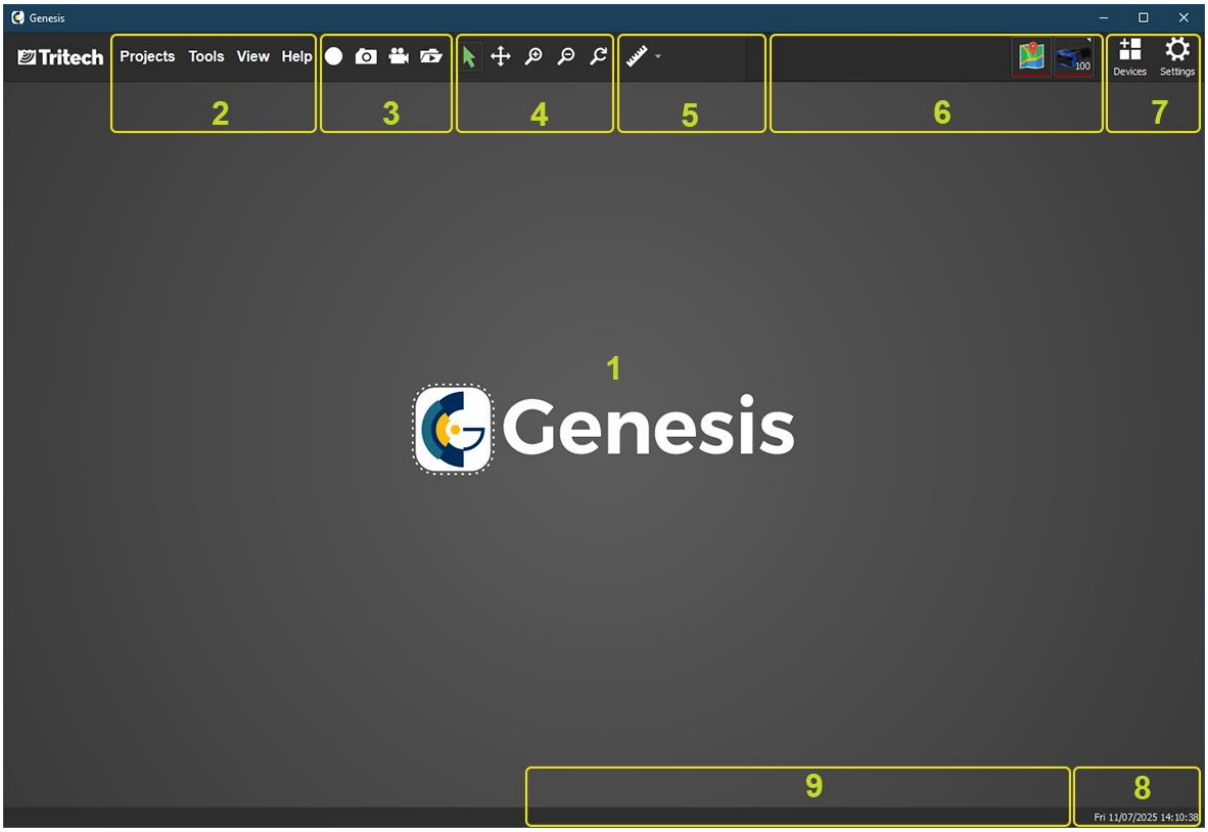
If the USB memory stick does not automatically run when inserted, open the memory stick in a File Explorer window and run the 'MENU' file to start the menu system. The menu will give you access to install Genesis as well as other current and legacy Tritech software. The USB memory stick also contains a full set of product manuals which can be accessed through the menu system.

To avoid compatibility issues between differing versions of Genesis it is recommended that any previous version is uninstalled and the computer restarted prior to the installation of a new version.

Once installed Genesis will create a shortcut icon on the Windows desktop and program menu which can be used to start the program.

Basic Operation and System Configuration

The Main Genesis Screen



When first started Genesis will present a blank screen similar to that shown above. The menu and footer areas of the screen have a standard set of controls and displays that will remain the same for the different sensors connected.

1 Main Display Window
This is the main display area of Genesis that will display the different windows and outputs from each of the sensors that are connected.

2 Main Menus
These drop down menus contain the Project file, Tool and View options and controls.

3 Recording & Playback
These control the capture and recording of graphic, video and data log files and playback of previously saved data.

4 Positioning and Zoom
These buttons control the positioning and zoom of the data displayed in the main window.

5 Measurement Tools
This selection button controls the use of various measurement tools that can be used on the displayed data from the sensors.

6 Device Bar
This area will display the ID and status of the different devices loaded into the Genesis project.

7 Device and Program Settings
These menu buttons allow access to the main device menu and the main program settings menus.

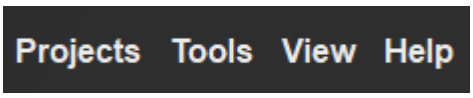
8 Date & Time
This area displays the system date and time of the computer system that Genesis is running on.

9 Cursor Location
Depending on the device type in the main display this will show the relative position (X Y Z coordinate, and/or range & bearing, and/or latitude and longitude position) of the mouse cursor on the display relative to the origin point for the device.

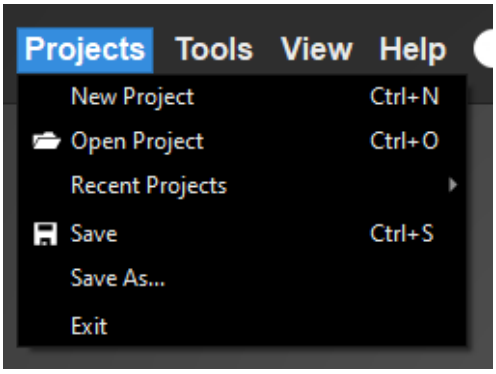
Further details on the options and settings within the menus are detailed in the following sections.

The Main Menus

The Main Menus offer a standard selection of options that can be used to affect the on-screen operation of Genesis.



The **Projects** menu contains the options and controls for creating, saving and loading a Project setup file:



New Project clears the current view and removes all devices.

Open Project loads a previously saved project and will attempt to use its devices and view settings.

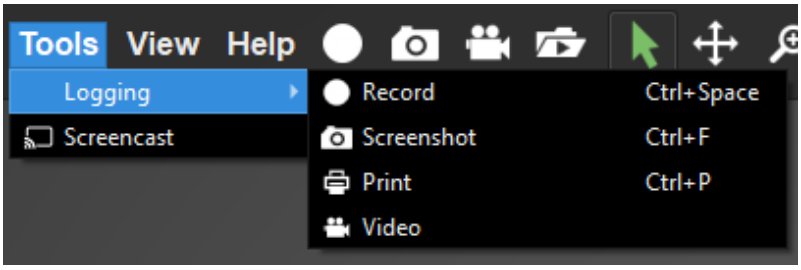
Recent Projects displays a list of the most recently saved projects for quick retrieval.

Save will store the current device and view settings into the current Project file.

Save As will store the current device and view settings into a user selectable Project file.

Exit will close Genesis.

The **Tools** menu contains the recording, print and screencast options available within Genesis.

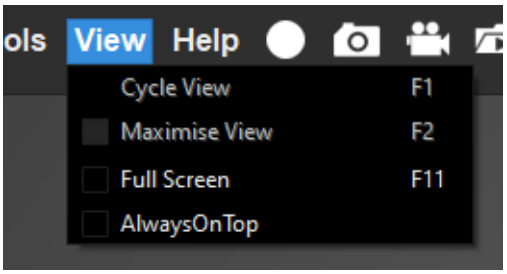


Logging displays a sub menu with the logging options. Record, Screenshot and Video options are detailed in the *Genesis Main System Settings* section of this manual.

Print will output a copy of the screen to the Windows default printer.

Screencast will activate or deactivate this option. When active the option will turn from white to green and the Device Settings icon will rotate on the main menu bar. Further details on the configuration and use are contained in *Genesis Main System Settings* section of this manual.

The **View** menu options control the display of the Genesis devices and views in the main Genesis display window and Microsoft Windows environment:

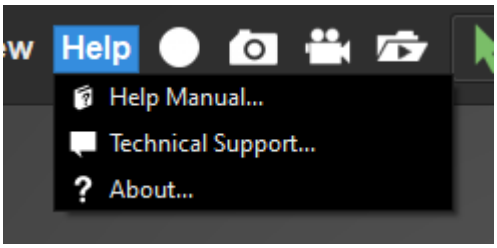


Cycle View will cycle to and make active the device view on-screen when multiple devices are in use.

Maximise View will enlarge the active device view to fill the whole screen. Other devices will continue to run in the background.

Full Screen enlarges the program window to cover the whole screen. Press F11 again to then exit this mode.

Always On Top will display the Genesis program window in front of any program windows on the Windows desktop.



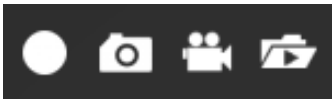
Within the **Help** menu **Help Manual** launches the embedded help file. An updated version of the manual may be available from the Tritech website www.tritech.co.uk.

Technical Support displays details on contacting Tritech International Ltd for technical assistance.

About displays details about the running version of the software and the OpenGL driver version loaded.

The Recording and Playback Controls

These toolbar buttons control the recording and playback of the Data Log File, Screenshot and Video capture within Genesis



The **Record** button starts and stops the recording of a data log file within Genesis and is red while recording. Refer to the section on the *Capture Settings Tab* for configuration details.

The **Snapshot** button takes an image of the Genesis program window as displayed. Refer to the section on the *Capture Settings Tab* for configuration details.

The **Video** button starts and stops the recording of a video image of the Genesis program window as displayed and is green while recording. Refer to the section on the *Capture Settings Tab* for configuration details.

The **Open Log File** button allows you to load and replay a previously saved data log file. Refer to the *Replaying Saved Log File Data* section of this manual for more details.

The Positioning and Zoom Controls

These toolbar buttons control the positioning and zoom levels of the sensor device displays in the Genesis main window display area.

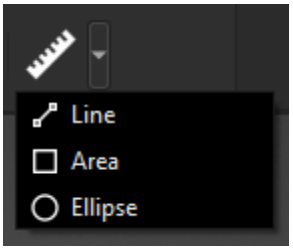
The **Select** tool allows the selection of the active device, device display or overlays within the main display window. The specific behaviour of the tool can change dependant on the device type that is selected.

The **Move** tool allows the movement of the device display or displayed data within the main window display. It will not change any device positional offset within the device settings. The specific behaviour of the tool can change dependant on the device type that is selected.

The **Zoom In** and **Zoom Out** buttons enlarge or reduce the displayed device data. The specific behaviour of the tool can change dependant on the device type that is selected. Manual zoom selection will override any automatic scaling functions.

The **Zoom Reset** button will return the device display to the default zoom size and position on the screen. This will also reset and enable any automatic scaling functions.

The Measurement Controls



The **Measurement** tools allow a variety of different measurements to be made on the device displays. The different options and behaviour will depend on the active device type and multiple measurements can be displayed at one time.

When active the “ruler” button will turn green, and when deactivated will remove the measurements displayed on the screen. The measurement colours can be configured in the Settings Display tab.

Line measurement is a simple point to point measurement on-screen. The measurements taken will depend on the active device within Genesis.

Area and **Ellipse** measurements are possible to give approximate sizing of targets on a sonar display or similar.

The Device Bar

When a device is manually or automatically added into Genesis it’s icon will be added to the Device Bar area of the Genesis screen.

If you move the mouse cursor over the device icon it will display the device type and ID or configured name. Selecting the device icon with the left mouse button will display the settings and configuration tabs for that device.

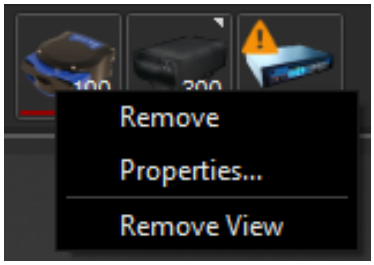
The coloured bars under the icon indicate the status of the device:

RED	Device is disconnected or has lost communication.
AMBER	Device is connected but offline or not transmitting data.
GREEN	Device is connected and online.

A red or amber caution sign indicates a fault or other outstanding diagnostic message (e.g firmware update available). More information will be shown in the Alerts area of the specific Device Diagnostics Settings Tabs.

With multiple devices displayed in the Genesis Main Display Window, the device that has focus for any keyboard or mouse operations is signified by the white triangle in the top right of the device icon. For the examples shown above and below, sonar ID 300 has focus.

If you click the device icon with the right hand mouse button you get the options to:



Remove the device from the Genesis project

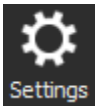
Properties… will display the device settings tabs

Remove View will remove the display of the device in the main window but leave the device in it’s current operating state.

Add View will add the device display back into the main window if previously removed.

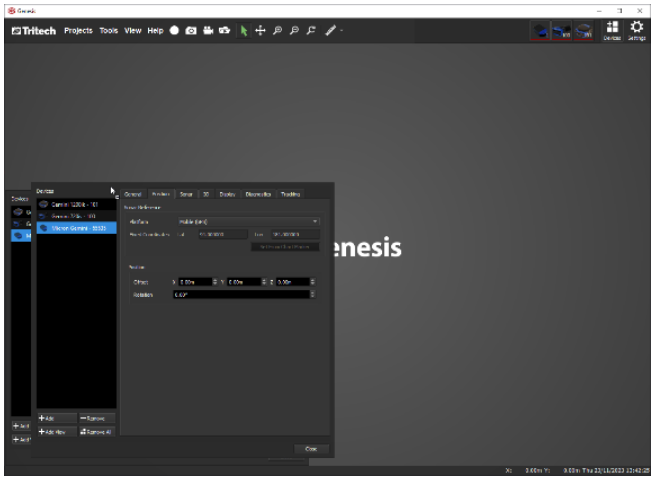
Devices and Program Settings

The **Devices** button opens the main devices settings page to allow devices to be added, removed and configured. See the manual section *Adding and Removing a Device* for more details.



The **Settings** button displays the main program and project configuration settings for Genesis. See the *Genesis Main System Settings* section of this manual for more details.

The Devices and Settings menu box can be moved to any of the four corner positions in the Main Display.



Quick “Elastic” Measurement

Genesis is able to give a quick “elastic” measurement on the main display screen for certain devices. The device screens with this functionality are:

Multibeam Sonar main display

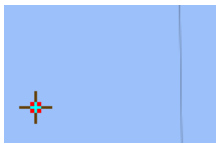
Mechanical Scanning Sonar main display

Chart device main display

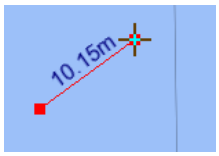
This feature allows a quick point to point measurement to be taken between two points selected by the mouse. **The measurement distance does not remain on the display.**

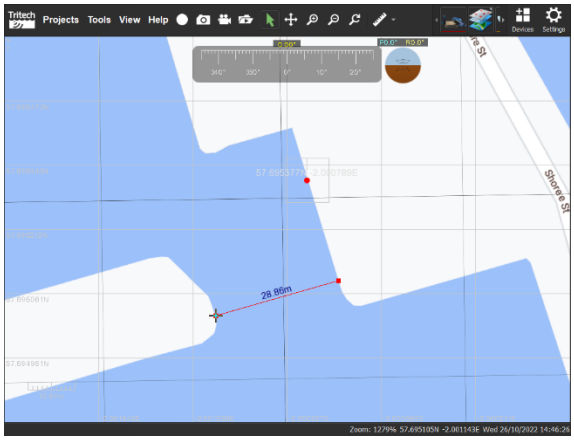
To take a measurement you need to have the **Select** control button active.

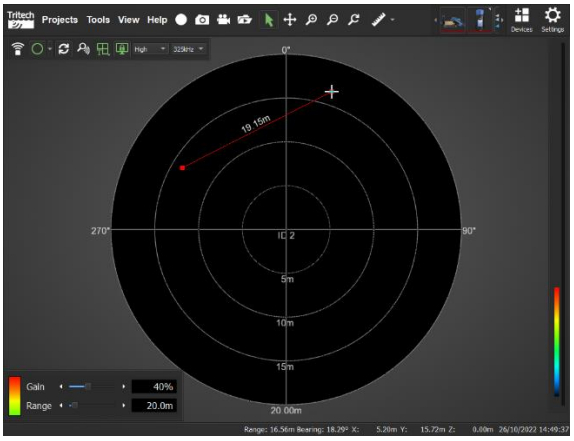
Move the cursor to the start point for the measurement and hold down the main mouse button. The screen cursor will change from the normal arrow to a cross as shown.



With the mouse button held down, move the cursor to the end point and Genesis will display the straight line measurement between the points. Once you release the mouse button the measurement will clear from the display.



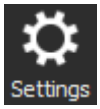




The Quick Measurement feature shown on a Chart (left) and Scanning Sonar (right) display.

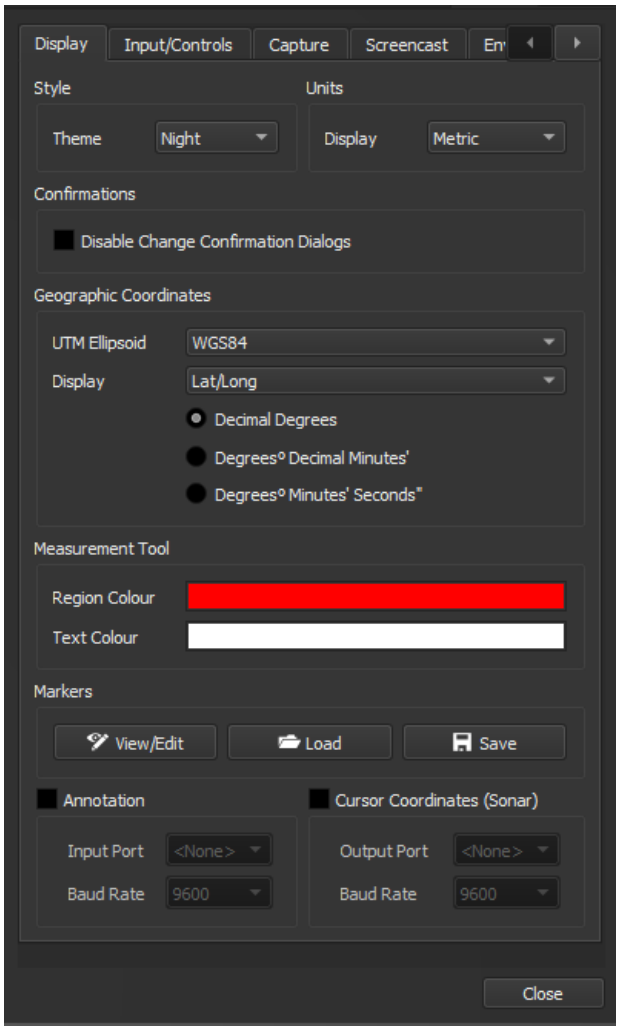
Genesis Main System Settings

The **Settings** button displays the main program and project configuration settings for Genesis. This includes the data capture, screencast and environmental settings used by Genesis which are contained in their own settings and control tabs.



Display Settings Tab

The Display settings tab contains controls for some of the Genesis display options



Style allows you to change the background from grey (Night) to blue (Ocean)

Units changes the measurement units used by Genesis between Metric (metres) and Imperial (feet).

Confirmations switches on and off the confirmation dialogs when applying device configuration changes.

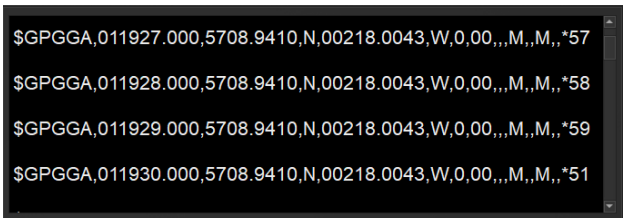
Geographic Coordinates:
UTM Ellipsoid allows the UTM Ellipsoid model being used by the Genesis devices to be selected from those supported.

Display controls the display and geographic coordinate settings being used within Genesis. Options are 'Off', 'UTM E/N' and 'Lat/Long'. With 'Lat/Long' selected there are additional configuration options available for the coordinate format.

The **Measurement Tool** options control the colours used for the display of the measurements using the Measurement Tool on the main toolbar.

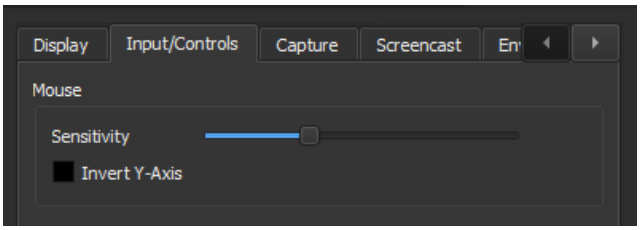
When using the Chart device the **Markers** options will allow import, export and configuration of the chart markers. See the section *Using Chart* Markers for details of their use and configuration.

Annotation option enables a text box in the main display window which will allow the display and recording of an ASCII input messages. The physical or virtual serial port and baud rate should be set as required.



Cursor Coordinates (Sonar) enables the coordinate output of the cursor position when you click the main mouse button in the Multibeam Sonar or Chart device display. A custom ASCII string containing the positional data is output on the selected serial port.

Input/Controls Tab

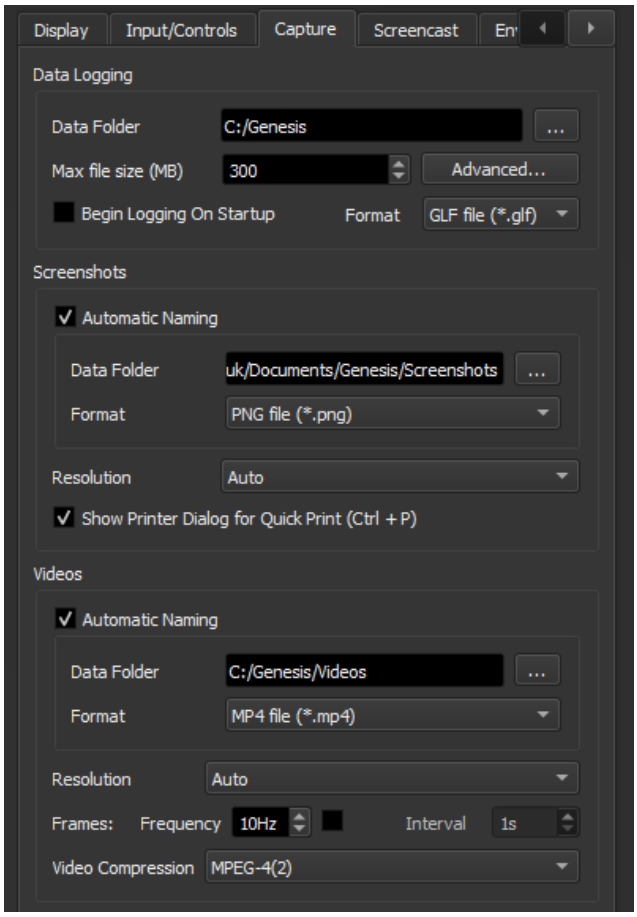


The Input/Controls settings tab contains the mouse configurations for the **Vehicle Device view only.**

Mouse:
Sensitivity changes the rate of the vehicle device view rotation. This applies when the user holds the left mouse button down and moves the mouse.

Invert Y-Axis applies to this drag action when moving the mouse up/down.

Capture Settings Tab



The Capture settings tab contains the settings and options for the capture of the data from the Genesis devices.

Data Logging:
Data Folder configures the location for storing log data files. To change this, click on the ellipsis button […] and choose a new location from the dialog window.

Max file size (MB) specifies the maximum log data file size before Genesis automatically starts a new file. It can be set from 2MB to 2GB.

The **Advanced** button allows the user to set a time to start and stop recording each day when leaving the system running over multiple days. The Rolling Data Retention option is applicable to licensed tracking systems only.

Begin Logging On Startup
When selected, Genesis will automatically start recording the log file when the program is started.

File Type
The format of the log file can be switched between the recommended Genesis Log File [GLF file] or older [ECD file] formats.

The GLF format is the default and recommended recording file format which should be used. The ECD format is included for backwards compatibility with the older Gemini software.

If the Genesis software is closed or forced to close before the logging has been stopped and the logfile completed the data contained in the last logfile will be corrupted and may be unrecoverable. Tritech recommend a 300MB default logfile size for multibeam sonar applications, or lower for USBL and low data rate logfiles.

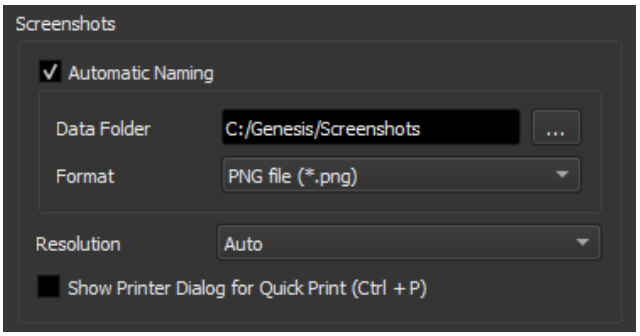
Screenshots:

Automatic Naming

When selected, the 'Save Screenshot As' dialog will not appear and a default filename format applied. The default filename will have the format:

`Screenshot_YYYY-MM-DD-hhmmss`

YYYY-MM-DD is the system date and hhmmss the system time.



Data Folder

The default location for storing screenshots. To change this, click on the ellipsis button […] and choose a new location from the Select Folder dialog window.

Format

This allows the image file format to be specified. Options are:

PNG JPEG TIFF BMP

Resolution

Select 'Auto' to capture Screenshots at the current size of the Genesis screen or select from a number of pre-set sizes between 640x480 and 1920x1080.

Show Printer Dialog for Quick Print (Ctrl + P)

When selected the 'Quick Print' command [Ctrl]+[P] will display a dialog box to choose the output printer. When deselected 'Quick Print' will output to the default Windows system printer.

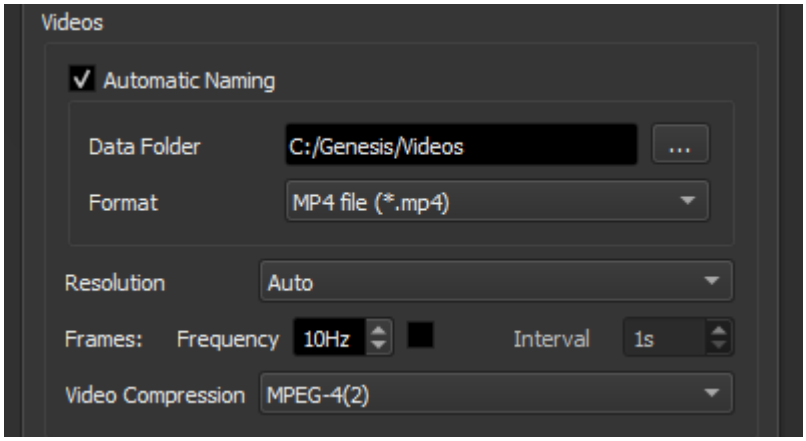
Videos:

Automatic Naming

When selected, the 'Save Video As' dialog will not appear and a default filename format applied. The default filename will have the format:

`video_YYYY-MM-DD-hhmmss`

YYYY-MM-DD is the system date and hhmmss the system time.



Data Folder
The default location for storing video files. To change this, click on the ellipsis button […] and choose a new location from the Select Folder dialog window.

Format
This allows the image file format to be specified. Options are:
AVI WMV MP4 MPEG-2

Resolution
Select 'Auto' to capture video frames at the current size of the Genesis screen or select from a number of pre-set sizes between 640x480 and 1920x1080.

Frames
The desired Frames per Second (FPS) rate for the video recording. Note that the actual FPS may vary from the requested rate if data transfers rates cannot support it.

Interval
If required to capture video slower than 1 frame/sec, the 'Interval' setting controls how long (seconds) between each frame.

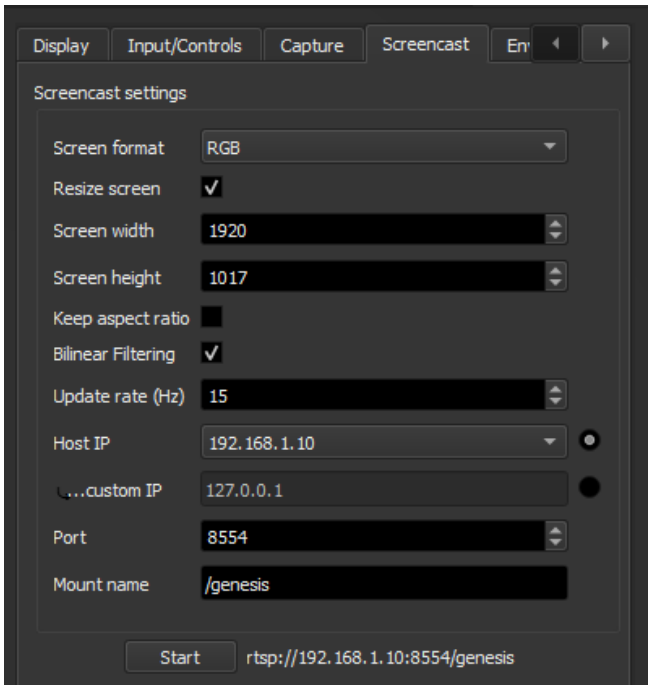
Video Compression
The setting allows the user to select the type of compression used when saving the video file. Current available options are:

MPEG-4(2) (Only applicable to MP4 video type)
MPEG-2 (Only applicable to MPG video type)
XVID MPEG-4
MPEG-4
Motion JPEG
Windows Media Video V7 (only applicable for WMV video type)
Windows Media Video V8 (only applicable for WMV video type)
Uncompressed (fastest but will produce extremely large file sizes)

The load on the host computer, operating system and video compression mode selected may result in dropped frames during the recording process. These are not "padded" with blank frames and will result in the video file being a shorter duration than originally recorded.

Screencast Settings Tab

The Screencast settings tab contains the configuration controls for the network (Ethernet) Screencast (remote display) functionality within Genesis.



Screen Format
RGB and RGB16 options are selectable to suit the system configuration used at the receiving end.

Resize Screen
This enables the Screen width and height controls for manual sizing of the cast screen. When deselected the current Genesis screen size is used.

Screen width / Screen height
This allows the streamed screen size to be altered to suit the receiving display or reduce streaming bandwidth.

Keep Aspect Ratio
When selected this will maintain the aspect of the Genesis window on the screencast streaming video. To avoid distortion of the graphics and fonts in the transmitted video stream it is recommended that this is selected.

Bilinear Filtering
This activates a texture filtering method used to smooth textures/images when displayed larger or smaller than the original. Having Bilinear filtering checked should produce better quality images at the receiving display.

Update Rate (Hz)
This sets the frames per second of the screencast video stream and can be configured from 1 to 60 fps. Between 15 and 30 fps is the recommended streaming frame rate.

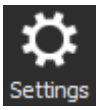
Host IP / …custom IP
These settings control the network adapter and IP address that the screencast video stream is transmitted from. In the 'Host IP' drop-down you can select the windows network adapters and corresponding IP address to be used. If the adapter is not listed you can manually add a custom IP address. This is useful if you use a portable network adapter that is being removed on a regular basis.

Port
This is the Ethernet port number the stream is transmitted through on the Host IP address. It is recommended to be left at 8554 (default) unless this port is in use by another application.

Mount Name
This is the mount name to be used with the IP address. It should be left at the default '/genesis'.

Start (Stop)
This will begin or end the screencast video stream and serves the same function as the menu option. To the right of the 'Start' control the video stream address is displayed and can be copied into the receiving video player.

When the Screencast feature is active the icon on the Device Settings button in the top right of the main window will rotate. This allows a remote viewer to ensure that the video stream has not frozen.



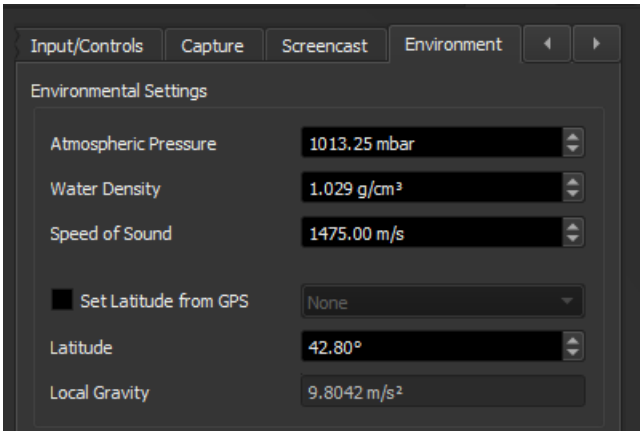
Environment Settings Tab

These options control the base settings used by the devices loaded into the Genesis project. Individual devices may have the option to take these variables from different sources which would be selected in the specific device settings.

Atmospheric Pressure
This value is used in the depth calculations for the SeaKing Bathymetric Sensor (Bathy).

Water Density
This can be used in place of the calculated value from the Bathy and is used in the depth calculations.

Speed of Sound
This can be used by the various acoustic devices in place of measured values available from other connected instruments.



Set Latitude from GPS / Latitude
When selected this allows Genesis to use the latitude taken from a connected and live GPS. If not selected the latitude should be manually entered.

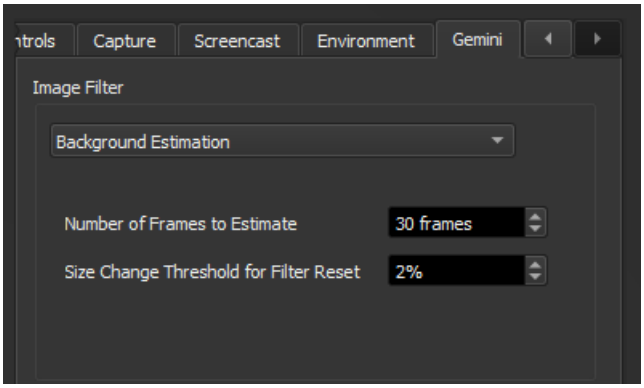
Local Gravity
The Specific Gravity value is used in the Bathy depth calculations and is derived from the current Latitude value entry.

Gemini Settings Tab

These are configuration settings for the Image Filtering feature controlled by the Filter button shown on the Gemini multibeam sonar devices. These are post-processing filters that are applied to the displayed sonar image and do not affect the log data recorded. The image filters can also be applied to the sonar data during the playback of a recorded log files.

The type of filter algorithm applied can be selected from the following options:

- Background Estimation (recommended)
- 2D Convolution
- Average
- Gaussian
- Median
- Bilateral
- Non-local Means Denoising



Depending on the type of image filter selected, further configuration settings may be displayed.

Adding and Removing a Device

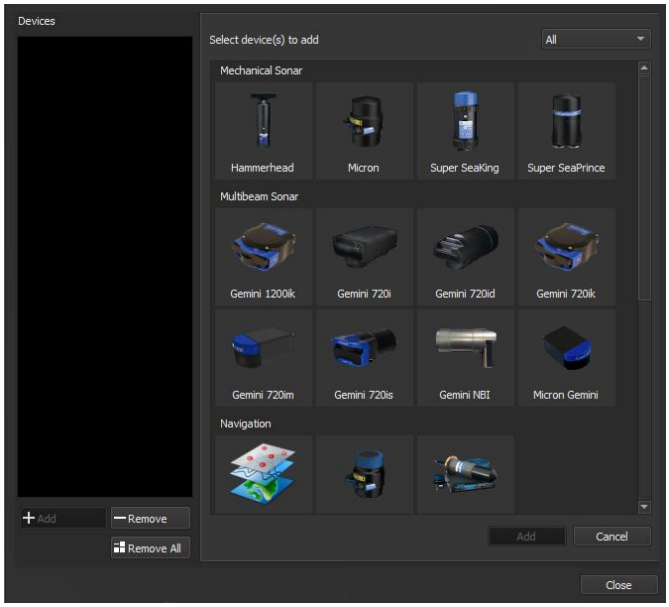
Some devices are automatically detected and added into Genesis when connected and turned on. These include

- Tritech SeaHub units
- Tritech MicronNav USBL System and NavHub
- Gemini and MicronGemini Multibeam Sonars connected via Ethernet
- MicronGemini and Gemini 720im sonars connected via the Tritech USB Serial Adapter
- Tritech SeaKing products connected over ARCNET (via SeaHub)
- Tritech SeaKing V7 products connected over Ethernet

If any of the above products were previously added into the current Genesis project and subsequently removed, they may not reconnect automatically. The unit will require to be powered off and back on to reset and reconnect.

All other accessory and serial connected devices require to be added manually. To add a device to the Genesis project, click on the Devices button on the toolbar.

On pressing the Devices toolbar button the Add Devices menu will open. This lists the different devices currently supported in Genesis which can be added into the project.

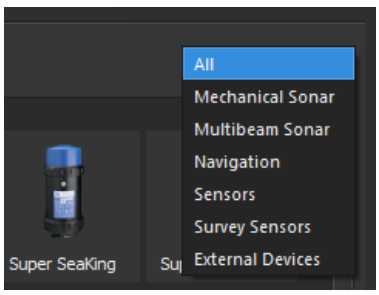


Multiple devices can be added to Genesis at one time by selecting the items on the device list. They will be highlighted blue if selected, and can be clicked again to deselect. To add the devices press the ‘Add’ button.

A single device can be added into Genesis by double-clicking on the icon in the device list.

Once added, the menu display will change to the relevant Device Settings Tabs and the default view is added to the Genesis main display.

The drop-down menu in the upper right will allow you to filter the device list by product type.



To remove a device from the Genesis project, select the device(s) from the list on the left hand of the Devices menu and select the ‘-Remove’ button. Alternatively, you can right click on the icon in the Device bar and select ‘Remove Device’.

Adding and Removing Devices with Internal Sensors

Some models of Gemini sonars have additional Attitude Heading Reference System (AHRS) or depth sensors fitted as standard, or as options. When the sonar device is connected and brought online, the additional sensors are automatically recognised and added as secondary devices onto the main display of the associated sonar.

An internal AHRS will automatically be added as a separate compass device and display on the Device Bar. It can be controlled and configured in the same way as other devices.

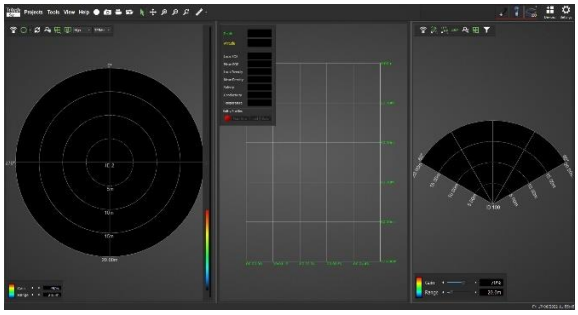
When connected and online the depth and AHRS are displayed in the relevant sonar main view as shown. The AHRS data is only displayed whilst the sonar is connected and online.

When removing the sonar from the Genesis Project the AHRS compass requires to be removed separately.

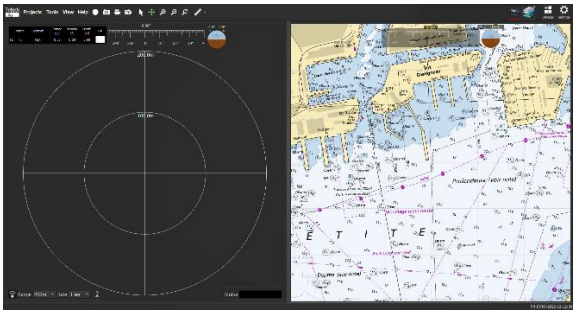
For further information, please refer to section *Gemini Multibeam Sonars with Internal AHRS and Depth Sensors* of this manual.

Displaying Devices

When a device is added into Genesis it will automatically display in the main window in its default position and arrangement. For primary devices (sonars, chart, Bathy etc.) the default layout is to locate the devices next to each other horizontally as is shown below.

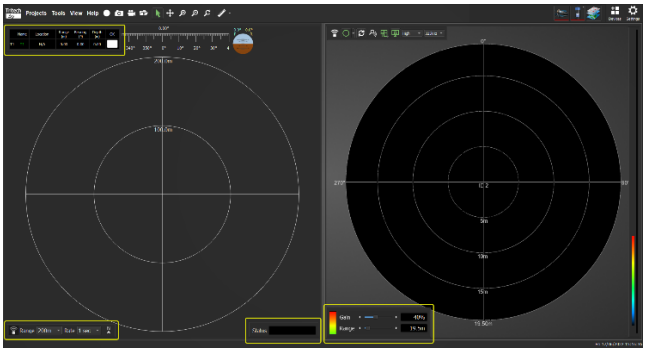


Default layout for 3 main devices.

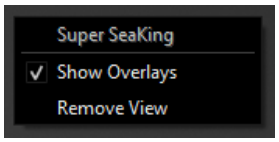


Default layout for MicronNav (2 devices).

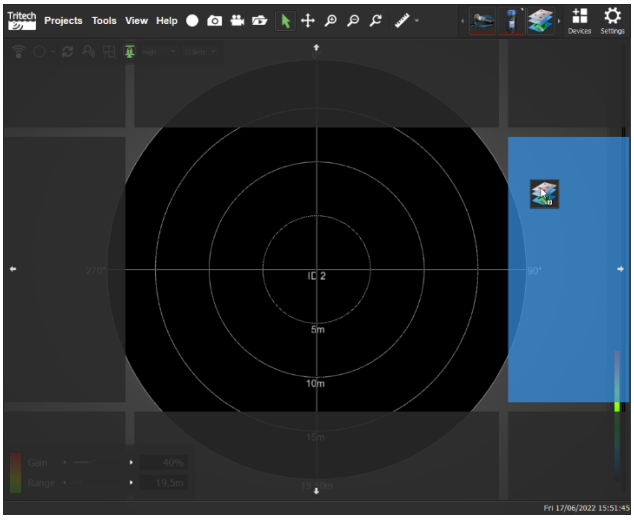
Depending on the device, there are a number of additional settings and information boxes that will be displayed next to the main device. These are configured as Overlay items and can be moved (dragged) using the mouse into either of the four corners in the relevant main device view.



Clicking within the device display window with the right mouse button will display a menu to show / hide the Overlay items and to remove the device display from the main Genesis window. The menu displayed in the Chart Device has additional options.



To add a device back onto the main window select the device from the Device Bar and using the left mouse button drag it into the main window. If the Genesis window is empty then the device will display in the centre. If there is another primary device being displayed you can add to the top, bottom left or right and Genesis will split the main window accordingly.



If using and displaying a number of different primary and secondary devices in Genesis it is often easier to create the layout required by removing all views from the Main Display Window and add the devices back individually.

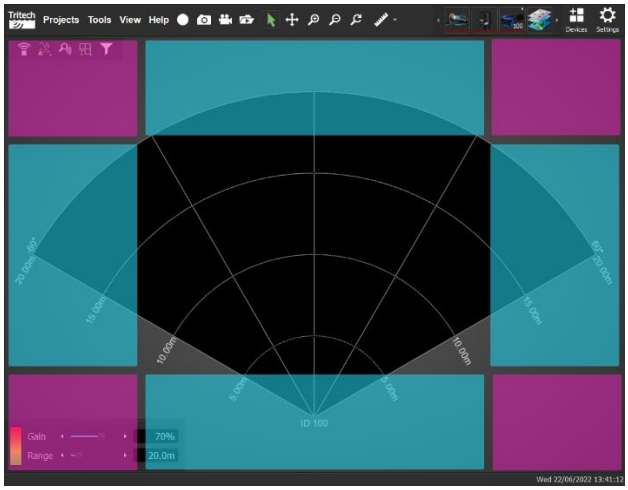
Positioning Devices on the Main Display

With a primary device displayed in the main display, Genesis will give the option to add or move device overlay displays, secondary devices or other primary devices. When dragging a device or overlay Genesis gives different options for the new location.

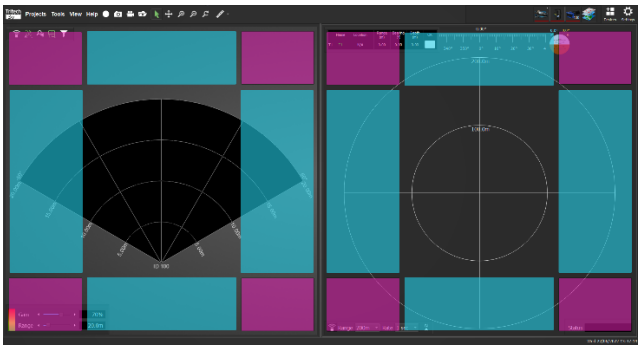
There are two different types of view location:

Primary (blue)
This will add the new view to the top, bottom left or right of the current device view. This will split the Main Display Window horizontally or vertically.

Secondary (pink)
This will display the device or information overlay in one of the four corners of a primary device view.



When there are two primary devices in the main view there is the option to add into the corners of either device display. If a device is added above or below one of the current devices it will split the Main Display Window on that side of the screen only.



To remove the view of a primary device when it has been placed in a corner (secondary) display position you should first move the device view into one of the primary (top / bottom / left / right) positions. Once located in a primary display position you can remove the view in the normal way.

If you are using and displaying a number of different primary and secondary devices in Genesis, it is often easier to achieve the required layout by removing all views from the Main Display Window and adding the devices back individually.

It is possible to overlay the image from one primary sonar device onto the main display area of a different primary sonar device. Please refer to the section *Displaying* Multiple Sonars in One View of this manual for more information. Display and positioning details specific to each device are contained in the relevant section of this manual.

Genesis Keyboard Shortcuts

There are different keyboard shortcuts that can be used to change the Genesis main display and control the functionality of Genesis and some Genesis devices.

Genesis Display Keyboard Shortcuts

These control the way that the different devices are displayed in the main Genesis window

Key	Action
F1	Switches to Single Device View and toggles between each device window.
F2	Switches between Single and Multiple (original) Device View
F11	Switches the Genesis window between **Fullscreen** and Normal view.
+	**Zoom In** the device view in the currently selected window
-	**Zoom Out** the device view in the currently selected window

Genesis Function Keyboard Shortcuts

These control some of the different functions within Genesis common across most devices.

Key Combination	Action
Ctrl N	Start a **New Project**.
Ctrl O	**Open** a saved project.
Ctrl S	**Save** the project.
Ctrl Space	**Start** or **Stop** the recording of a Log File
Ctrl F	Take a **Screenshot**.
Ctrl P *	**Prints** a copy of the screen to the default Windows printer.

***** If the 'Show Printer Dialog for Quick Print' option is selected the Windows print dialog will be displayed. Refer to the *Capture Settings Tab* for more detail.

Genesis Device Control Keyboard Shortcuts

These will control the settings within a single sonar device display window. If there are multiple sonar windows active the controls will not have any affect.

Key	Action
A / Z	Increase / Reduce sonar **Gain**
D / C	Increase / Reduce sonar **Range**

If the Ctrl key is held down the step size increases.

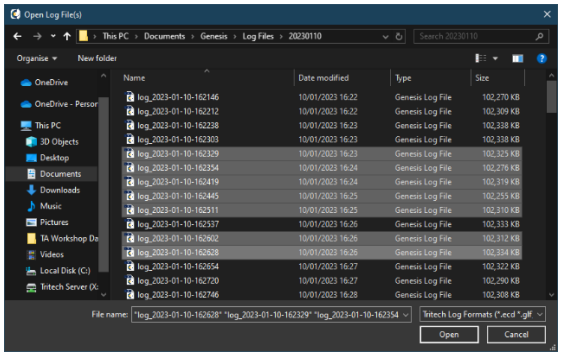
Replaying Saved Log File Data

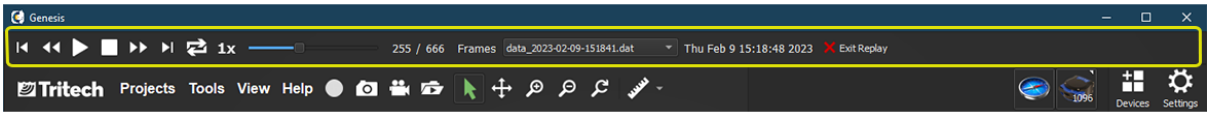
When the **Open Log File** button is selected Genesis will open a Windows dialog box allowing you to select the log file(s) for playback. Genesis can reply data recorded in the formats:

- **ECD** - A legacy file format containing Multibeam imaging data, previously recorded in Genesis or older Gemini software.
- **GLF** – A proprietary Genesis log file format which will contain all supported device data types as well as facilities to store current project settings and any imported bitmap chart.

Holding the [Shift] button when selecting files will select a range. Holding down the [Ctrl] button will allow you to select multiple individual files.

During playback these files will be displayed sequentially, ordered by filename.





When opening a saved log file Genesis will display an additional toolbar at the top of the main screen as shown above. This contains the tools for the playback control of the log files.

When opening a logfile in Genesis the arrangement and display of devices in the main window will be the same as the arrangement when the logfile recording was started. **Changes to the device layout on screen are not saved to the logfile after recording has started.** The device views and window arrangement can be adjusted during playback in the normal manner.

Once loaded the logfile will begin to play automatically. During playback the following controls can be used:

The Play button will begin playback (if required) and during playback changes to a Pause control.

When pressed the Stop button will turn red, stop the playback and return to the start of the selected logfiles.

During playback the Forward and Back buttons will move the display forward or backwards by 100 frames on each press. When paused they will move the display by 1 frame.

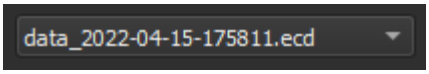
The Skip buttons will move the display forwards or back to the start of the next logfile if more than one file has been selected for playback.

When active the Loop control will begin playing at the start of the first logfile once it has finished playing all of the logfile(s). The control button is green when active.

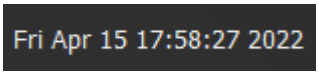
The Speed button will vary the playback speed. Pressing the button will increase the playback speed in steps between 1/4x (0.25 x normal) and 16x (16 x normal) in a loop. The button will display the current playback speed.

The Frame Display and Slider shows the current displayed frame, and total frames in the selected logfile(s). The slider can be moved to adjust the playback position

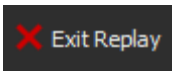
The log file selector drop-down menu will display the name of the logfile currently being played. If multiple files are selected for playback it will allow you to select and jump to the start of that specific logfile.



The time and date displayed is the logfile date and time recorded by the original computer.



The Exit Replay button will close the logfile (and queue) being played and revert to the live display.

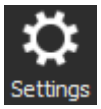


During playback the range and sonar gain cannot be changed. Adjustment of the gain alters the brightness of the data displayed on the screen.

Extraction of Saved Log File Images

During the replay of saved Log Files containing Gemini Multibeam Sonar data Genesis has the facility to output each sonar image frame as an individual still graphics file.

Whilst the replay of Log File data is active or paused, an additional option will appear on the Gemini tab in the main Genesis Settings



The Log File Data playback should be **stopped** or queued to the beginning frame and **paused** prior to the starting of image output or changing of the Log Replay settings.

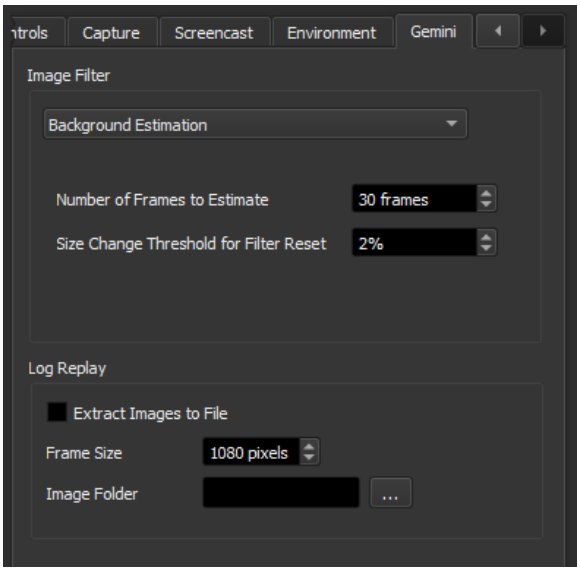
Image Filter settings are covered in more detail *Genesis Main System Settings* section of this manual.

Log Replay settings control the image output from saved Log Files

Extract Images to File will enable the image file output from the Log Data during playback

Frame Size will set the horizontal size of the image (up to 2000 pixels max.).

Image Folder specifies the folder that the images will be stored in. This can be set or changed by clicking on the ellipses button **[…]**.



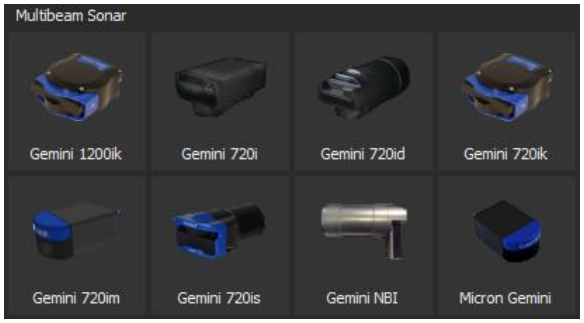
Output of image files will begin immediately on the start of playback and will name the files in numerical order from 00001 onwards. Any files or previous images with the same file name will be overwritten automatically.

Using Genesis with a Multibeam Imaging Sonar

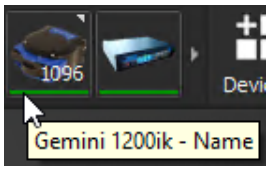
Genesis is the primary software package for the use of the Tritech Gemini range of multibeam imaging sonars (multibeam sonar).

Genesis does not currently support Gemini 620pd Multibeam Profilers and the Gemini Hub. Users of these systems should continue to operate using the legacy Gemini EVO software package.

When connected via a Tritech USB to Serial Adapter or over a correctly configured Ethernet connection, the multibeam sonar will automatically be detected by Genesis and added to the current Project.

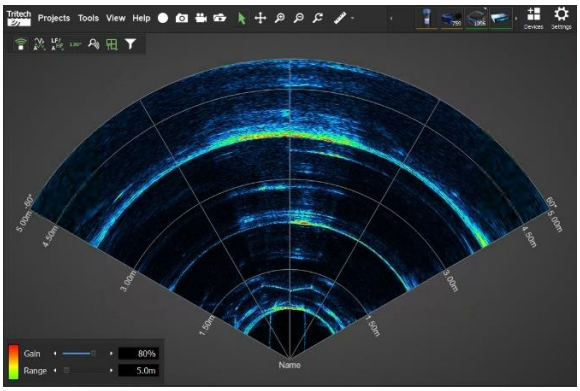


Once connected the multibeam sonar will automatically be displayed and the corresponding button and status indicator will be shown in the Device Bar. Unlike other devices, a multibeam sonar will also display the Sonar ID next to the device icon. The sonar model and any name given to the device will be displayed as a Windows Tooltip.



Operating Multiple Ethernet Devices
Unless certain no devices share the same IP Address, only connect one Ethernet device to the PC and Genesis at a time. It is advised to connect each device individually to check and make any alterations to the IP address prior to operating them simultaneously.

All the multibeam sonars display as a primary device. If there is no other device displayed in the Genesis main window it will display using the full screen as shown. If there is another primary device in the Genesis Main Window the sonar will split the window vertically and display side-by-side.



In the top left of the multibeam sonar view there is a secondary toolbar displayed with controls specific to the sonar. Although most of the controls are the same across the different multibeam sonar devices, there will be some controls specific to a single sonar type.

After being added some Devices may not automatically startup **Online**. On this occasion the user will need to manually switch the device **Online**.

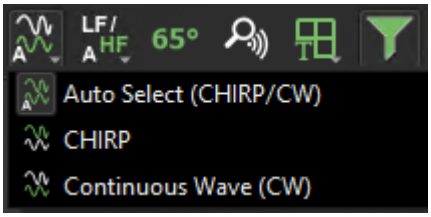
This button indicates and will toggle the sonar **Offline** or **Online**. The icons shown indicate the device as offline or online respectively.


If supported, the **CHIRP** control button and drop down menu can be used to select:

Automatic CHIRP control

CHIRP on

CHIRP off (Continuous Wave)

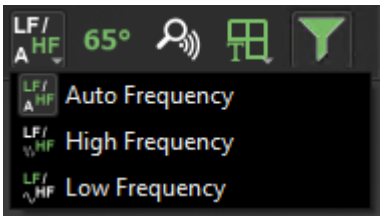


If supported, the **Frequency** control button and drop down menu can be used to select:

Automatic frequency switching

High Frequency sonar operation

Low Frequency sonar operation



On a sonar with pre-set apertures (width of view) this button will quickly switch between **Aperture** settings.

This control button will enable or disable **Acoustic Zoom** on sonars that support this feature. Further details can be found in the section *Using the Acoustic Zoom Function*.


This button and drop-down menu will control the **Grid and Labels Display** options for the current sonar view.

This control button will enable or disable the **Image Filter** applied to the sonar output. The filter settings are controlled from and further details can be found within the *Gemini Settings Tab* section of the *Genesis Main System Settings*.


If enabled within the device settings this control will temporarily **Freeze** the image displayed within the Genesis window. The sonar will continue to operate, and this will not affect any logfile being recorded. The Annotation overlay display will also freeze but continue to operate in the background.


At the bottom left of the multibeam sonar view are a set of secondary controls for the display colour palette, gain and range:

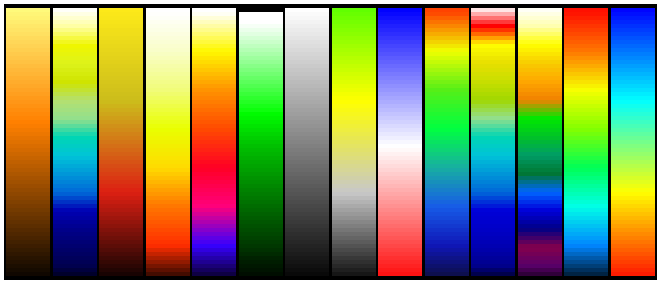
Gain will control the amount of gain used on the display of the sonar image. This can be adjusted using the slider or typed into the display box.

Range will allow control of the sonar operating range between the minimum and maximum values.

Selecting the current **Colour Palette** with the mouse will display a range of different colour palettes to choose from. Strong returns will display in colours at the upper end of the palette and weaker returns at the lower end.

Available colour palettes are:

- Bronze
- Echosounder
- Fire 1, 2 & 3
- Green
- Grey scale
- Grey to Yellow
- Polarity
- Sonar 1, 2 & 3
- Spectrum
- Survey



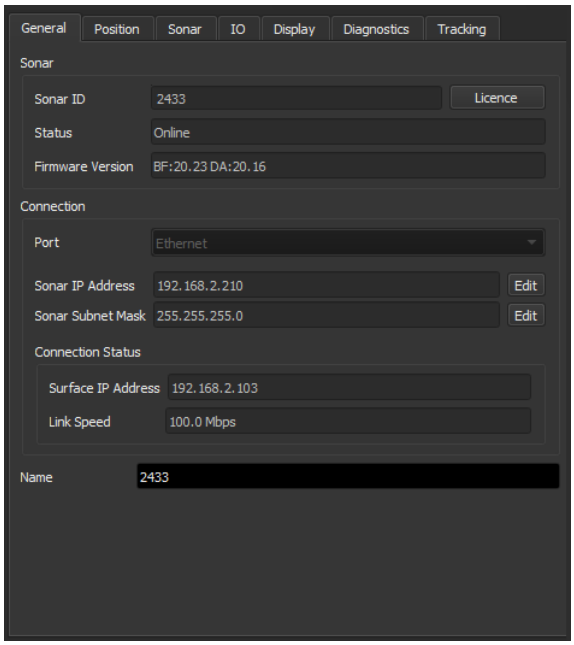
Multibeam Sonar Device Settings

To adjust the settings and configuration for the Multibeam Sonar click the device icon which will then display the settings tabs.

The screen images and configuration settings shown cover a range of Gemini Multibeam Sonar models. The control layout may differ slightly between sonar models with some features only available on certain sonar models. If unavailable the controls may appear disabled (greyed out) or not shown.

The General Settings Tab

The General settings tab displays information about the connected sonar, displays and allows changes to the sonar communication connection and sets the position reference.



Sonar:
Sonar ID displays the fixed ID programmed onto the sonar.

License button will show any special feature licences that have been purchased and loaded onto the sonar. If no additional licences have been loaded the following window will show “Problem reading licence in sonar”.

Status will display the current status (online / offline / disconnected) of the sonar.

Firmware Version shows the current version loaded onto the sonar. If there is an update available an [Update] button will show next to the firmware display.

Connection (Ethernet):
Port

This will display the communications mode the sonar is using. Depending on sonar type and connections it may display Ethernet, VDSL, Tritech USB or Serial.

Sonar IP Address / Subnet Mask displays the current settings for the sonar after connection. Pressing the [Edit] button will allow you to program the sonar with new Ethernet settings. After any change of the settings and selecting [Apply] the sonar will reset and reconnect to Genesis which may take up to a minute to complete.

Ensure any changes to the network configuration is recorded. The sonar may require to be returned to Tritech to recover communication should these details be lost. Recovery of sonar communication in this situation is not covered under warranty.

Connection Status:
Surface IP Address shows the IP address of the PC running Genesis and will display once a connection to the sonar has been established.

Link Speed shows the Ethernet Link Speed of the connection to the sonar once established.

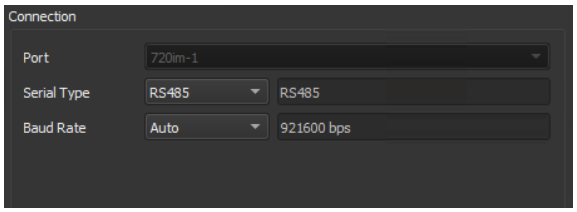
Name will default to the sonar ID or a user chosen name can be entered to help with differentiation of the sonar if multiple units are being used in the same Genesis project.

Connection (VDSL):
This shows the difference in details shown when connected to a Gemini 720is or 1200id Sonar over VDSL.

Link Speed shows the current and maximum VDSL connection speeds.

VDSL Noise allows you to set compensation for longer connection cables or external noise should the VDSL connection become unstable.

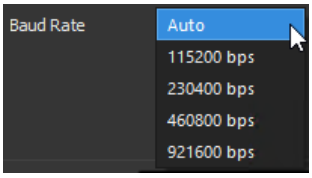
Connection (Serial):
The options displayed for connection to MicronGemini or 720im sonar over a serial connection are shown opposite.



Port allows the selection of the serial port or Tritech Serial Adapter (shown) that the sonar is connected to.

Serial Type allows selection of the communications protocol, RS232 or RS485.

Baud Rate allows selection of the connection data rate for the sonar. This setting will typically default to 115,200 bps on connection of a sonar. The baud rate can manually be selected from the drop-down menu or Auto can be chosen. The current baud rate is shown in the box to the right.



Auto Baud Rate will quickly rotate through the available baud rates (dependant on sonar and connection type) and the highest rate to give a stable connection at that time will be selected. Once complete the auto baud function will not restart unless triggered manually or by reconnection of the sonar.

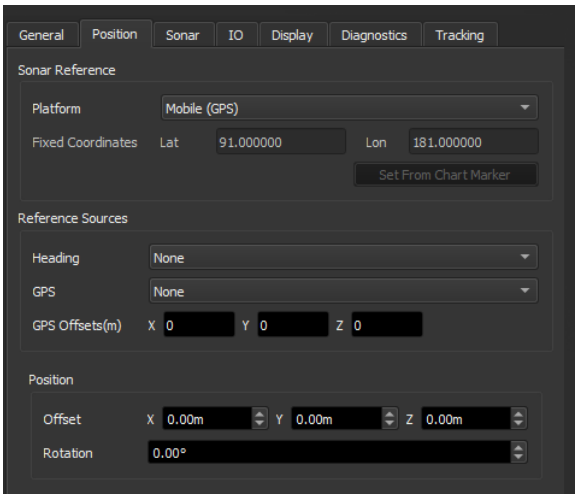
Operation of the sonar through a MUX or via a generic serial port may result in the Auto Baud Rate function connecting at a lower rate than is supported. Tritech recommend that the baud rate be selected manually to suit the rates supported by the serial adapter.

Operating Multiple Serial Connected Multibeam Sonars

Windows and Genesis will not support more than one Gemini 720im or MicronGemini sonar connected via the Tritech Serial USB Converter simultaneously.

The Position Settings Tab

These settings control the position type and references for the sonar geo-referencing ability.



Sonar Reference gives the option to set the sonar position (**Platform**) as Mobile (GPS) derived (eg for a ROV or Vessel) or Fixed at a set of manually entered **Fixed Coordinates**. For a fixed position you have the option to import the location coordinates from a previously saved Chart Marker.

Reference Source:
Heading allows selection of an active Compass device or AHRS sensor to be used as a geo reference for the Sonar.

GPS allows the selection of an active GPS device or MicronNav Transponder to be used as the geo-reference location for the sonar.

GPS Offsets (m) allows an X and Y offset to be entered between the physical GPS location and the sonar location in metres.

Position allows a sonar display **Offset** to be entered in three dimensions and a **Rotation** offset from the reference heading.

Offset sign conventions are:

X = screen right and left, right is +ve

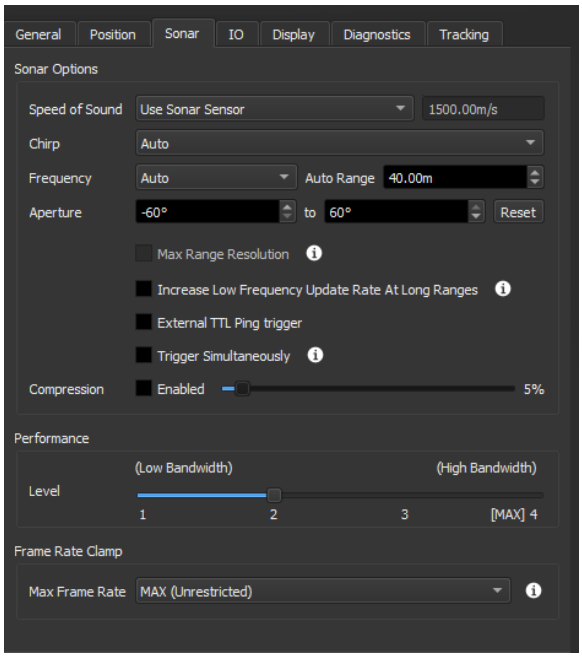
Y = screen top (forward) and bottom (back), top is +ve

Z = sonar height if layered on the screen, increase in height / top of layers is +ve.

Rotation of display on the screen, +ve is clockwise (RH) around the vertical (Z) axis.

The Sonar Settings Tab

These options control the function and configuration of the multibeam sonar features.



Speed of Sound allows you to select and change the value used by the sonar. Different options will be shown dependant on the sonar device.

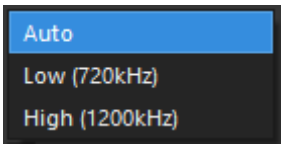
Use Sonar Sensor utilises the reading from the internal transducer if fitted.

Environmental Settings uses the project value set in the main *Environment Settings Tab*.

Fixed Value allows you to enter a specific value for this device in the box to the right.

Freshwater / Saltwater are options available for the MicronGemini sonar and will automatically correct for temperature if the appropriate sensor is fitted to the device.

Chirp allows the selections 'Auto' 'Enabled' or 'Disabled' for the CHIRP functionality if present on the device. When set to 'Auto' it is enabled above 7m range.



Frequency controls the operating frequency on dual frequency sonars. Available options are 'Auto', 'Low' or 'High'. When set to 'Auto' the sonar will switch from high to low frequency at the **Auto Range** value set to the right.

Aperture allows the horizontal aperture (field of view) to be set for the sonar device. This can also be adjusted by selecting and dragging the left and right grid lines in the main display.

Max Range Resolution will increase the resolution of the sonar to maximum regardless of the display resolution and range. This feature is applicable to Gemini Mk 2 sonars and above, and will only operate if CHIRP is disabled and the Performance Level set to 4. This may result in increased data transmission from the sonar.

Increase Low Frequency Update Rate At Long Ranges is applicable to dual frequency sonars with the frequency switching set to 'Auto'. At ranges higher than the low frequency switch setting, the sonar will operate in Continuous Wave (CHIRP disabled) to obtain an increased frame update rate.

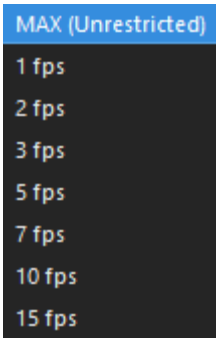
External TTL Ping Trigger will enable the external trigger on sonars with this feature. For more information refer to the manual specific to the sonar model.

Trigger Simultaneously will ping all devices with this option selected at the same time. When not selected, devices are pinged sequentially.

Compression enables image compression algorithms to reduce the bandwidth requirements by rejecting very low level return echoes. The recommended default level of compression balancing image clarity and data bandwidth reduction is 5.

The **Performance** control is shown for Gemini Mk2 Sonars. There are four settings available and the control adjusts the image quality and features to reduce the data transmission bandwidth without reducing the frame update rate. Please refer to the manual section *Reducing Sonar Connection Bandwidth* for more information.

Frame Rate Clamp will enforce a maximum frame rate that the multibeam sonar will operate at. The **Max Frame Rate** selection will allow you to choose the maximum frame rate. A reduction in frame rate can be useful to reduce the bandwidth being used by the sonar without reducing the quality of image. Network and other operational constraints may cause the sonar to operate at less than the selected maximum frame rate.

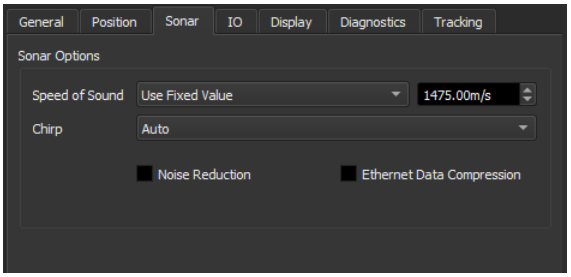


If more than one multibeam sonar is connected and online, the **Frame Rate Clamp** should be set to 'Max (Unrestricted)' across all of the devices. This will avoid synchronisation issues between the sonars and resulting acoustic interference.

The MicronGemini and other Gemini Mk3 Sonars display a differing set of performance and bandwidth controls.

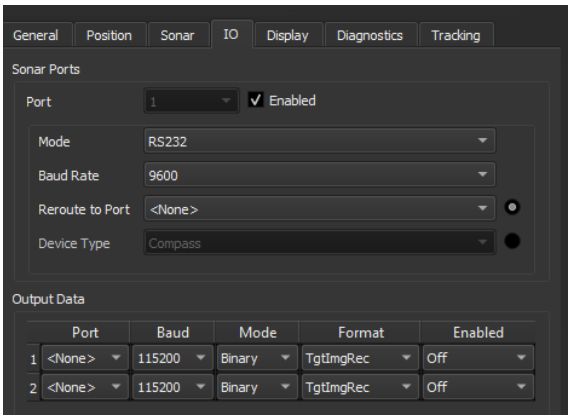
Noise Reduction utilises a noise reduction algorithm dependant on operating conditions and range.

Ethernet Data Compression utilises bandwidth control and data compression to reduce the data being transmitted over the Ethernet connection.



The IO Settings Tab

These options configure and control the operation of the Sonar device additional Aux ports (if fitted), and the serial data output strings connected to the device if available.



Port selects the Aux port settings being displayed. Selecting **Enabled** will activate and allow configuration of the sonar port.

Mode selects the available serial communication options.

Baud Rate controls the data speed for communications.

Reroute to Port will forward the serial data string to an open and available Windows COM port (physical or virtual).

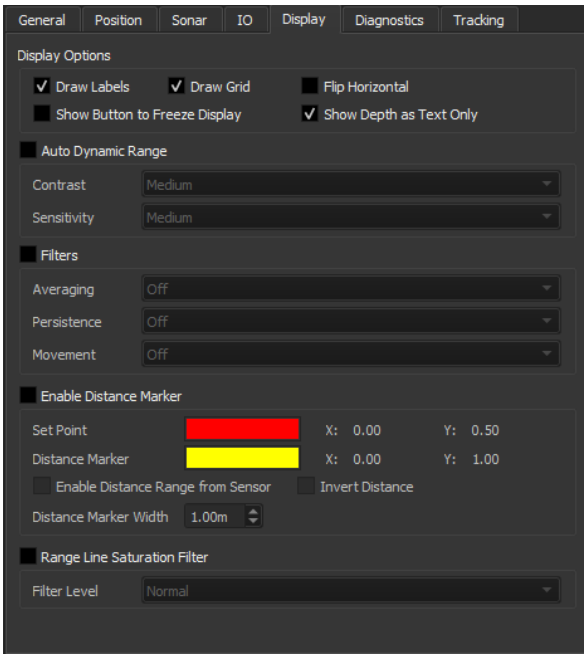
Device Type allows selection of the data type as an Altimeter or Compass. Genesis will automatically add the secondary device decode and display the data if it is an accepted format. Please refer to supplementary manual 0716-SOM-00002 Genesis Supported Interface Strings and File Formats for details.

Output Data allows the user to share/use certain sonar data with third party software packages or for further processing.

The current available output formats are proprietary to specific applications used with **licensed tracking systems only**. Please contact Tritech Support if you have any queries regarding the output data.

The Display Settings Tab

This tab contains configuration settings that control how the sonar image is displayed and the additional display options.



Display Options:
Draw Labels / Draw Grid enables or disables the range grid and labels on the device display.

Flip Horizontal will flip the sonar image about the horizontal centre line. This will allow the sonar to be mounted upside down.

Show Button to Freeze Display will display the Freeze button with the other sonar control buttons.

Show Depth as Text Only switches the depth display (if applicable) from a dynamic bar on the right of the sonar view to a text box in the top right corner.

Auto Dynamic Range is a display setting that will automatically adjust the **Contrast** and **Sensitivity** (brightness) of the sonar image. Options for both settings are Low, Medium and High. Under certain conditions this feature may result in a reduction of image quality.

Filters will apply various display filters to the Gemini image updates. Only one filter can be run at any time. These filters are independent to the graphical image filters activated using the Filter Button on the Gemini Device Toolbar.

The **Averaging** filter accumulates an image over a number of frames which is configured by the drop-down list setting (**Off**, **Short**, **Medium**, **Long**, **Extreme**). It has the effect of removing random noise and rapidly moving targets from the image.

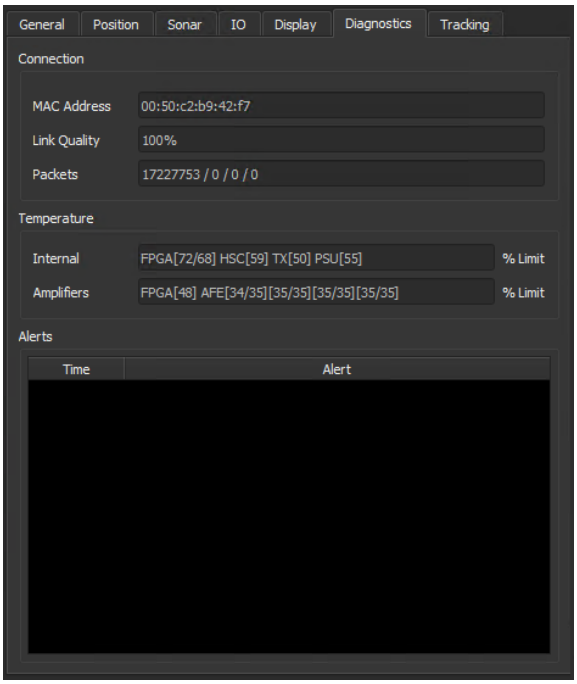
The **Persistence** filter persists the image over a number of frames, set by its drop-down list setting. It has the effect of highlighting movement in the images, which appears as a decaying trail behind the moving object.

Movement applies a combination of Persistence and Averaging to persist a target and remove static objects and background noise.

Enable Distance Marker will enable or disable the distance marker line and points shown on the sonar display. For more detail about this feature please refer to the manual section *Using Sonar Distance Markers*.

Range Line Saturation Filter is a display filter to subdue “ringing” around a hard target which reflects back acoustic pulse energy and appears as a strong target on the sonar image. There are 2 settings, **Normal** and **High** that can be configured when this Filter is enabled. The High setting may have the effect of blanking range lines around the target in some circumstances so is only recommended when the Normal setting is not reducing the saturation arcing enough.

The Diagnostics Settings Tab



The Diagnostics tab shows the operating information regarding the sonar, sonar connection and any alerts.

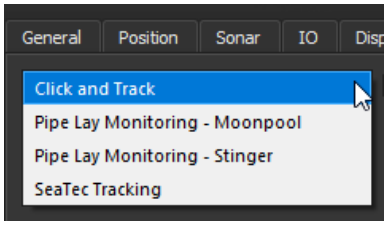
Connection information shows the details of the sonar (network) **MAC Address** if relevant and an indication of the connection **Link Quality**. If connected over Ethernet or VDSL there is also a count of the data **Packets** received / dropped / resent / lost. A high number of resent or lost packets may indicate an issue with the connection.

Temperature information displays the operating temperatures of the **Internal** and **Amplifier** elements of the sonar as a percentage of their operating limit.

The **Alerts** area will display any current amber (warning) or red (critical) alerts specific to the device.

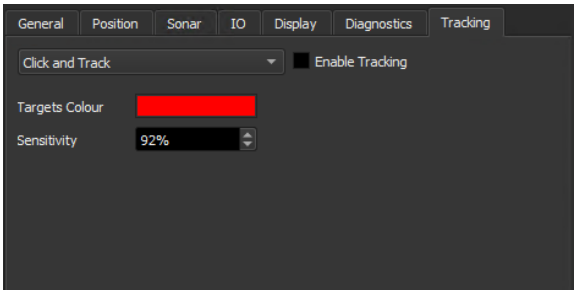
The Tracking Settings Tab

These options allow you to select and enable the object tracking features for the sonar device. Tracking options not licensed to the sonar may be displayed but cannot be enabled.



These options allow you to select and enable the object tracking features for the sonar device. Tracking options not licensed to the sonar may be displayed but cannot be enabled.

The Tracking application can be selected from the pull-down options



Click and Track:
Target Colour allows selection of the highlight colour for identified targets on the sonar display.

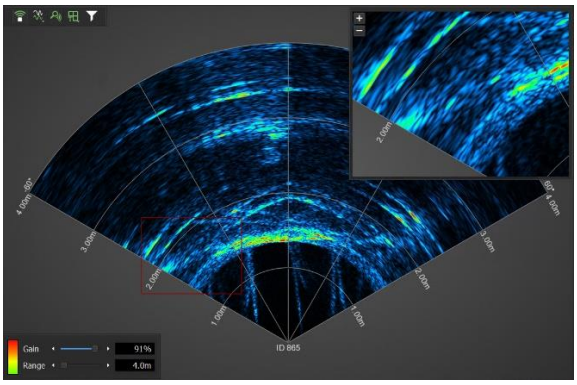
Sensitivity will adjust the target lock sensitivity and can be adjusted to maintain a target lock in different conditions.

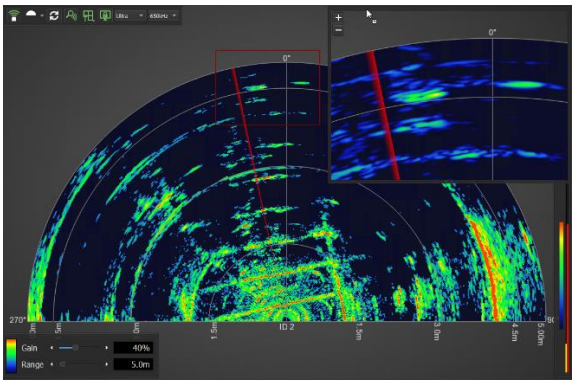
Pipe Lay Monitoring - Moonpool and **Stinger** are tracking applications for use during pipe-lay operations through a moonpool and over the stern of a vessel respectively. **SeaTec Tracking** is an application used for the identification and tracking of marine animals. These tracking options require specific licenses to be purchased and loaded onto the Gemini Sonar.

Using the Acoustic Zoom Function

For devices that support the feature, Acoustic Zoom is switched on and off using the controls at the top of the device display.

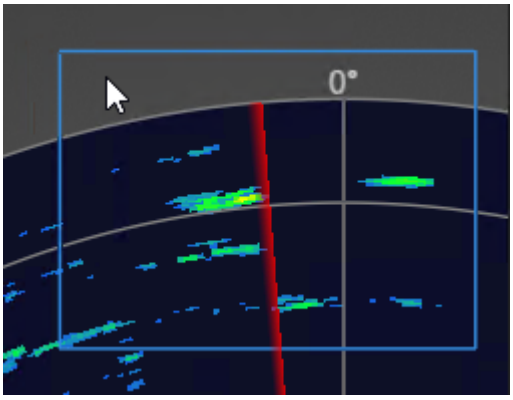
When active, the acoustic zoom overlay window (zoom window) will display in one of the secondary display positions for the device. The area displayed in the zoom window is shown as a red box in the main sonar display.



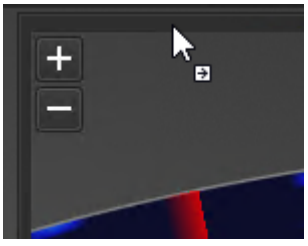


Multibeam (left) and Scanning (right) Sonar displays with Accoustic Zoom active.

The position of the zoom area can be adjusted by moving the mouse cursor into the red box shown on the main sonar display. The box will turn blue and can be moved by holding down the main mouse button and dragging the box to a new position.



The zoom window size can be increased by selecting and dragging the top, bottom or corner in the typical Windows method. To move the zoom window to a different position on the main display, move the cursor over the top border. The cursor will change as shown opposite, and you can click and move the zoom window to a different position.

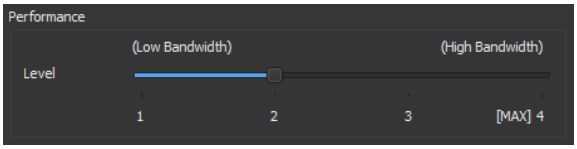


The zoom magnification can be increased and decreased by selecting the [+] and [-] buttons in the top left of the zoom window. When active the sonar will display the area within the zoom window at the highest resolution available. On scanning sonars this may result in a slowing of the sweep speed as it scans that area.

The acoustic zoom function can only be activated and adjusted during the live operation of the sonar and will be saved as part of the logfile data. It can not be applied to previously recorded logfile data during playback.

Reducing Sonar Connection Bandwidth

The **Performance** adjustment is contained in the Sonar settings tab and allows the operator to reduce the communication bandwidth used by the sonar by adjusting the sonar operating parameters.



Default Performance Setting

The default setting for the Performance Control is 2 which gives a balance of sonar performance whilst reducing the connection bandwidth and maintaining high frame rates. If the sonar is under no bandwidth constraints, or the full resolution is required for logging purposes, the Performance Control should be set to (MAX) 4.

The table below identifies the effects of the different performance levels (4 max to 1 min) when applied across the Gemini sonar range:

Sonar Model	Performance Level	Operating Settings		
		No. Beams	Max Resolution	Screen Lock
1200ikd *	4	1024 **	On	Off
	3	512 **	Off	On
	2			
	1			
1200id ***	4	1024 **	On	Off
	3	512 **	Off	On
	2			
	1			
720iks	4	512	On	Off
	3		Off	On
	2	256		
	1			
720is	4	512	On	Off
	3		Off	On
	2	256		
	1			
720i	4	256	On	Off
	3		Off	On
	2			
	1			

* performance in HF (1200 kHz) mode, for LF (720 kHz) refer to the 720iks model

** number of beams across 120º horizontal aspect

*** performance in HF (1200 kHz) mode, for LF (720 kHz) refer to the 720is model

Number of Beams will always operate at maximum if the Acoustic Zoom function is enabled.

Max Range Resolution will operate the sonar and record log data at the maximum range resolution regardless of the ability to display at the same resolution. Under normal operation and using standard monitor display resolutions this results in excess data being transmitted from the sonar that will not be displayed within Genesis.

Screen Lock will reduce the number of range lines to match the pixel width of the sonar display on the PPI, if this is less than the operating setting for the sonar. This feature reduces the bandwidth and data from the sonar by not operating the sonar at a range resolution greater than can be displayed on the PPI display. When used with the sonar Performance setting this changes depending on the Performance level selected. The table below shows the sonar range line resolution at the differing screen display pixel count and performance setting:

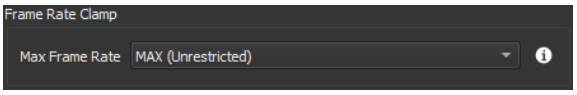
<table>
<tr><th rowspan="2">Screen Lock</th><th rowspan="2">Performance Level</th><th colspan="3">Display Resolution (Pixel Count)</th></tr>
<tr><th>≤ 256</th><th>≤ 512</th><th>≤ 1024</th></tr>
<tr><td>Off</td><td>4</td><td colspan="3">2048</td></tr>
<tr><td rowspan="3">On</td><td>3</td><td rowspan="2">256</td><td rowspan="2">512</td><td rowspan="2">1024</td></tr>
<tr><td>2</td></tr>
<tr><td>1</td><td>256</td><td colspan="2">512</td></tr>
</table>

Sonar Range Line Resolution vs Performance Setting and Display Pixel Count

If it is preferable to keep the clarity and resolution of the sonar image at the maximum with a reduction to frame update rates, the user should use a smart or managed Ethernet switch to reduce the available data rate for the sonar connection. In this situation the Performance control should be adjusted to MAX.

The use of the **Compression** option will yield the greatest reduction in bandwidth, but will mask very faint responses and is less effective for images with lots of strong responses.

Should the user require to record images at the maximum clarity the **Frame Rate Clamp** can also be used to reduce the bandwidth consumed by the sonar.



There is no single configuration of performance and compression settings that will work in every situation for every Sonar and vehicle. Tritech advise that the user adjust the settings to suit the individual application and requirements.

Use of the Performance Control with the Gemini 1200id and 1200ikd Sonar

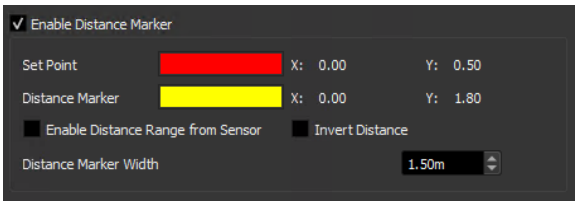
Due to the mode of operation and internal frame rate controls on the Gemini 1200id and 1200ikd sonars, a reduction in the Performance Setting will result in a direct reduction in the amount of data sent, and bandwidth used.

This is of importance in systems with limited Ethernet bandwidth capabilities and systems where the Ethernet bandwidth is shared between different devices. In these circumstances Tritech recommend a Performance Level setting of 2 (Genesis default) and 5% (default) compression. This will give a negligible reduction in clarity over most ranges, whilst maintaining acceptable frame rates on low bandwidth systems.

As each installation and system is different there will require to be some customisation of these settings by the user in order to match the system and operational requirements.

Using Sonar Distance Markers

The sonar distance marker function is controlled through the Display Settings Tab in the device settings and will display reference markers typically used in Mass Flow Excavation operations.



Enable Distance Marker will enable or disable the marker overlay on the sonar display.

Selecting the colour bars allows the user to change of the Set Point and Sonar Marker display colours.

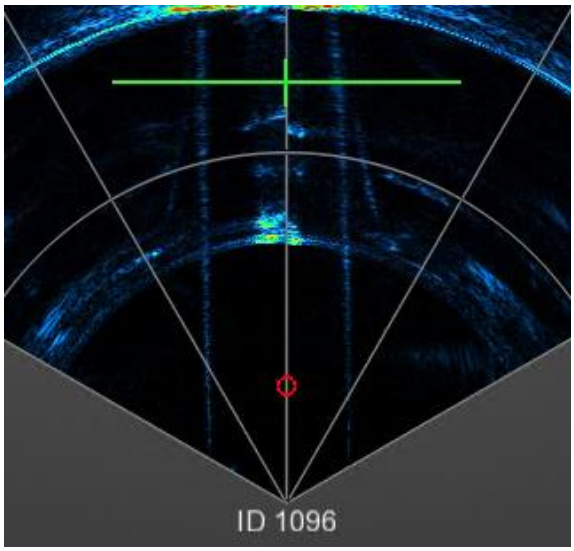
The X and Y coordinates for the Set Point and Distance Marker show the distance from the sonar (or project) origin.

Enable Distance Range from Sensor will automatically set the Distance Marker Y position using the data received from an Altimeter Device. For this to operate correctly, a single Altimeter Device requires to be added to the Genesis project sending a string recognised by Genesis.

Invert Distance swaps the value (+ve / -ve) being received from the Altimeter Device. This setting does not affect the primary or secondary Altimeter Device display.

Distance Marker Width allows the marker width (display line length) to be adjusted.

The Set Point (circle) and Distance Marker (line) are shown on the main sonar display. These can be selected using the mouse and, by holding the select button, can be adjusted on the screen.



Gemini Multibeam Sonars with Internal AHRS and Depth Sensors

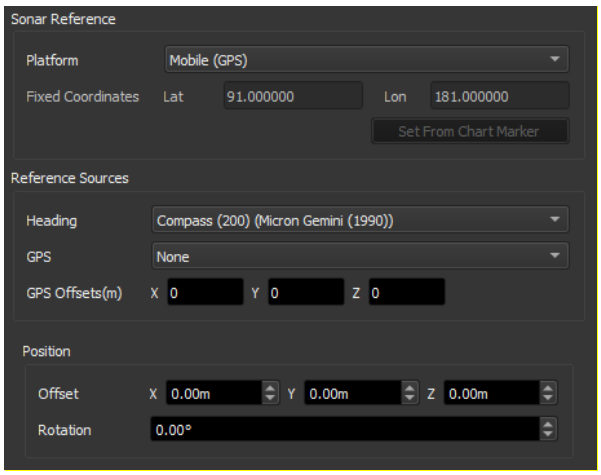
When a Gemini sonar with an internal AHRS or Depth sensor fitted is added to Genesis the sensors will automatically be detected and added at the same time.

Gemini Sonars with an Internal AHRS

For devices fitted with an internal AHRS, this will display as a Compass device. The device is configured as a secondary device and will automatically position itself in the corner of the corresponding sonar view.

The AHRS will be added to the Genesis devices and displayed after the sonar is placed online.

Once active with a valid input, the internal AHRS Compass can be used as the Heading Reference Source for a sonar or other valid device. The picture to the right shows the Position settings Tab for a Gemini Sonar as an example.



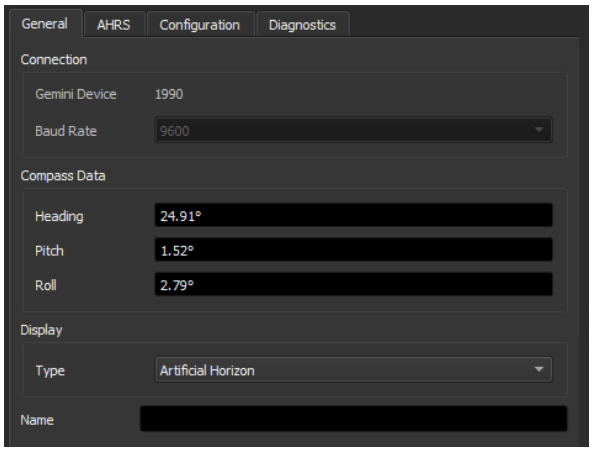
The AHRS sensor will only send data to Genesis for display and recording while the sonar is online.

To adjust the settings and configuration for the internal sensor click the Compass Device icon. This will then display the relevant settings tabs.

The General Settings Tab

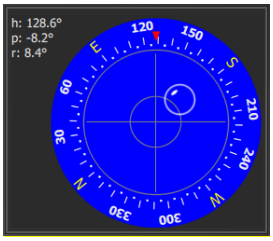
The **Connection** details display the relevant Gemini Device ID for the sonar and it's internal connection speed.

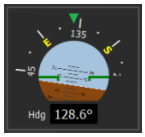
The **Compass Data** displays the values from a recognised input string. If the data is not included or recognised the output will remain blank.

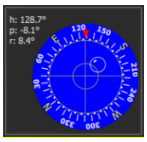


The compass **Display Type** can be selected from a 'Spirit Level or more typical 'Artificial Horizon' display type. Both options are also available in a smaller form factor.

The **Name** field allows a separate label to be given to the device to aid identification. Lefy blank Genesis will automatically use the Gemini Device ID or AHRS Node number for the Device Bar and Main Display.



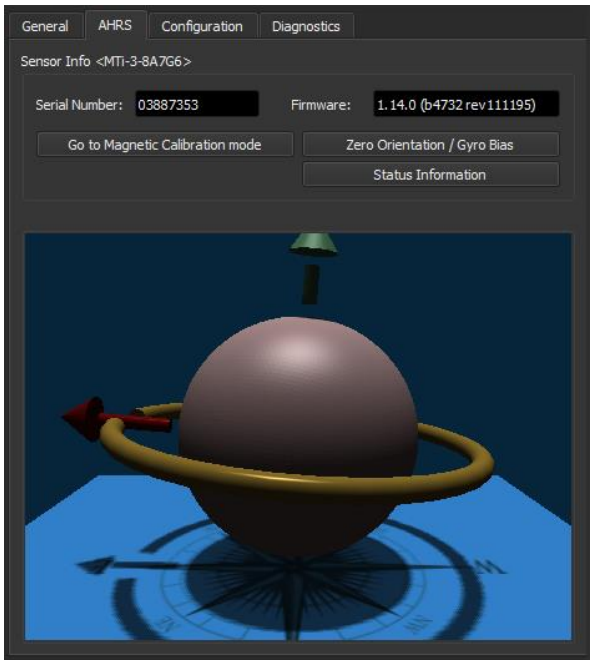




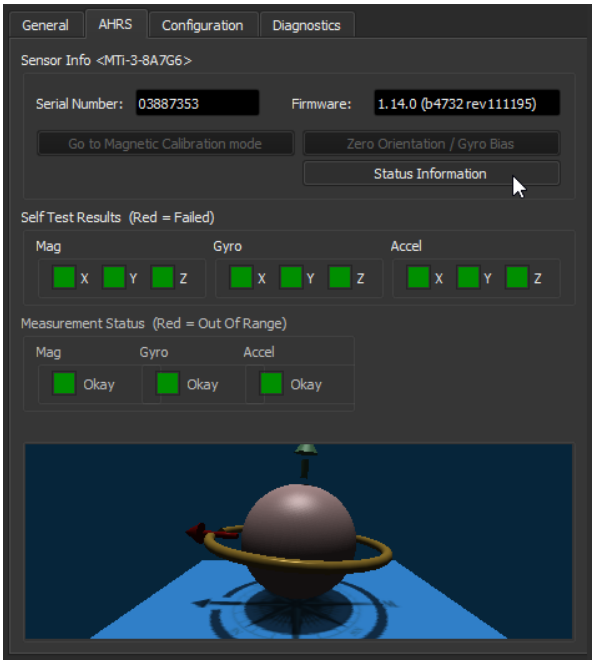
The AHRS Settings Tab

The main AHRS settings tab displays the **Sensor Info.** For the AHRS sensor fitted to the device including the serial number and firmware revision. The graphical representation of the sensor shows the data received.

There are additional configuration buttons to display information or allow access to the advanced setup and configuration of the sensor. Selecting either of these will open up the different setting toolboxes.



The [**Status Information**] button displays the results of the initial continuous diagnostic tests carried out by the AHRS sensor.

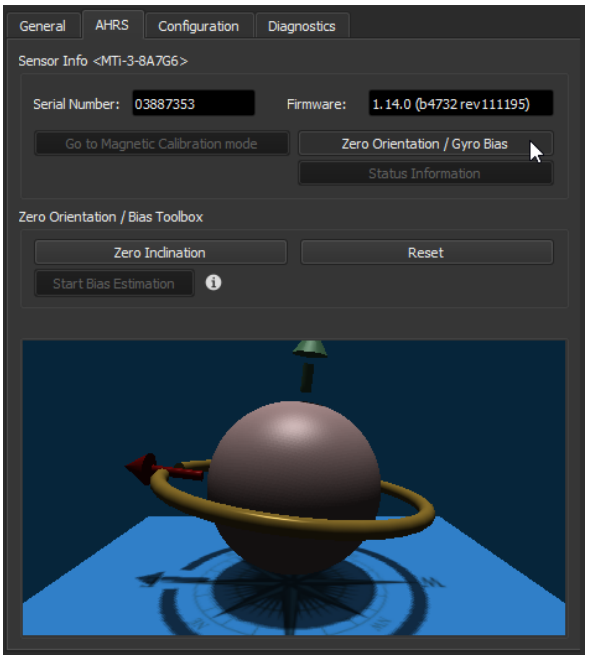


The **Self Test Results** show the output from the internal start-up tests completed by the sensor during the power on and initialisation stages. Should any of the results display as Red (failed) then the unit should be powered down and restarted.

Select the [**Status Information**] button to return to the starting display.

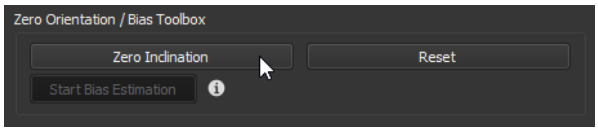
Please contact Tritech should one of the sensors continuously display red. If a continuous fault develop the unit will need to return to Tritech for service and further investigation.

Selecting the [**Zero Orientation / Gyro Bias**] button will open the controls to allow the gyro to be reset to level. This setting allows the pitch and roll settings to be levelled should the sonar not be level when mounted on the vehicle.



Genesis levels the AHRS pitch and roll values by applying offset values to return the displayed value to zero. These offset values are not saved in the Genesis Project File or device, and will need to be applied when the software or device is restarted.

Pressing the [**Zero Inclination**] button will apply offset values to set the Pitch and Roll to zero the output in Genesis. Once set, the control will be disabled and appear greyed out.



Pressing the [**Reset**] button will remove the offsets and return the AHRS pitch and roll values to normal.

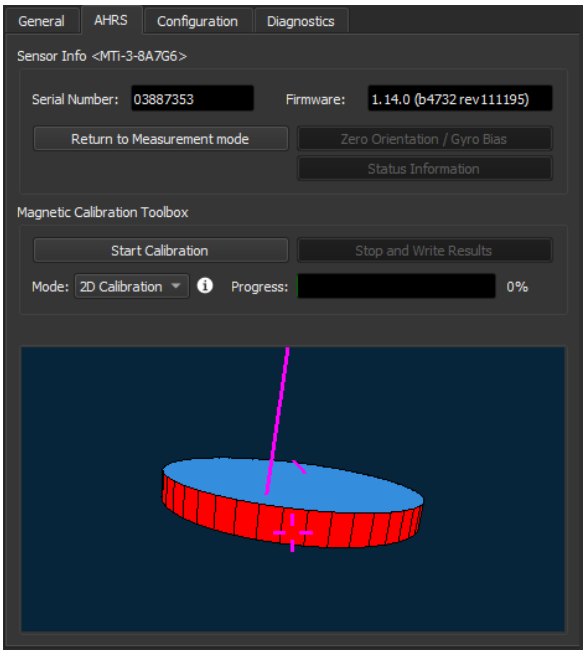
To complete a 2D or 3D magnetic calibration select the [**Go to Magnetic Calibration Mode**] button on the AHRS settings tab. This will change the display to the 2D and 3D magnetic calibration toolbox. To complete a magnetic calibration select the **Mode** (2D or 3D) and press the [**Start Calibration**] button in the Calibration Toolbox menu.

Magnetic Calibration of the AHRS Sensor

Once you select [Start Calibration] the sensor will delete the previous user or factory calibration values. The existing settings cannot be recovered or entered manually. **The sensors undergo a full 3D calibration during manufacture and this should not be attempted in the field, unless under direct instruction from Tritech International.** Recalibration of the AHRS sensors may require the unit to be returned to Tritech for service not covered under warranty.

The **2D Calibration** is shown opposite. With the vehicle in an area clear of additional magnetic interference you should rotate the vehicle in a slow figure-of-eight or circle. As the sonar is rotated the side of the disc will turn yellow (on first pass) and then green (on second pass) as the **Progress** bar increases.

Once there is enough information to create the magnetic field map and calibrate the AHRS the [**Stop and Write Results**] option button can be selected. For an accurate 2D calibration it is recommended the progress be at 80% or above before writing to the AHRS.

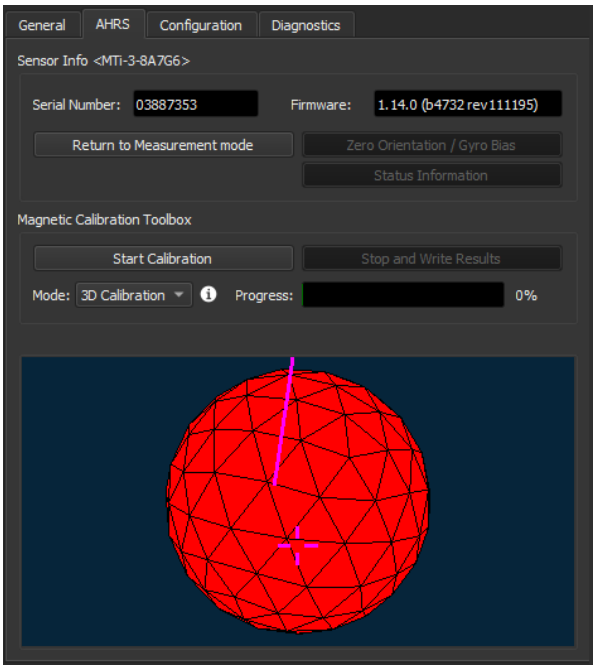


When to carry out a 2D calibration ?

The 2D calibration is designed to compensate for any additional magnetic interference from the vehicle after mounting. If there are no heading bias or errors noticed and the sonar device is attached to a vehicle with low magnetic properties, Tritech recommend you do not complete an additional 2D calibration.

If required, the 2D calibration should take place on the vehicle in an area clear of additional magnetic interference.

The **3D Calibration** is designed to compensate for local (sonar) and vehicle magnetic interference in three dimensions and is shown opposite. **The calibration requires the sonar to be mounted on the vehicle in an area free of external magnetic interference and the sonar and vehicle slowly moved in all three directions.**



The AHRS sensor device (and vehicle) requires slow rotation in all three axis resulting in coverage of the sphere sectors in yellow (first pass) and green (second pass).

A 3D field calibration is not required under normal use and during routine operations and should not be started unless directed by Tritech International.

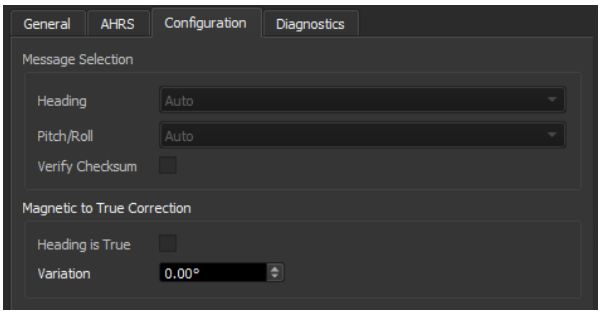
Configuration of More Than One AHRS Sensor

If Genesis is connected to two different sonars with AHRS systems fitted one of the units may revert to “measurement only” operation and not allow selection of some of the configuration options within the AHRS settings tab. Should this happen please start and configure the AHRS sensors individually with only one loaded and connected to Genesis at any time.

The Configuration Settings Tab

The **Message Selection** options and settings are disabled as the sensor is integral to a Gemini sonar.

Magnetic to True Correction allows correction of the input between true and magnetic heading with the variation specified as required.



The Diagnostics Settings Tab

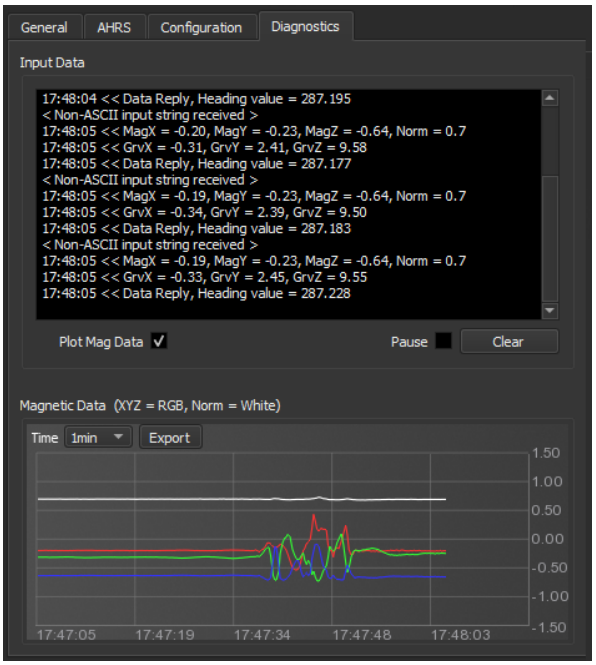
The **Input Data** shows the time stamped input messages received from the device and can be used for troubleshooting any issues with the output.

Plot Mag Data replaces the Alerts display window with a graphical display of the the X Y Z magnetic data from the internal sensors to aid calibration and diagnostics.

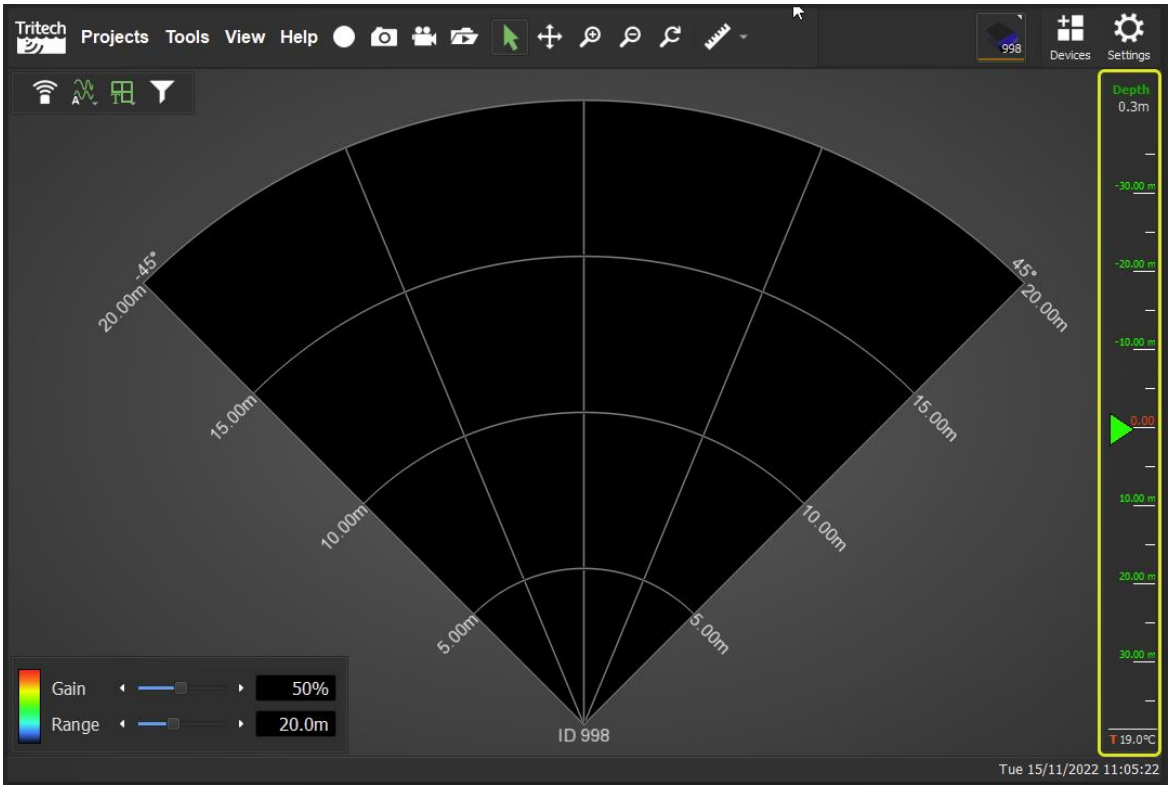
Pause temporarily pauses the Input Data display.

Clear will delete the text in the Input Data display.

The **Alerts** area (not shown) will display any warnings or alerts specific to this device (e.g. loss of comms).

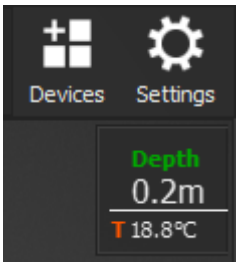


Gemini Sonars with an Internal Depth Sensor



When a Gemini Sonar fitted with an internal pressure/depth sensor is connected Genesis will automatically recognise the sensor and display the depth in the main sonar display. The depth is shown as a dynamic side bar on the right of the sonar display as shown above.

The depth and temperature can be displayed as a smaller text box by selecting the Show Depth as Text Only option in the device Display settings tab. The text box is located in the top right of the sonar display.



If the sonar has both a depth and AHRS sensors fitted the depth display will automatically switch to the text box when the AHRS is displayed.

Calculation of Depth

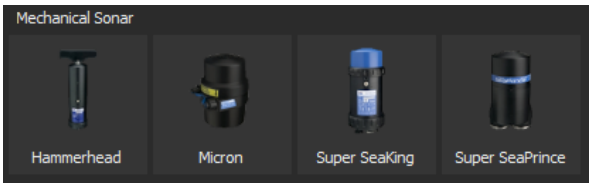
The sonar depth is calculated using the Atmospheric Pressure, Water Density and Local Gravity values that can be found and changed in the Environment settings tab. For more details, please refer to the *Genesis Main System Settings* section of this manual.

Using Genesis with a Mechanical Scanning Sonar

Genesis supports the current and legacy models of Tritech Mechanically Scanning Imaging sonars.

Genesis does not currently support SeaKing Mechanical Profiling Sonars or the SAV4 Multicomm Intelligent Junction Box. Users of these devices should continue to use the Seanet Pro software package.

When connected via ARCNET or Ethernet the device will automatically be detected by Genesis and added to the current Project. If the device is connected via a serial connection it can be added to Genesis by selecting the Devices button in the top right of the main screen.

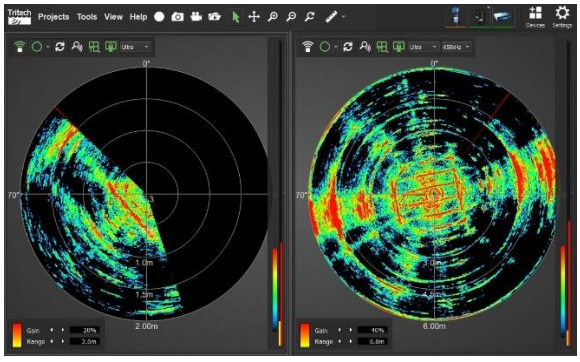


Once added into Genesis the sonar output image will be displayed in the main window and corresponding button and status bar shown in the Device Bar.

Operating Multiple Serial or ARCNET Devices

If connecting more than one device of the same type (i.e. two SeaKing sonars) care should be taken to ensure the devices have a different Node number. It is advised to connect and check each device individually and make any alterations to the Node number prior to operating them simultaneously.

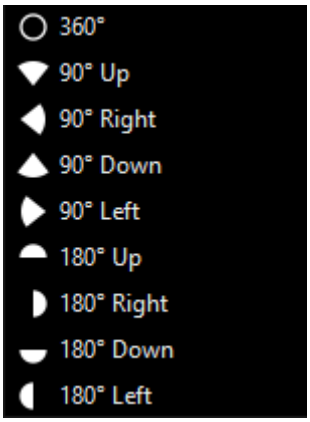
Scanning sonars display as a primary device. If there is no other device displayed in the Genesis main window it will display using the full screen. If there is another primary device in the Genesis Main Window the sonar will split the window vertically and display side-by-side as shown.



Displayed in the top left of the sonar view is a secondary toolbar with controls specific to the sonar. Although most of the controls are the same across the different scanning sonar devices, there will be some controls specific to a single sonar type.

This button indicates and will toggle the sonar **Offline** or **Online**. The icons shown indicate the device as offline or online respectively.

The Sweep Aperture button provides a drop down menu showing several pre-set scanning apertures. If a more specific aperture is required, it can be created by selecting and dragging the sides of the sonar display to increase or decrease the sweep angle.



Scan Direction reverses the direction of scan for the sonar. It is applied immediately on selection.

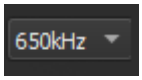
This control button will enable or disable **Acoustic Zoom** on sonars that support this feature. More details can be found in the section *Using the Acoustic Zoom Function*.

This button and drop-down menu will control the **Grid and Labels Display** options for the current sonar view.

Screen Lock will lock the number of range line samples taken to equal the number of pixels on-screen used to represent that scanline (bearing line) of data.

The **Resolution** drop-down control allows selection of the sonar scanline resolution from the available options.

The **Frequency** drop-down control selects the operating frequency of the sonar (if applicable).



At the bottom left of the sonar view are a set of secondary controls for the display colour palette, gain and range:

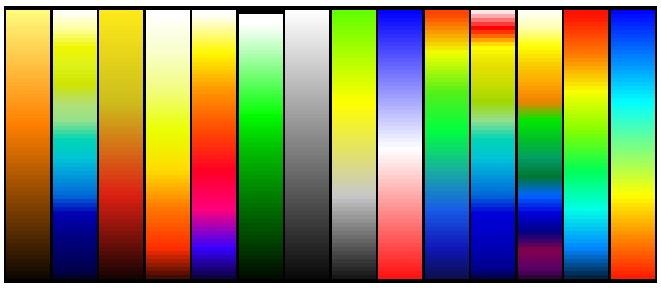
Gain will control the amount of gain used on the display of the sonar image. This can be adjusted using the slider or typed into the display box.

Range will allow control of the sonar operating range between its minimum and maximum values.

Selecting the current **Colour Palette** with the mouse will display a range of different colour palettes to choose from. Strong returns will display in colours at the upper end of the palette and weaker returns at the lower end.

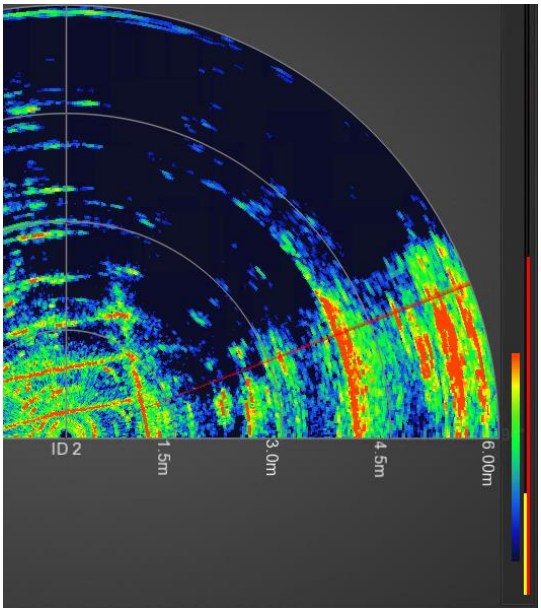
Available colour palettes are:

- Bronze
- Echosounder
- Fire 1, 2 & 3
- Green
- Grey scale
- Grey to Yellow
- Polarity
- Sonar 1, 2 & 3
- Spectrum
- Survey

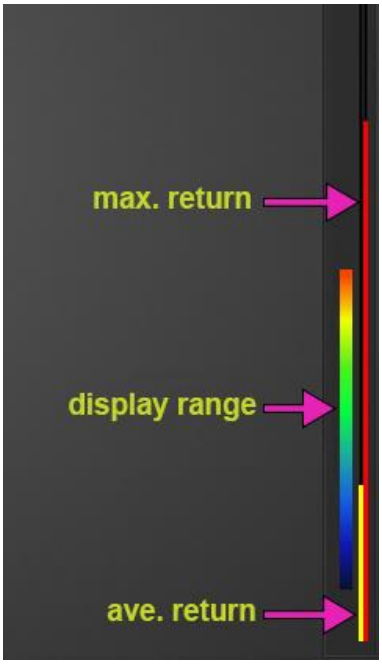


Sonar Dynamic Range Controls

At the bottom right side of the scanning sonar window are the sonar strength of response (return strength) bars and the adjustment for the Dynamic Range settings. Dynamic range is enabled or disabled through the control on the device display settings tab.



As the sonar operates the thin red and yellow bars indicate the average and maximum strength of return for the current scanline. This gives a simple visual indication of the difference between the maximum and the rest of the return echoes for an individual scanline.



By selecting the range bar with the mouse you can move it up and down. By moving it upwards the returns require to be at a higher strength before being displayed, so reducing the effective sensitivity of the sonar display. By moving the bar downwards you reduce the strength of echoes required before being displayed, so increasing the effective sensitivity.

By selecting the range bar with the mouse and holding the [Ctrl] key down on the keyboard, the dynamic range can be increased and decreased. This will have the effect of increasing the contrast between different strength return echoes.

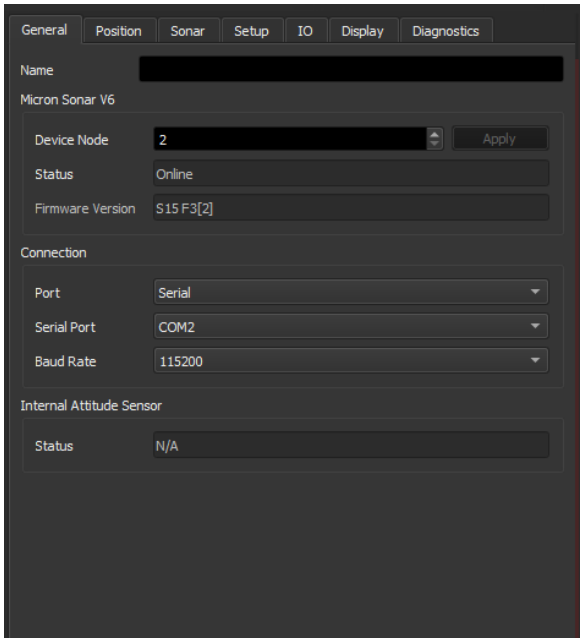
Scanning Sonar Device Settings

To adjust the settings and configuration for the Scanning Sonar click the device icon which will then display the settings tabs.

The screen images and configuration settings shown cover the range of scanning sonar models. The layout may differ slightly between sonar models with some features only available on certain sonar models. If unavailable the controls may appear disabled (greyed out) or not shown.

The General Settings Tab

The General settings tab displays information about the connected sonar, displays and allows changes to the sonar communication connection, and sets the position reference.



Name will default to the sonar ID, or a user chosen name can be entered to help with differentiation of the sonar if multiple units are being used in the same Genesis project.

Sonar:
Device Node displays the number set for the sonar. If supported by the sonar, the Node can be changed using the up and down arrows and select [Apply] to program the new value. The device will reset and reconnect to Genesis.

Status will display the current status (online / offline / disconnected) of the sonar.

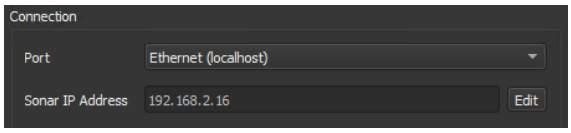
Firmware Version shows the current version loaded onto the sonar. If there is an update available an [Update] button will show next to the firmware display.

Connection:
Port
This allows selection of the communications mode the sonar is using. Depending on sonar type and connections it may display Ethernet, VDSL, ARCNET or Serial.

Serial Port / Baud Rate displays the current settings for the sonar after connection.

Internal Attitude Sensor will display the status of the internal sensor if one is fitted.

Connection (Ethernet):
This shows the different connection details when connected to a Super SeaKing V7 Sonar over Ethernet.

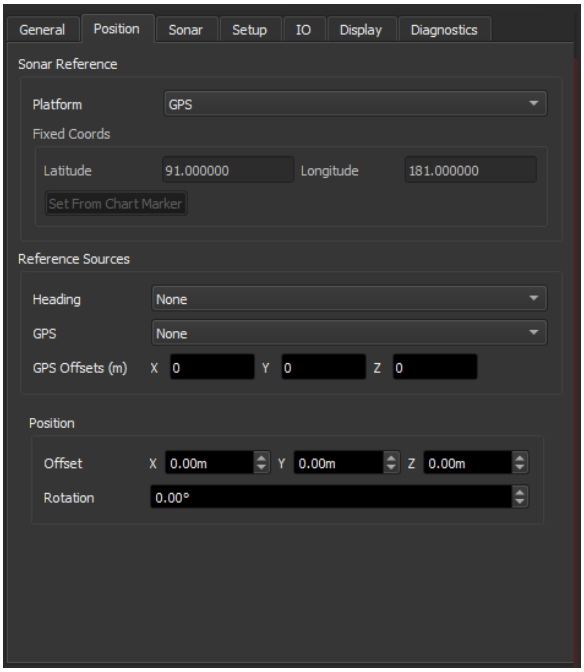


Sonar IP Address displays the current settings for the sonar after connection. Pressing the [Edit] button will allow you to program the sonar with new Ethernet settings. After any change of the settings and selecting [Apply] the sonar will reset and reconnect to Genesis which may take up to a minute to complete. Please refer to the common tasks section *Changing the Device IP Address* for more detail.

The Position Settings Tab

These settings control the position type and references for the sonar geo-referencing ability.

Sonar Reference gives the option to set the sonar position (**Platform**) as GPS derived (eg for a ROV or Vessel) or Fixed at a set of manually entered **Fixed Coordinates**. For a fixed position you have the option to import the location coordinates from a previously saved Chart Marker.



Reference Source:
Heading allows selection of an active Compass device to be used as a geo reference for the Sonar.

GPS allows the selection of an active GPS device or MicronNav Transponder to be used as the geo-reference location for the sonar.

GPS Offsets (m) allows an X and Y offset to be entered between the physical GPS location and the sonar location in metres.

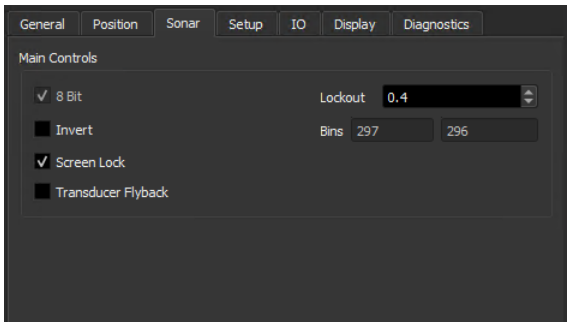
Position allows a sonar display **Offset** to be entered in three dimensions and a **Rotation** offset from the reference heading.

Offset sign conventions are:

X = screen left and right, right is +ve
Y = screen top (forward) and bottom (back), top is +ve
Z = sonar height if layered on the screen, increase in height / top of layers is +ve.
Rotation of display on the screen, +ve is clockwise (RH)

The Sonar Settings Tab

These options control the function and configuration of the main scanning sonar features.



8 Bit is fixed and will request 8 bit binary range samples from the sonar.

Invert configures the sonar for a change in mounting to an upside-down (transducer down) orientation. The image will be flipped on the horizontal axis.

Screen Lock instructs the sonar to limit the range samples to what can be represented on screen .

Transducer Flyback will instruct the sonar to return to its start position before starting a new sweep when not scanning 360 degrees. When deselected the sonar will sweep (left and right) across the scan area.

Lockout specifies the range (in metres) from the sonar that will be ignored when processing return echoes.

Bins is the number of *Bin*ary range samples requested (left), and produced and sent from the sonar (right) for the current scanline.

The Setup Settings Tab

This settings tab displays the operating configuration settings for the sonar transducers and transducer controls. The information is programmed into the device and is displayed for information and diagnostic purposes. Configuration settings that can be modified are:

Half Duplex is always selected for RS485 communications. This can be enabled for other communications if required.

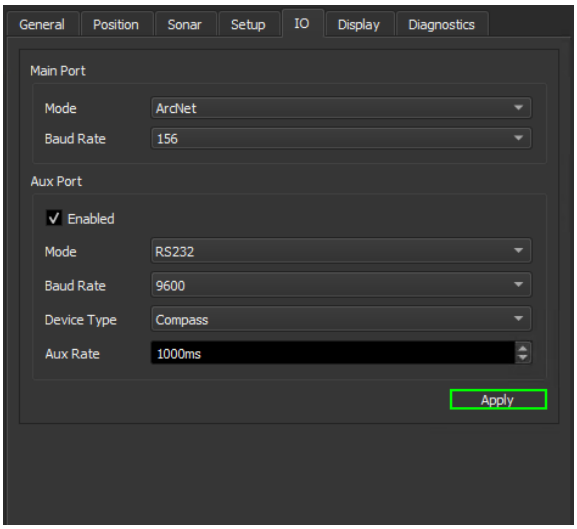
Load Config opens a window dialog box and allows loading of a `.userbbcfg` file containing a differing set of calibration coefficients and serial number settings. Select **Apply** to program the device with the new values.

Save Config will open a windows dialog box to save the current calibration and serial number data to a `.userbbcfg` file.

Programming the sonar with configuration parameters will overwrite those stored in the memory, the device will not store any previous values. Reprogramming the configuration data should only be carried out at the direction of Tritech Support as loading of incorrect data will affect the operation of the sonar and may require remedial work not covered under warranty.

The IO Settings Tab

These settings control the communications configuration for the main and aux port (if fitted) to the sonar.



Main Port:
Mode allows the selection of the communications configuration on the main port of the sonar. The options available depend on the sonar type and configuration.

Baud Rate allows selection of the communications speed for ARCNET and serial connected sonars.

Aux Port:
If the device has an Aux port selecting **Enabled** will activate communications from the port in Genesis.

Mode / Baud Rate allows selection from the available serial communication type (RS232 or RS485) and speed.

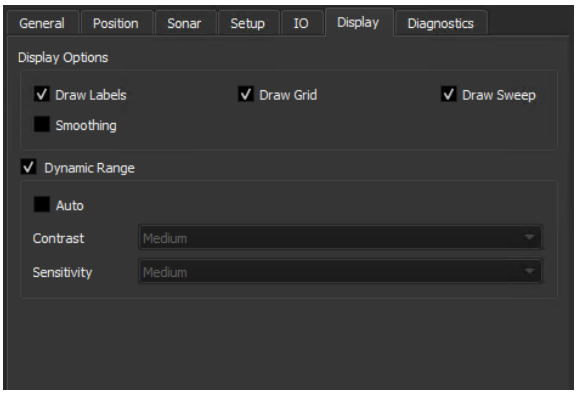
Device Type allows selection of the pre-set devices that can be recognised by Genesis (Altimeter or Compass). Genesis will automatically add the (secondary) device and display.

Aux Rate limits the sample and send rate of the ASCII string to Genesis. The last string held in the sonar aux buffer will be sent at the specified intervals. The default, and recommended setting is 1000 msec (1 Hz).

After the change of configuration select **[Apply]** to program the sonar with the new settings. The connection configuration in the 'General' settings tab may require to be changed to match changes to the Main Port configuration.

The Display Settings Tab

These options change the display of the sonar image within Genesis.



Display Options:
Draw Labels / Draw Grid enabled or disables the range grid and labels on the device display.

Draw Sweep displays a sweep line on the sonar display.

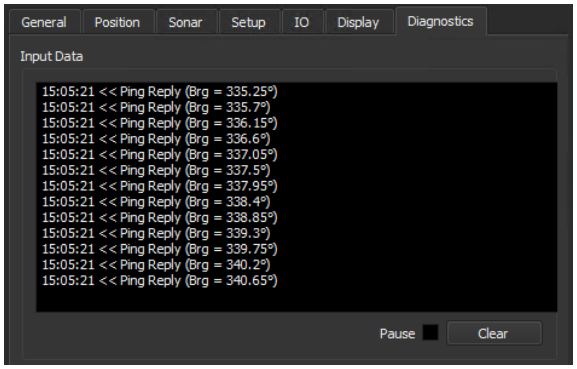
Smoothing will apply an image smoothing effect to the sonar display. The use does not affect data recorded to a logfile.

Dynamic Range enables the manual control of dynamic range using the control bars at the side of the sonar display.

Auto (Dynamic Range) is a display setting that will automatically adjust the **Contrast** and **Sensitivity** (brightness) of the sonar image. Options for both settings are Low, Medium and High. Under certain conditions this feature may result in a reduction of image quality.

The Diagnostics Settings Tab

The Diagnostics tab shows information regarding the sonar, and any alerts.



Input Data displays time stamped history of the data packets received from the sonar. These include the initialisation and attitude data as well as the scanline data packets.

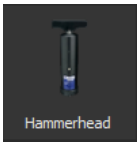
The **Alerts** area will display any current amber (warning) or red (critical) alerts specific to the device.

Using Genesis with a Hammerhead Survey Sonar

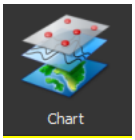
The Hammerhead Mechanical Sonar device is available in Genesis v1.10 and above. The functionality and controls largely follow that of the other Mechanical Sonar devices previously described. There are a few functions specific to the Hammerhead which will be described below, including the capability to capture Hammerhead Sonar imagery into geographic TIFF files (or Image Tiles) which can then be used in the Tritech Image Tiler software to produce sonar mosaic images.

If the Hammerhead is connected via ARCNET, a device will be automatically added into Genesis. For a serially connected Hammerhead the device will need to be manually added into Genesis and a Port configured (as described earlier) in the Hammerhead Device Settings.

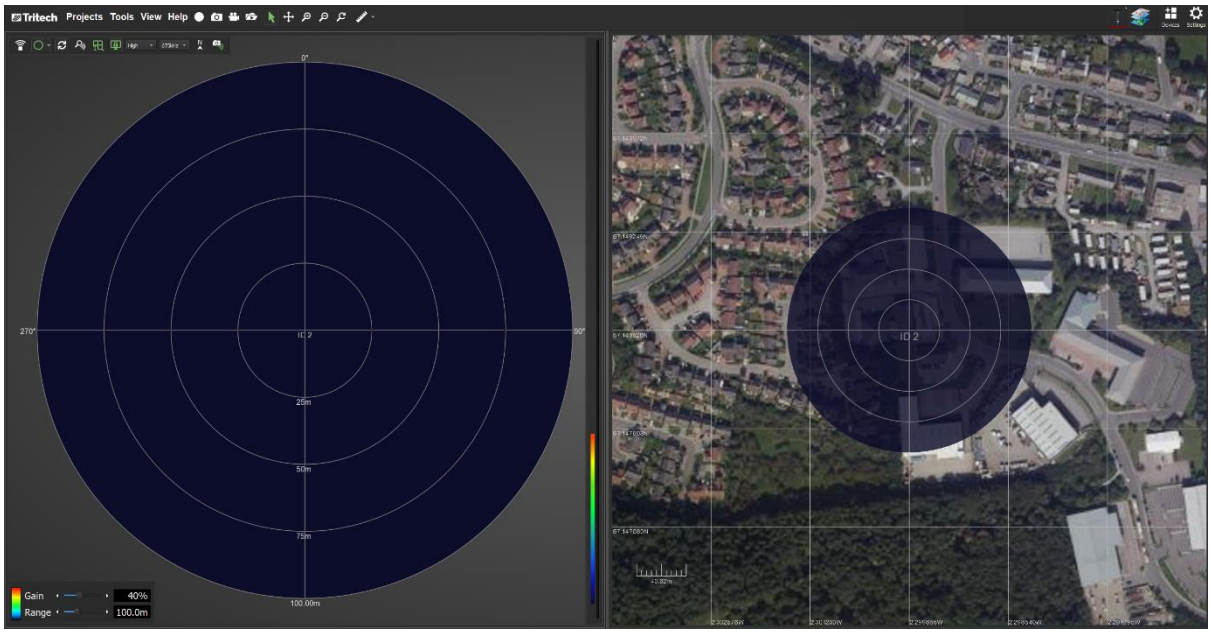
The Hammerhead device can be manually added via the Add button in the Devices List.



A Chart Device should also be added to the Genesis display when conducting a site survey with the Hammerhead sonar. For further information, please refer to section *Using Genesis with a Chart Device* of this manual.



With Chart and Hammerhead devices added, the Genesis display will appear as below.



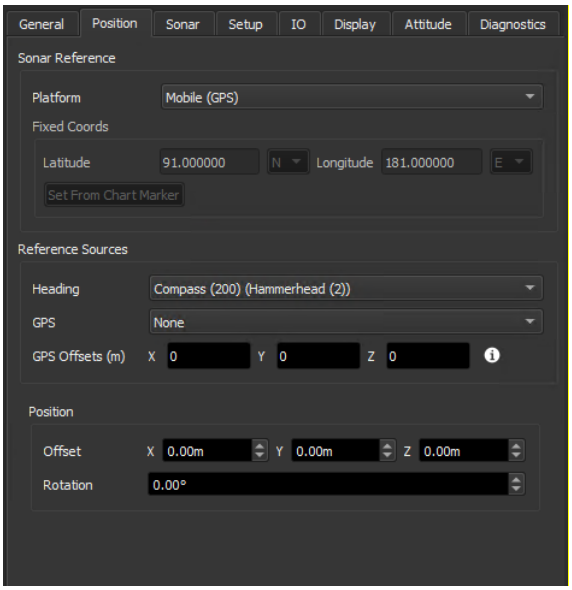
Hammerhead with Chart Display

After adding the Hammerhead device and Chart, the Hammerhead overlay will be positioned at the centre of the Chart. At this point, the Hammerhead position will not have been configured / geo-referenced properly. It is recommended to first setup the Chart and to configure it to the location of the Site Survey. Either Google Maps or an imported Raster chart can be used. To configure the Chart, refer to the *Using Genesis with a Chart Device* section of this manual.

Geo-referencing the Hammerhead

Once a Chart has been setup, the Hammerhead position will now need to be configured. This can be done in several different ways in the Hammerhead Settings. To adjust the settings and configuration for the Hammerhead device, click on the Hammerhead icon which will display the Settings tab.

To configure the Hammerhead position, click on the **Position** Tab within Settings.

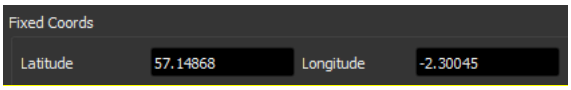


The **Platform** can be set to 'GPS', 'Fixed' or 'Markers':

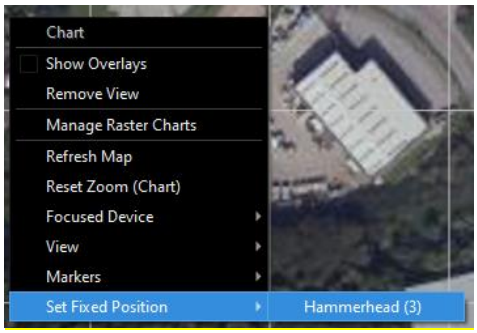
If a 'GPS' platform is selected, then a GPS or MicronNav device will need to be connected and added into Genesis first. It can then be selected from the **Reference Sources** 'GPS' control.

Heading should be left to the default 'Internal' selection to use the Attitude Sensor fitted to the Hammerhead. It is possible to install an external compass/attitude sensor to the Hammerhead frame (e.g. tripod) and select this in place of the internal sensor.

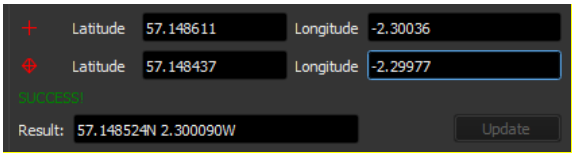
If a 'Fixed' platform is selected, then Fixed Coordinates will need to be manually entered:



It is also possible to set the Fixed platform location by right-clicking on the Chart display and selecting **Set Fixed Position – Hammerhead**:



If a 'Markers' platform configuration is selected, the co-ordinates for 2 known reference targets on the Chart need to be manually entered, e.g.

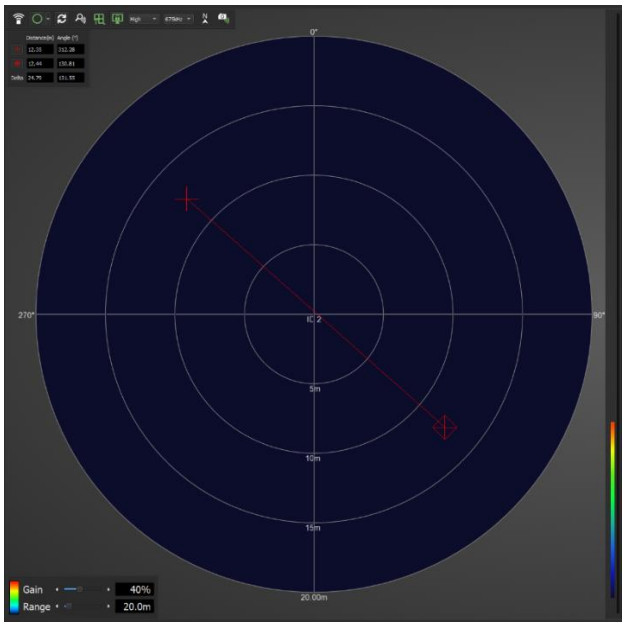


On entering these (pressing Return after editing), a result of 'SUCCESS!' will be shown if they are within a sensible range of each other, otherwise an error will be given.

If any of the settings have been changed and the keyboard 'Return' is not pressed afterwards, an **'Update'** button will appear which can be pressed to apply the changes.

If ‘Markers’ is selected, a toolbox will be shown on the Hammerhead display. Two markers will be laid on the Sonar display and are used in locating the target co-ordinate points just added by moving each marker over the (reference point) targets as they appear on the live Sonar image.

The Hammerhead overlay on the Chart will then be located at this new position configured from the 2 Marker positions.



North Up / Heading Up

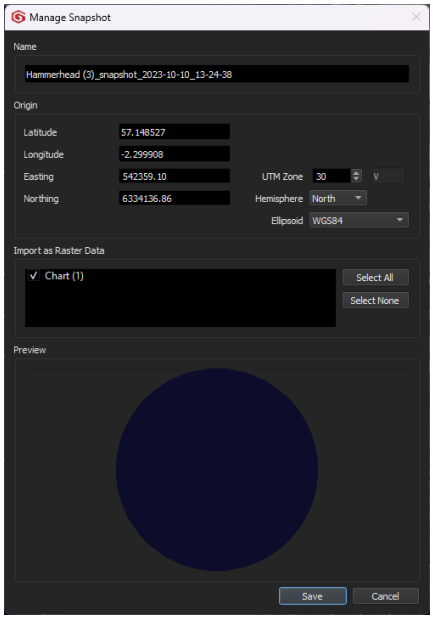
The sonar display can be oriented with either a North Up or Heading Up referenced. North up is indicated by the Icon turning green when toggled.

Capturing Sonar Image Tiles

Displayed in the top left of the sonar view is a secondary toolbar with controls specific to the sonar. For the Hammerhead, an ‘Image Snapshot’ button will be added to the right of this toolbar.

With the Hammerhead geo-referenced / located at the correct position and a full 360 degree sonar image collected, an Image Tile can be captured for use in offline mosaicking. The Tritech Image Tiler or other third party software can be used for this purpose.

To capture a Sonar Image Tile, press the ‘Image Snapshot’ button. A ‘Manage Snapshot’ dialog will popup:



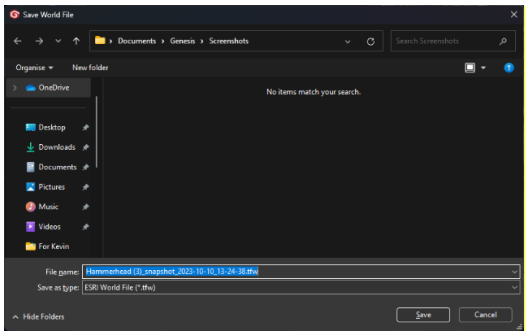
The ‘**Name**’ field will be automatically populated with current Time and Date. This is the filename of the ‘.TIF’ image file and associated ‘.TFW’ world file that will be generated.

The ‘**Origin**’ fields allow for any manual adjustment made to the position that the Image Tile will be captured at, although normally these fields will not need editing.

‘**Import as Raster Data**’ allows the Image Tile to also be overlaid on the selected (ticked) Chart device. This is useful as when the Hammerhead is moved to the next location, the Chart will display previous location Image captures for reference.

Click ‘Save’ to save the Image and its position to a ‘.TIF’ with associated ‘.TFW’ world file.

A further ‘Save World File’ dialog will appear where the folder location can be changed if necessary.



The whole process can be repeated and the Hammerhead moved to the next position and a further Image Tile captured. The screenshot to the right shows the Hammerhead moved to an adjacent position and the Chart displaying the Image Tile captured at the previous position:

Once the Site Survey area has been fully covered and Image Tiles captured at each Hammerhead position in turn, these can be imported into the Tritech Image Tiler software to produce a mosaic. Refer to the documentation specific to this software package for more information and instructions on how to combine the image times into a larger mosaic. Image Tiler allows editing of the Image Tiles when they are imported such as adjusting Tile positions and rotating them to facilitate the alignment of all tiles before a mosaic is generated.

The latest released version of Tritech Tiler is available from the Tritech website www.tritech.co.uk.

Using Genesis with a Chart Device

When you add a MicronNav device into Genesis it will automatically add the Chart device at the same time. If you wish to add a Chart device without a MicronNav system, or an additional Chart to the MicronNav system it can be added via the Add button in the Devices List.

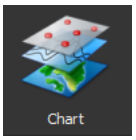


Chart Device Settings

To adjust the settings and configuration for the Chart click the Chart Device icon which will display the settings tabs.

The Chart Settings Tab

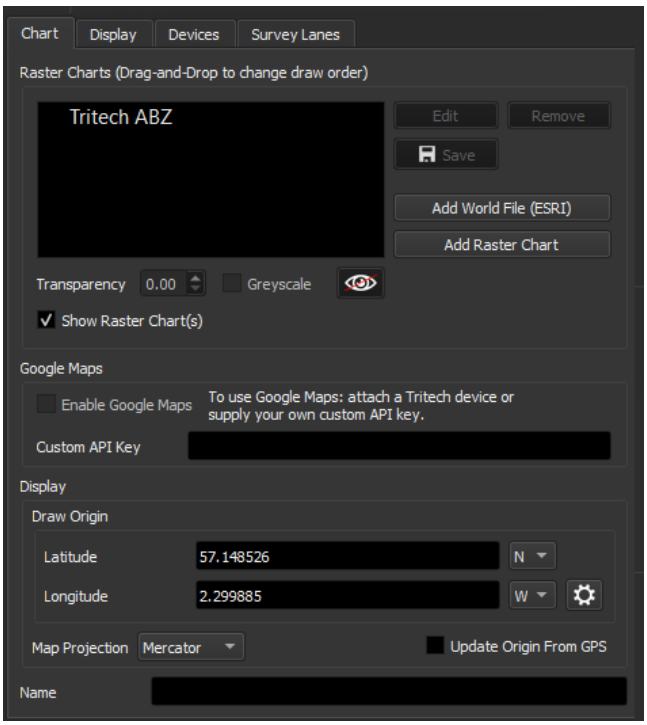
Raster Charts:
Add World File (ESRI) allows the import of a world file for the required chart, which has been saved to the computer. The world file contains the reference positioning and scale for the associated chart image to be displayed correctly.

Add Raster Chart allows the import of a suitable raster graphics file (.bmp, .png, .jpg, .jpeg & .tif) to be used as the chart.

The **Edit, Remove** and **Save** buttons can be used to control the added chart once it has been selected.

Transparency sets the transparency level of the selected chart on the Chart device view. '1.00' being 100% visible.

Greyscale sets the selected chart from colour to greyscale.



The **Eye** button will move the chart display to the centre of the selected chart.

Show Raster Chart will add or remove the selected chart from the Chart device view.

Google Maps:
Enable Google Maps will enable the use of Google Maps™ to render the chart. Enabling this option also shows a new settings tab called Google Maps which can be used for configuration. For further information, please refer to section *Using the Google Maps™ Functionality* of this manual.

Display:
Draw Origin allows the user to enter the coordinates for the origin point on the chart. The location of the origin point on an imported chart file is set using the **Edit** button in the Raster Chart controls.

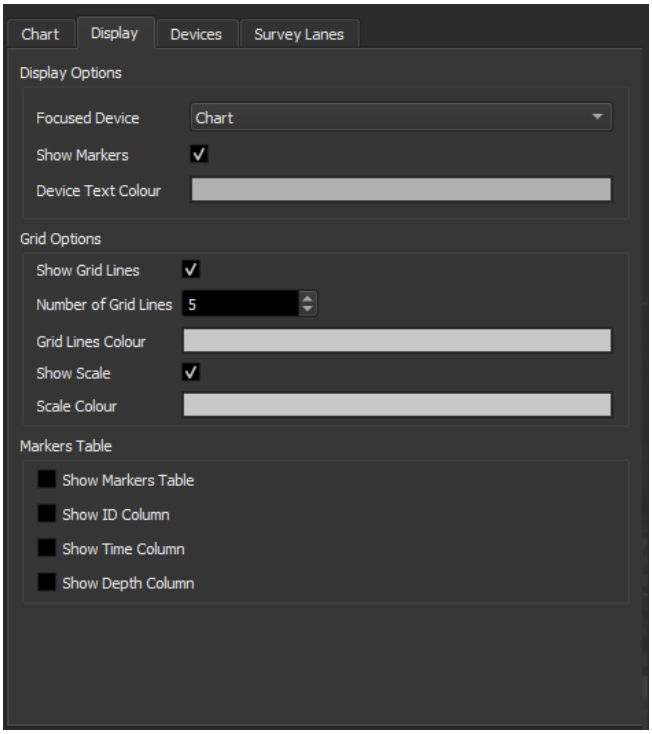
The **Settings** button allows the user to quickly access the main Geographic Coordinates settings.

Map Projection allows the user to select the map projection from Mercator or UTM Zone.

Update Origin From GPS will automatically update the coordinates if a GPS device has been successfully added and has a positional fix.

Name allows you to enter an individual name for your chart. This is useful if you have more than one chart device loaded into Genesis.

The Display Settings Tab



Display Options:
Focused Device will enable the chart to focus (centre and track) on any of the available Chart Devices. In this case it has been focused on the Chart.

Show Markers displays markers that have been imported into the chart or recent ones that have been created.

Device Text Colour sets the colour for the device text.

Grid Options:
Show Grid Lines controls the display of the geographical grid lines on the Chart Display.

Number of Grid Lines adjusts the number of grid lines displayed in the Chart view.

Grid Lines Colour sets the colour for the grid lines.

Show Scale switches the display Scale on or off.

Scale Colour sets the colour for the Chart Display scale.

Markers Table:
Show Markers Table will turn On/Off the markers table on the chart device display.

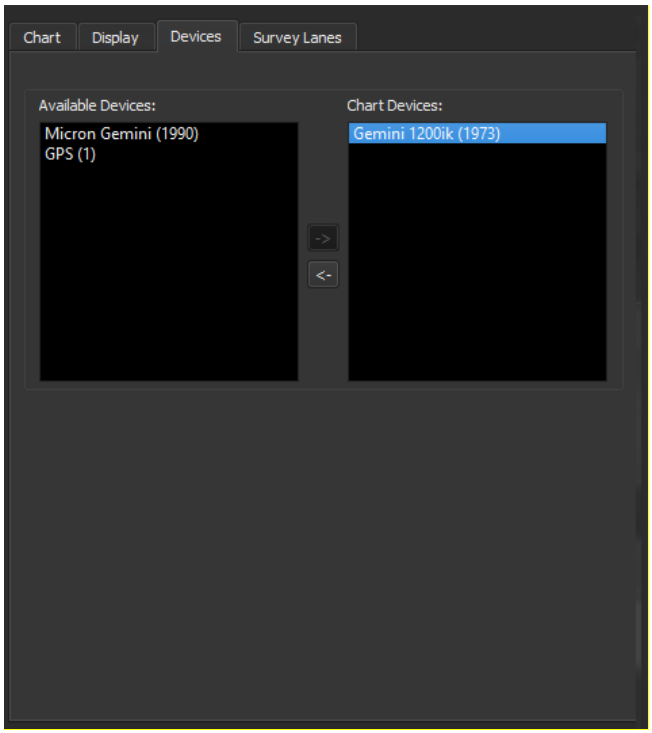
Show ID Column will add the ID column to the markers table.

Show Time Column will add the Time Column to the markers table.

Show Depth Column will add the Depth Column to the markers table.

The Devices Settings Tab

Devices shows the available devices loaded into Genesis and allows them to be added for display onto the Chart Display window. To display onto the Chart the device must be selected from the 'Available Devices' and added to the 'Chart Devices' box by pressing the directional button [->]. To remove a device from the chart, do the opposite. By selecting the device and pressing the directional button [<-]. Once on the 'Chart Devices' list the device can be selected as a 'Focused Device'.



The Survey Lanes Settings Tab

Survey Lanes can be laid on the Chart as a route guide to assist the operator with an area search or survey.

This feature is described in detail under the *Displaying Survey Lanes* section. Please refer to this section for further details.

Using the Google Maps™ Functionality

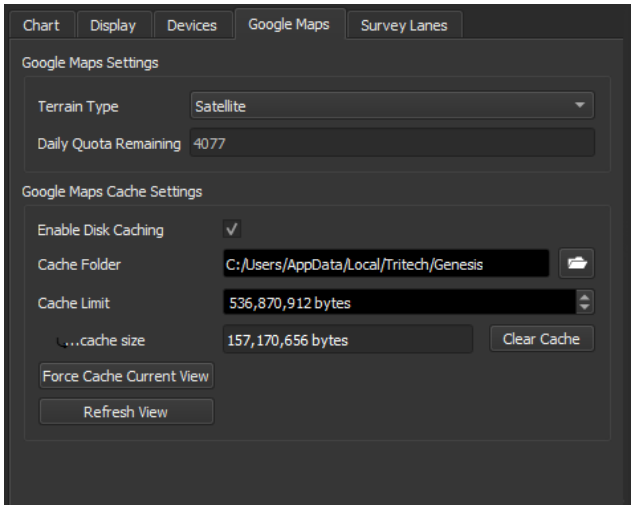
This function allows the use of Google Maps™ as an alternative to a loaded chart. **This is an online service and requires an internet connection and the connection of a Tritech product or device to the computer running Genesis.**

If the laptop running the Genesis software has an instance of Google Maps running in another software application, this will need to be closed before Genesis can use the Google Maps Function.

For this tab to become visible the **Enable Google Maps** box must be checked under the Chart tab settings. Alternatively, please enter a custom API Key if purchased from Google. With this option Genesis does not require a Tritech product to be connected to display Google Maps.

Google Maps Settings:
Terrain Type will display the different Terrain Types, which are selected via the drop-down list. Available options are:

- **Roadmap**
- **Satellite**
- **Terrain**
- **Hybrid**



Daily Quota Remaining
Google Maps is a paid for service which Tritech supports in Genesis by allowing a fixed quota of map tiles to be downloaded into Genesis in a 24hr period. This shows the remaining number of map tiles in the daily quota.

Google Maps Cache Settings:
Enable Disk Caching
Disk Caching takes a copy of the map tiles at different levels, so that the mapping can be used later without an internet connection. Cached map tiles are automatically deleted after a set period according to the Google Maps terms of use.

Cache Folder displays the folder being used to store the downloaded and cached map data.

The **Folder** button opens a Windows folder window to allow the location of the cached files to be viewed.

Cache Limit allows the user to set a limit the amount of disk space used on the computer to store the downloaded and cached map data. This is set to the amount of free space on the disk by default.

…cache size displays the amount of disk storage being used by Genesis to download and cache the map data.

Clear Cache will delete the downloaded and cached map data on the computer. The current map display will require to be downloaded from Google again and will impact the daily data limit.

Force Cache Current View
Ensures the currently visible map is downloaded to your cache folder.

Refresh View refreshes the visible map, allowing you to flush out any failed map download and try again. To ensure you have the most recent map data you will need to select “Clear Cache” first.

The Chart Pop-Up (Right Click) Menu

If you click onto the displayed Chart with the right hand (or alternate) mouse button, a supplementary menu will display and allow you to control the Chart display and overlay information.

Show Overlays turns on or off all of the information overlays displayed on the Chart. This includes overlay information that may have been copied over from other devices.

Remove View will remove the current Chart view from the Genesis Main Display.

Manage Raster Charts is a quick link to open Chart Settings in the ‘Chart’ tab page.

Refresh map will force a refresh and download (if using Google Maps™) for the current displayed Chart view. This may be useful if having difficulties with map downloads.

Reset Zoom will reset the chart to the default zoom size and position.

Focused Device will centre the Chart view to the location of the selected Device (e.g. MicronNav, Gemini, GPS or other).

Device Overlays allows you to select what control and information overlays are displayed on the Chart view from the associated devices.

View gives the option of centring the map on the clicked location on selection of **Focus Here…** To reset the centre of the map to the original position select **Reset to map origin**. This option is not shown if the Chart is using a GPS Device.

Markers displays controls for creating and working with Chart Markers. See the manual section

Using Chart Markers for more details.

Set Fixed Position will set the geographic position of the selected Device (e.g. Gemini or MicronNav when in Fixed Position modes) to the location on the chart that the right mouse click was depressed at (e.g. to open the Pop-Up menu).

Sub Trails will show options for displaying the USBL Transponder location and tracks when a MicronNav device is being used.

Gps Trails shows options for displaying and pausing the GPS location and tracks when a GPS device is being used.

Using Chart Markers

The Chart application in Genesis, includes the facility to lay a series of markers to label and track objects, points of interest and waypoint positions. These markers can be saved to file for the purpose of re-loading later or to form part of a report.

There are two formats of marker file:

- full comma separated file format with the filename extension **.mrk**
- shortened comma separated format with the filename extension **.csv**

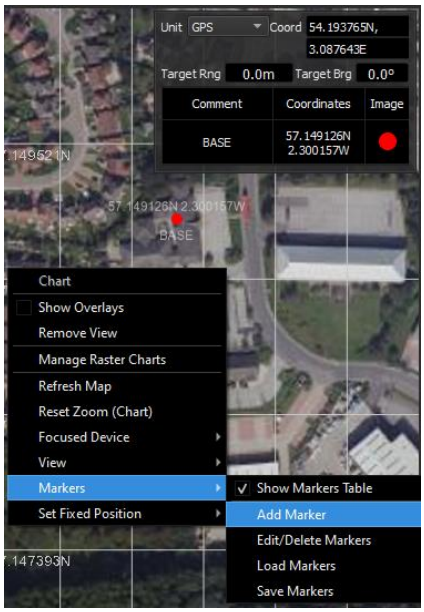
Full details of the file types and format can be found in the “Genesis - Supported Interface Strings and File Formats” software manual on the Tritech website at www.tritech.co.uk.

Creating and Laying a Marker

Right-clicking anywhere on the chart will open the chart options where the Marker selections can be accessed.

Double-clicking anywhere on the chart will open the Add Marker box with the options for laying a marker at the point clicked.

The options available for adding a new marker are the same as those for editing a marker which are explained in more detail below.

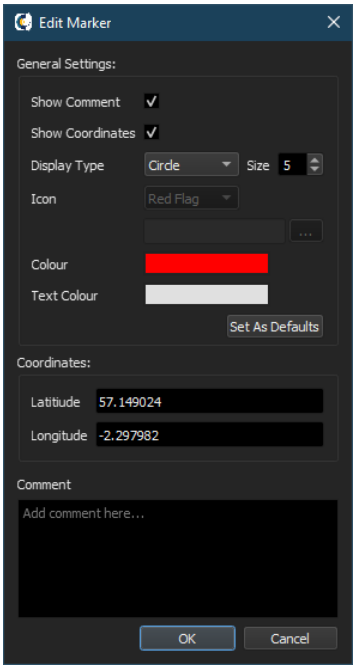


Editing Markers

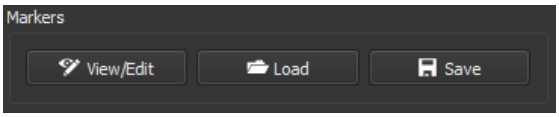
In the Edit Marker dialog, options for the marker can be configured such as shape, image (from a pre-set or loaded bitmap), size, colour, font colours, comment, and coordinates. Once configured, clicking on Ok will lay the marker on the chart.

Multiple markers can be created and laid onto the chart. The markers will be stored in the Genesis configuration, closing and re-opening Genesis will result in the markers being re-loaded as well.

The markers can be added, edited, cleared, loaded, or exported by right-clicking on the chart and selecting Markers from the pop-up menu.



The options to edit load and save Markers can also be accessed from the Display Settings Tab in the main Genesis Settings



If a full format .mrk file is to be opened, it is recommended that this be in the state as saved from Genesis (i.e., no subsequent modifications have been made to the text file). The .mrk file format is a native format and any slight modifications or errors to this format will not be handled.

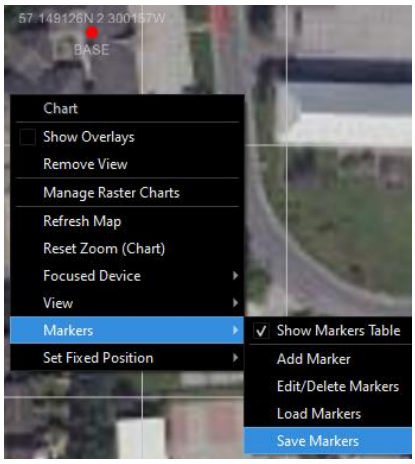
Loading Markers from another System

It is recommended that the shortened .csv format be used to import the marker information. There are several variations to this format that can be handled and are described in more detail in the “Genesis - Supported Interface Strings and File Formats” software manual available on the Tritech website at www.tritech.co.uk.

Saving Markers

To save a Marker for use on another computer:

- right click on the chart
- select the Save Markers option from the Marker Dialog box, a Save File box will open up
- save the Marker in the desired file location

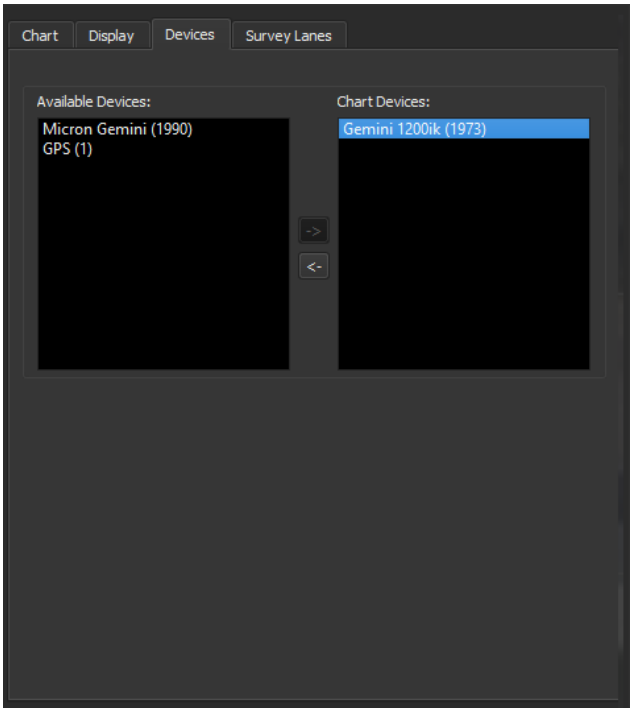


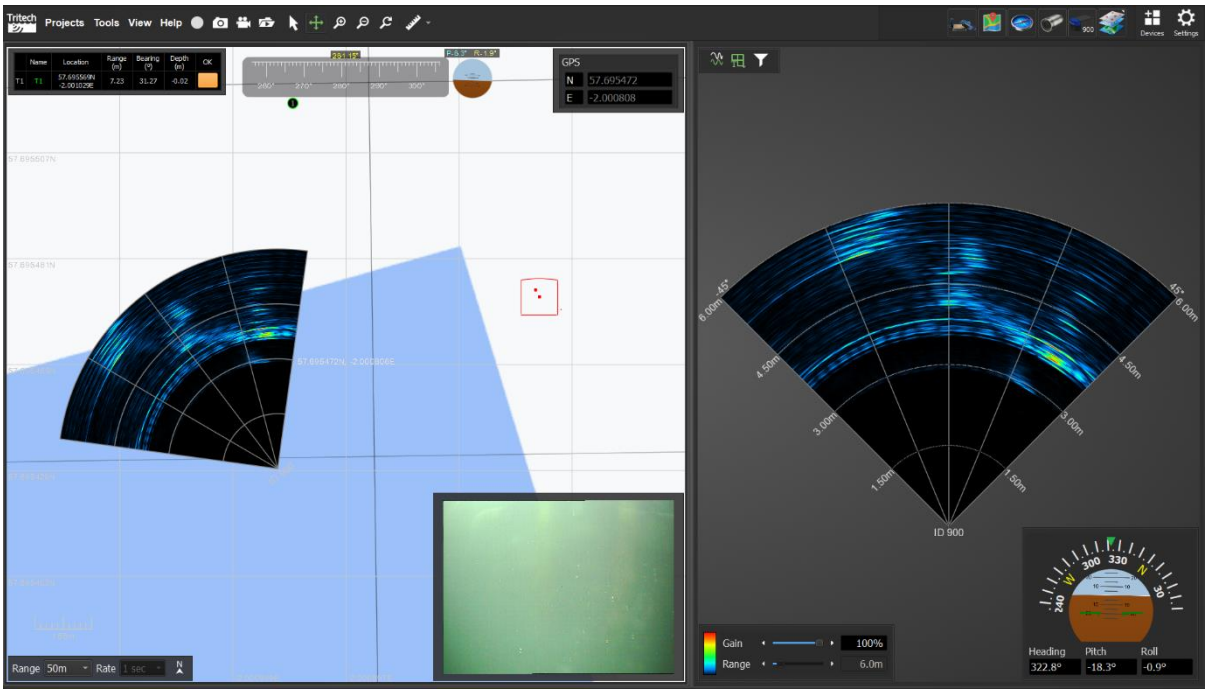
Displaying the Sonar Image on a Chart

If a multibeam sonar device is added to the Genesis project, the sonar image can be displayed on the Chart.

The sonar device will show in the Devices tab of the Chart settings. Once added as a Chart Device the sonar will display onto the Chart and can be used as a Focused Device. The Sonar display will scale and orientate itself with the settings for the Chart.

The location and orientation of the sonar display is controlled by the Position settings for the sonar. Details of these controls are in the relevant section of this manual.





The above screen shows the Sonar display displayed on the chart located according to the position input from the USBL MicronNav system and with the heading input from the secondary Compass device input.

Displaying Survey Lanes

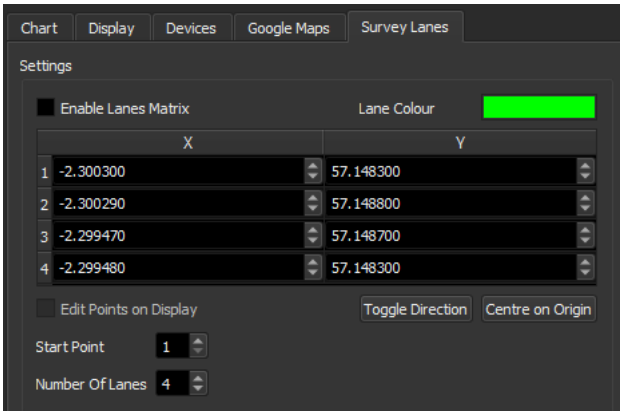
Survey Lanes can be displayed over the Chart as a route guide to assist the operator with an area search or survey.

They can be configured by clicking on the Survey Lanes tab in the Chart Settings:

Enable Lanes Matrix switches the lanes feature On or Off.

Lane Colour selects the colour the lanes overlay will be displayed on the chart.

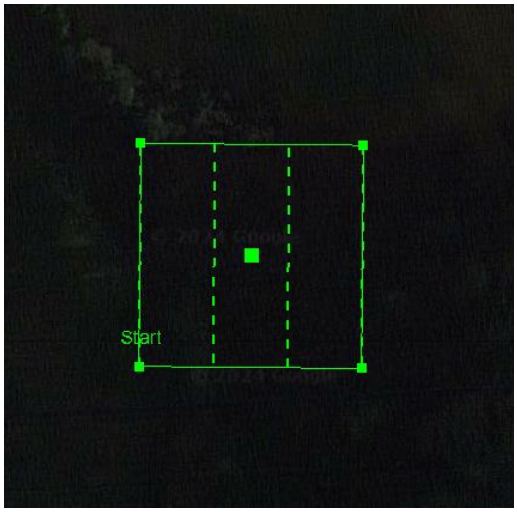
Table of Coordinate Points shows the four corner points of the Area Matrix used to build the Survey Lanes.



Edit Points on Display If this option is ticked, square selection points will be drawn to represent each Corner Point of the Area Matrix.

A selection point will also be added at the centre of the Area Matrix whereby the whole Area Matrix can be dragged to a new position.

These selection points can be dragged with the mouse (e.g. left button click-and-hold then drag) on the Chart to quickly move the position of the Area Matrix.

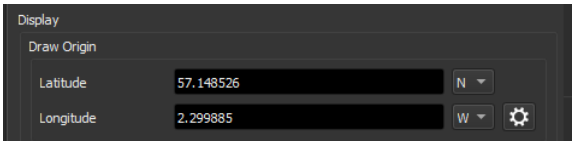


Start Point selects the corner point from which the operator will start the search/survey from. This will be circled on the display. Bottom-Left is Point 1, Top-Left is Point 2, Top-Right is Point 3.

Number of Lanes adjusts the number of lanes inside the search matrix. The examples above have 4 lanes each, these are represented by the dotted lines.

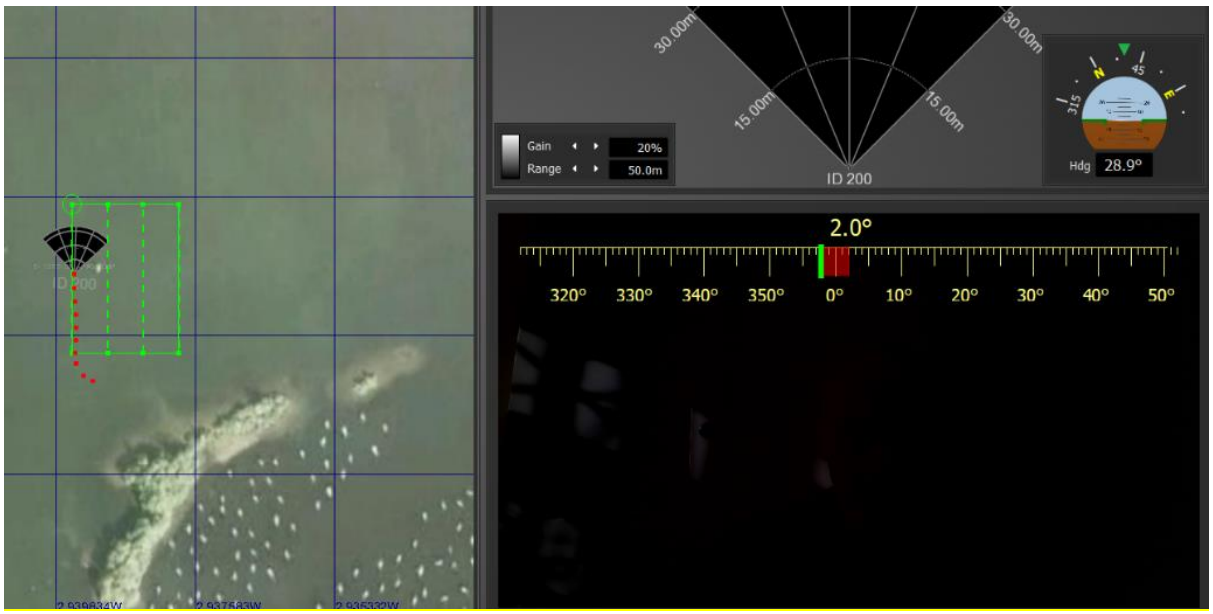
Toggle Direction toggles the Survey Lanes Horizontally or Vertically.

Centre on Origin is used to ensure the 'Draw Origin' in the Chart Tab is set correctly. The Area Matrix will be reset to this position.

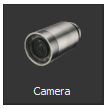


Helmsman Aid

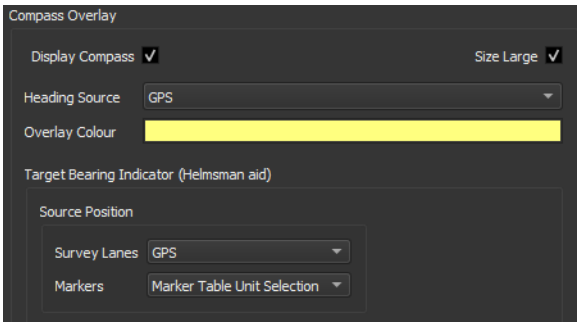
When following the Survey Lane route (e.g. Lawn-Mower search pattern), the next Survey Lane point (Start / End Lane) will be circled, as shown below.



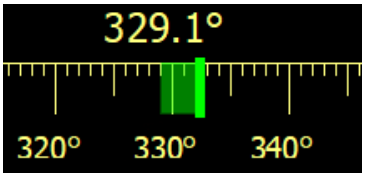
If a Camera device is added to Genesis with the 'Display Compass' option selected (see right) then the Heading will be displayed on the Camera as an overlay as shown above.



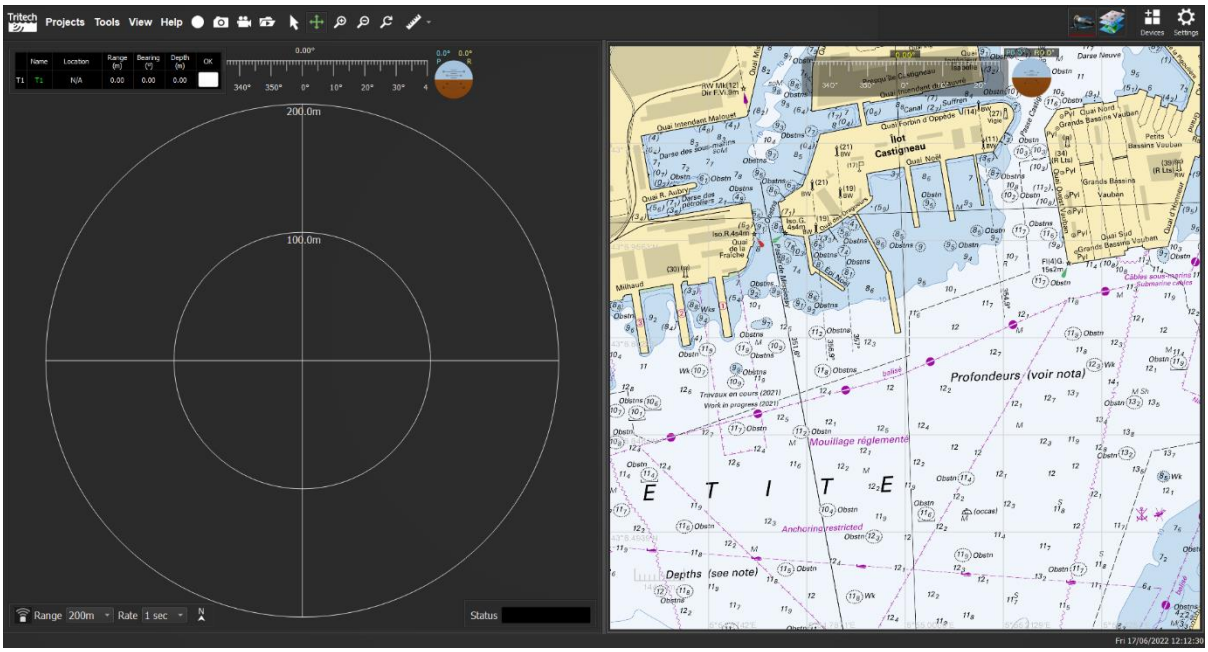
To draw the Bearing Line on this Compass Overlay, to indicate bearing of Next Survey Lane point, ensure 'Survey Lanes', under the Camera Display settings, has the positional source selected being used (see right). This source may be a GPS or Transponder position.



The Target Bearing Indicator will be drawn on this Compass Overlay to indicate the Bearing of the Next Survey Lane point, e.g. example to right guides the helmsman to steer right to stay on course for Next Lane point. The Target Bearing Line drawn is in the colour of the Survey Lanes (green in this case).



Using Genesis with a MicronNav USBL System



For details on using Genesis with a MicronNav 100 or MicronNav 200 USBL system please refer to the MicronNav 200 System Software Manual reference 0734-SOM-00003. The latest version of the manual can be found on the Tritech website at www.tritech.co.uk.

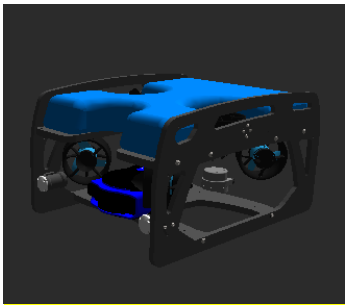
The Genesis Vehicle Display

The Vehicle display can be added via the Add button in the Devices List.

This feature does not control any device but uses data from other devices added into Genesis to update the Vehicle display area.

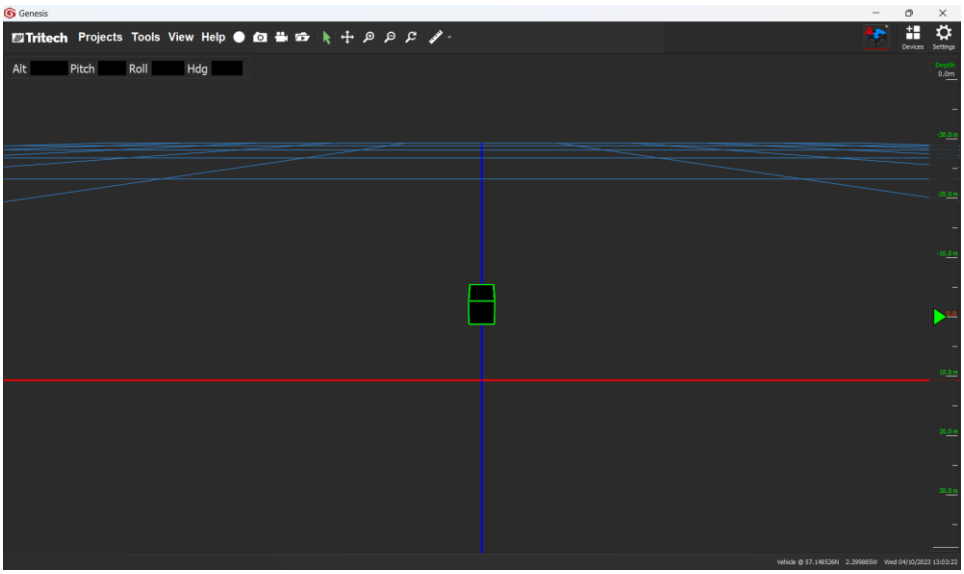
The main purpose of the Vehicle display area is to provide environmental visualisation and situational awareness when operating a number of devices/sensors fitted on a Vehicle (e.g. ROV). It provides a further option to the (2D) Chart device for monitoring and tracking position. The 3D Vehicle view offers a different perspective to the Chart which can be beneficial to the ROV pilot, i.e. to give better positional awareness and convey an operating height from the seabed (when Altitude data is available).

The Vehicle display will import and display 3D models from .STEP formatted files. Within Genesis, a generic ROV model has been provided as well as a range of 3D models from the Tritech product range. These can be imported / selected from the Vehicle Settings. Several 3D models can be added into the Vehicle display at any time and positioned to match the Vehicle fit. To the right is an example of 3D models added and positioned for a 'Generic ROV' with 'Gemini 720ik' & 'Micron Echosounder'.



The Vehicle display area is formed of a main 3D Camera View with Seafloor. The 3D model(s) added forms the main focal point of the Vehicle display, being oriented and positioned in the view through data from selected input devices (GPS, Altimeter, Compass, Attitude, Depth). The Camera View has several, selectable camera types (Free, Follow & Marker) which can be used in different circumstances.

When the Vehicle display is first added into Genesis, it's Camera View will be basic with no 3D models selected/added and a cuboid used to represent the vehicle at this stage. The Vehicle display will require populating from selectable options made in the Vehicle Settings. Full details of the Vehicle Settings configuration follow below.



Basic startup state of the Vehicle display

Vehicle Device Settings

To adjust the settings and configuration for the Vehicle display, click on the Vehicle Device icon which will display the Settings tabs.

The General Settings Tab

The General Settings tab displays the input data being used to control the vehicle display.

Vehicle Data:
Heading indicates valid heading data being received from the selected Compass device.

Pitch & Roll indicates valid inclination data being received from the selected Pitch/Roll device.

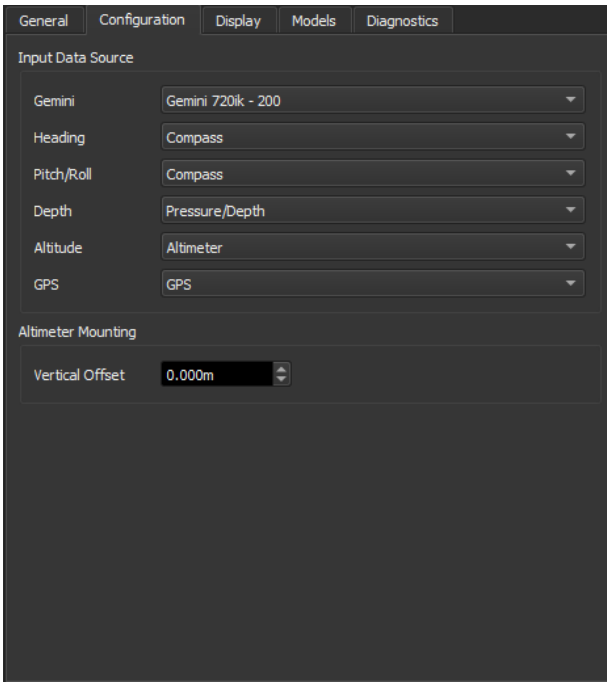
Depth indicates valid pressure/depth data being received from the selected Depth device.

Altitude indicates valid altitude data being received from the selected Altimeter device.

The above data will display a zero value when there is no input or invalid data present or configured.

The Configuration Settings Tab

The Configuration Settings tab allows the user to appropriately select the input source of each component of the vehicle device.



Input Data Source:
Gemini is a list of the Gemini sonar devices that are currently added into the Genesis project. A Gemini device can be selected for inclusion on the vehicle display. A 3D model of the device will also be auto-loaded into the vehicle display.

Heading is a list of the devices added into Genesis that provide Heading data. The Heading data will rotate the Vehicle 3D model displayed on the Vehicle Camera View (or just the Gemini 3D model if no Vehicle 3D model is loaded).

Pitch/Roll is a list of the devices added into Genesis that provide Pitch/Roll data. The Pitch/Roll data will adjust the inclination of the Vehicle 3D model displayed on the Vehicle Camera View (or Gemini 3D model if no Vehicle 3D model is loaded).

Depth is a list of the devices added into Genesis that provide Depth data. The Depth data will auto-adjust the level of angle and zoom applied with some of the Camera viewing options.

Altitude is a list of the devices added into Genesis that provide altitude data. The altitude data will adjust the height of the Vehicle 3D model off the Seafloor on the Vehicle Camera View (or Gemini 3D model if no Vehicle 3D model is loaded).

GPS is a list of the devices added into Genesis that provide positioning data (e.g. Latitude/Longitude or Easting/Northing). The geographic positioning data will geo-reference the Vehicle (or Gemini when no Vehicle 3D model is loaded) whenever a Chart option has been selected (see Display Settings tab). If no Chart option is selected, then the GPS input will be irrelevant to the vehicle display.

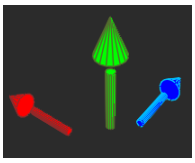
If a MicronNav 200 device is being used, an option to select the appropriate Responder/Transponder will appear on the right side.

Altimeter Mounting:
Vertical Offset will apply a correction to the Altitude text value displayed on the Vehicle display. The Vertical Offset should be entered as the measured vertical distance between the base of the vehicle and the Altimeter transducer face. If the Altimeter transducer face is above the base of the vehicle, enter a -ve Vertical Offset value. Altitude values displayed will then be given for the vertical height between the seafloor and the base of the vehicle (instead of to the transducer face).

The Display Settings Tab

The Display Settings tab allows the user to configure how the main vehicle device display will be populated.

3D Display:
Display Axis Frame will draw an axis frame around the focal 3D model on the Camera View, where Blue = North, Red = West, Green = Up.

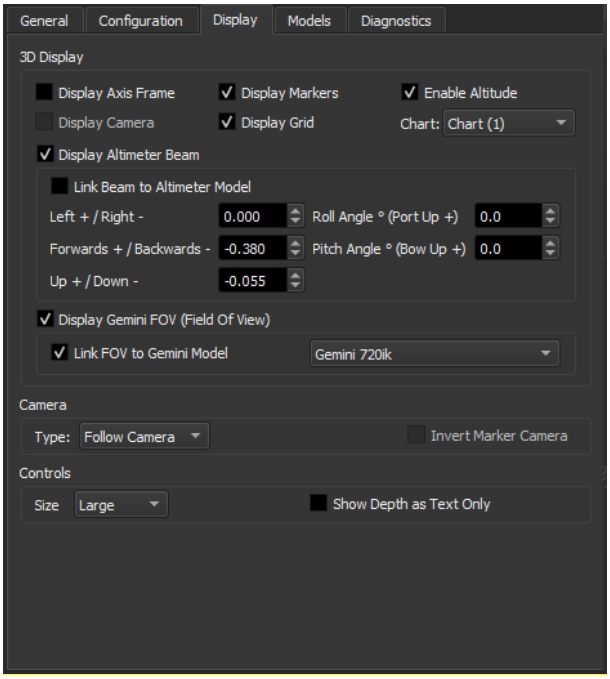


Display Camera is enabled whenever a Camera device (i.e. included Super SeaSpy Camera) is added to the vehicle. This will show a camera field of view from the vehicle. This FOV can then be adjusted for position.

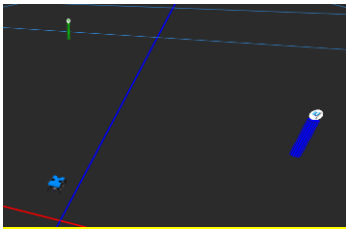
Display Grid will switch on/off the Seafloor Grid on the Vehicle Camera View.

Enable Altitude will auto-adjust the position of the Vehicle 3D model relative to the Seafloor in the Camera View. If disabled a nominal fixed height will always be applied.

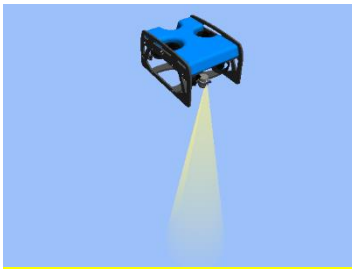
Chart will be populated with any Chart devices added into Genesis. When a Chart is selected, the raster Map and/or Google Maps will be displayed as the Seafloor representation on the Vehicle Camera View. Any positioning data from a selected GPS device will then be applied to geo-reference the Vehicle 3D model within the (now) geographic Camera View.



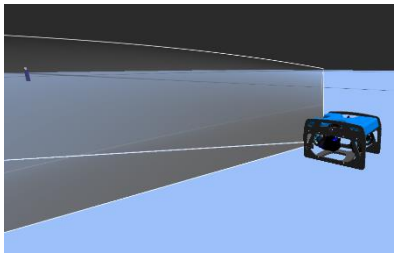
Display Markers will add any markers that have been added to the selected Chart device onto the Vehicle Camera View Seafloor. These are represented by columns filled with the Marker colour and with the Marker Icon placed on top.



Display Altimeter Beam will show the Altimeter beam on the Camera View and whenever **Link Beam to Altimeter Model** is selected it will then be automatically attached to the transducer face of the selected Altimeter 3D Model. If the Link Beam option is not selected, the Beam can be positioned on the Vehicle Camera View relative and offset to the centre of the Vehicle 3D model (or cuboid if no 3D model is loaded).



Display Gemini FOV will show the Gemini Field Of View beam on the Camera View and whenever **Link FOV to Gemini Model** is selected it will be attached to the transducer face of the selected Gemini 3D Model. If the Link FOV option is not selected, the FOV can be positioned on the Vehicle Camera View relative and offset to the centre of the Vehicle 3D model (or cuboid / or a Gemini 3D model if no 3D Vehicle model is loaded).



Camera:
Type selects the visualisation camera viewing option on the Vehicle Camera View.

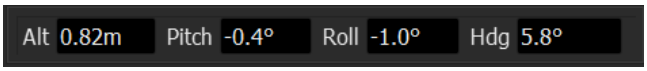
The **Follow Camera** option will position the Camera immediately off the Vehicle. This will be to the south of the Vehicle after a Reset Camera operation is performed (i.e. right click on Camera View to select this). The bearing angle of the Camera can then be adjusted by left-clicking and holding the mouse button down on the Camera View and rotating by moving the mouse Left/Right.

The **Free Camera** option will set a fixed Camera position and angle which can be adjusted by the user with a combination of Mouse and Keyboard actions. When Left-clicking and holding the mouse button down on the Camera View, Left/Right and Forward/Backward motions on the mouse will reposition the Camera angle. If the 'W' and 'S' keyboard buttons are then held down the Camera position will move Forward and Backwards respectively.

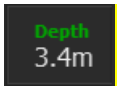
The **Marker Camera** option only applies when Chart markers have been laid and a Marker has been selected in the Marker table on the Chart. The Camera will position itself with the Vehicle always to the fore and with the Marker always at the 12'o'clock position on the display.

Invert Marker Camera is only active when the Marker Camera is selected and there is a selected Marker. It will position the Camera with the Marker immediately to the fore (e.g. instead of the Vehicle) and the Vehicle then at the 12'o'clock position.

Controls:
Size options are Small and Large to set the size of the toolbar.

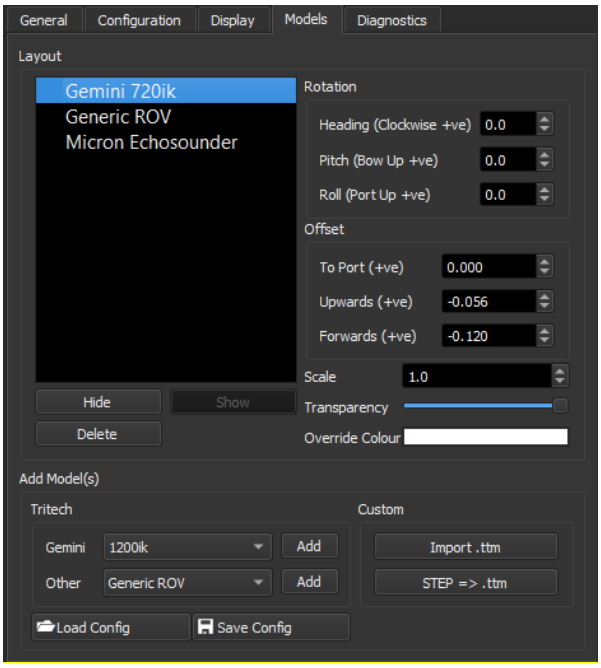


Show Depth as Text Only will replace the Depth gauge with a Text only display of Depth to conserve screen space.



The Models Settings Tab

The Models Settings tab is where the user will add, remove, modify and import 3D models to be used in the vehicle device view.



Layout:
The **top-left** Panel lists all of the 3D models that have been added (from the 'Add Model(s)' group) or Imported from a STEP conversion or .ttm file. By selecting a 3D model, the user can modify its orientation and position using the **Rotation** and **Offset** controls.

Hide, **Show** and **Delete** apply to the selected list item and will hide/show the 3D model on the Camera View or delete it altogether.

The **Scale** control should normally be left to 1.0 unless there is a known scaling issue with the 3D model that has been loaded.

The **Transparency** slider will adjust how translucent the 3D model will appear when rendered on the Camera View This option requires OpenGL 4.2 and above.

The **Override Colour** option will replace all colours loaded from the STEP / .ttm file with a single, base colour.

Add Model(s) - Tritech:
Gemini lists most Gemini Imaging Sonar 3D models that have been included with Genesis. These can be added to the Camera View by pressing the 'Add' button.

Other lists other types of 3D model that can be added to the Camera View by pressing the 'Add' button. These include a Generic ROV model, Altimeter options and others.

Custom:
Import .ttm will import a 3D model from a Tritech proprietary .ttm file. This file format is streamlined to contain only the supported elements for rendering of a 3D model onto the Camera View.

STEP -> .ttm will generate the above .ttm model files from any STEP file selected.

Load Config / Save Config will save off all models and their associated settings configured on this Tab page into a .VehCfg file (Tritech proprietary). These files can then be loaded into new Genesis projects or transferred to other Genesis systems later.

Saving a project which includes a Vehicle Device will also save the vehicle settings and it's associated models. If you intend on using the same project file you do not require to save the '.VehCfg' file separately.

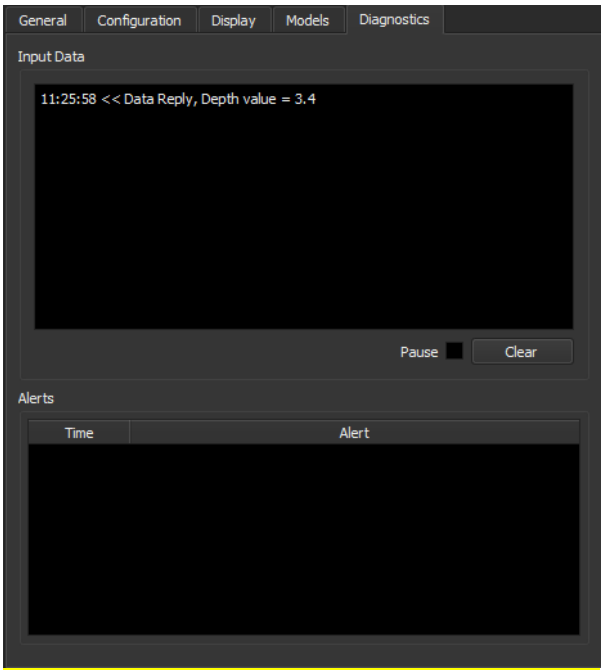
The Diagnostics Settings Tab

The **Input Data** shows the time stamped input messages received from selected device inputs.

Pause temporarily pauses the Input Data display.

Clear will delete the text in the Input Data display.

The **Alerts** area will display any warnings or alerts specific to the Vehicle device (e.g. loss of comms when no input data is received from any selected input device).



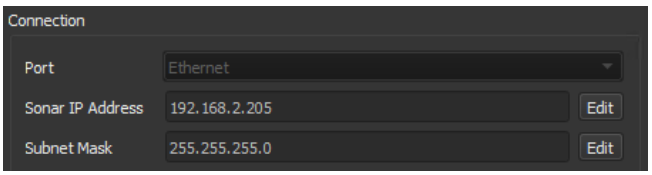
Common Genesis Tasks

Changing the Device IP Address

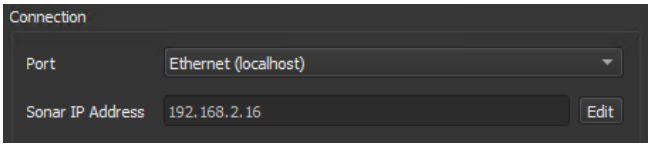
A number of devices communicate with Genesis through an Ethernet IP connection rather than a Serial or ARCNET connection. Current devices that connect over Ethernet and are supported in Genesis are:

- Gemini Multibeam Sonars
- MicronGemini Multibeam Sonar
- Super SeaKing V7 Scanning Sonar (Ethernet option)
- V7 Series Bathymetric Sensors (Ethernet option)

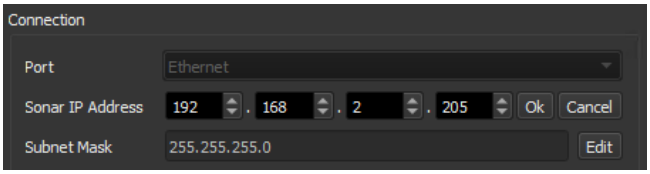
For the multibeam sonar, the IP configuration can be found in the Connection options in the General settings tab for the relevant device.



For the SeaKing V7 Bathymetric Sensor and Super SeaKing V7 Sonar, the IP configuration can be found in the Connection options in the General settings tab for the relevant device.



With the device online and operating, select the [Edit] button to change the IP Address or Subnet Mask and press [Ok] to confirm and reprogram the device.



After changing Ethernet settings the device will disconnect from Genesis. The device will automatically reconnect if the network settings for the device are compatible with the network adapter settings on the computer.

Reserved IP Addresses
There are a number of unique IP addresses that are reserved for different functions on Tritech devices. If reconfiguring the device IP address away from the default the following should not be used:

192.168.2.16 192.168.2.200
192.168.2.17 192.168.2.201 (default sonar IP)
192.168.2.100 (default surface IP)

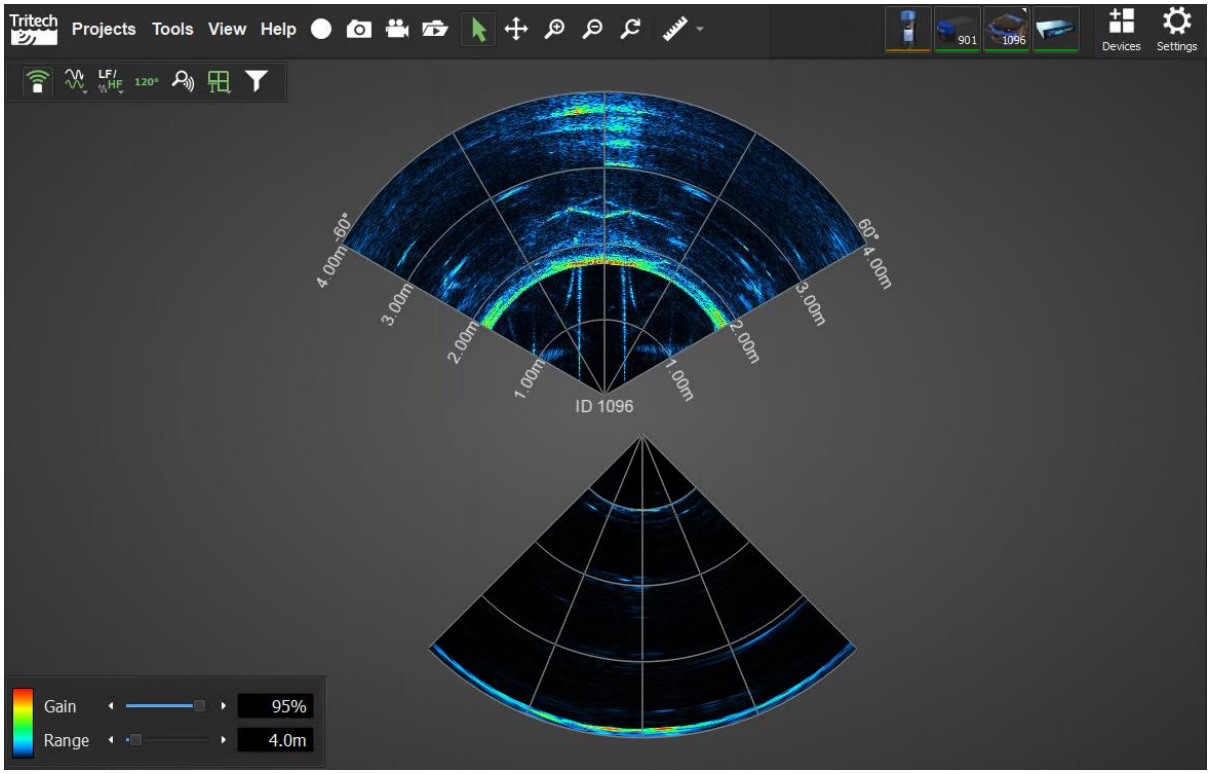
Subnet Mask Limitations
Genesis will only accept subnet masks up to 255.255.255.0 (CIDR Prefix /24). Anything higher than this will not work. E.g. 255.255.255.128 (Prefix /25).

Ensure any changes to the network configuration is recorded. The device may require return to Tritech to recover communication should these details be lost. Recovery of communication in this situation is not covered under warranty.

Displaying Multiple Sonars in One View

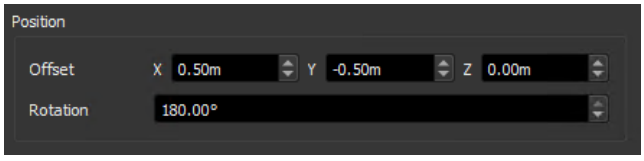
Genesis will allow the display of multiple scanning and multibeam sonars, or combinations of the two differing types in a single view.

With the first sonar added as a primary device in the main display window, the second sonar can be added by dragging the sonar icon from the Device Bar into the main window area. Genesis will now add the display of the second device to the first.



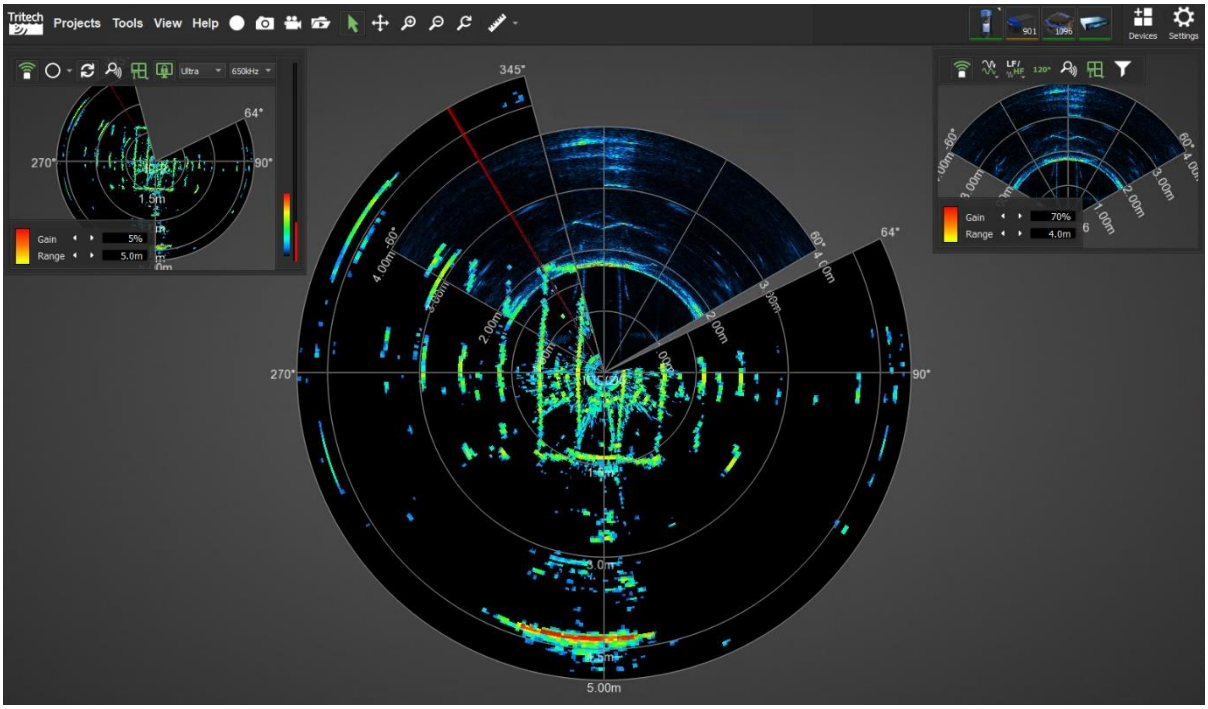
The image above shows a 1200ikd sonar with a MicronGemini sonar added into the same view. The sonars are arranged to show forward and backwards from a vehicle. The position of each sonar will be from the same origin point and can be adjusted within the Position settings tab for the relevant device.

The settings to the right are those for the MicronGemini sonar shown in the combined view above.



If two different sonars are added to the same main view they will share the same Gain and Range settings. This is of note and importance if the sonars are of differing types as the gain settings for one sonar may not be suitable for the other.

Where the sonar images overlap they will be displayed as a combined image as shown below.



Should the user wish to control the sonars individually, they should first construct the main view as required, and (using the secondary mouse button) unselect the ‘Show Overlays’ option. Each sonar device can be added into a secondary location on the screen. Each secondary display window contains the individual device controls. This will allow one sonar device to be adjusted without affecting the other.

Additional Tritech or Third-Party Instruments

Genesis will accept and display the output from other Tritech Sensors and a wide range of third-party and generic subsea sensor devices. Genesis can interface with other Tritech products via a serial connection, Ethernet connection or ARCNET connection (via a SeaHub or similar). Additional third-party sensors can communicate with Genesis via a standard hardware or virtual Serial port connection. Genesis does not currently support sensor input via IP connections.

For details of the currently supported input and output data format and strings please refer to the supplementary manual 0716-SOM-00002 Genesis Supported Interface Strings and File Formats, available from the Tritech website. This list is not exhaustive and is regularly added to with subsequent revisions of the Genesis software. Please contact Tritech Support if your required input or output string is not shown for further assistance.

Using Genesis with a Tritech SeaHub

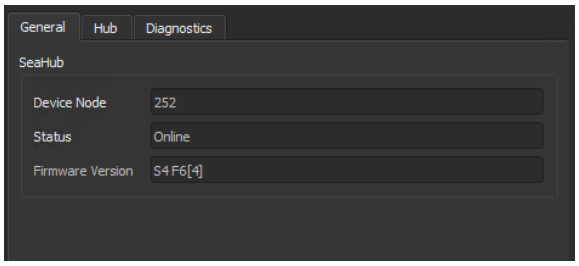
The Tritech SeaHub communicates with the PC and Genesis via a USB connection. Once connected to the PC and recognised by Windows it will automatically add itself to the current Genesis project. If the SeaHub does not automatically add itself into Genesis this may indicate an issue with the USB connection, drivers, or an issue with the Windows operating system.

Once added to Genesis the SeaHub will display as a button in the Device Bar. Selecting this button with the mouse will show the different configuration and settings tabs for the device.

The General Settings Tab

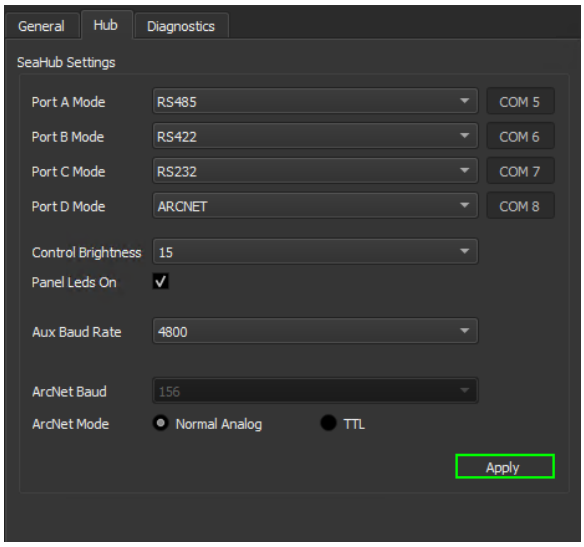
This settings tab displays the Device Node, Status and Firmware revision for the SeaHub.

Should a firmware update be available for the SeaHub, there an Update button will display next to the Firmware Version.



The Hub Settings Tab

These settings control the communication configuration for the differing interface ports on the SeaHub.



Port *x* Mode
These drop-down selection boxes change the communication protocol that the Port is set to. To make things easier for integration, Ports A-D show the corresponding COM Port numbers assigned to them by Windows.

Led Brightness sets the relative brightness of the front panel LEDs of the MicronNav Hub. A setting of 15 is full brightness, with 0 being the lowest possible.

Panel LEDs On switches off or on the front panel LEDs, regardless of the Brightness control. By default, this control is checked.

Aux Baud Rate sets the speed for the Auxiliary (front) connector on the SeaHub.

ArcNet Baud displays a drop-down selection box (when available) to change the baud rate for ARCNET communications.

ArcNet Mode allows switching between standard Analog or TTL ARCNET.

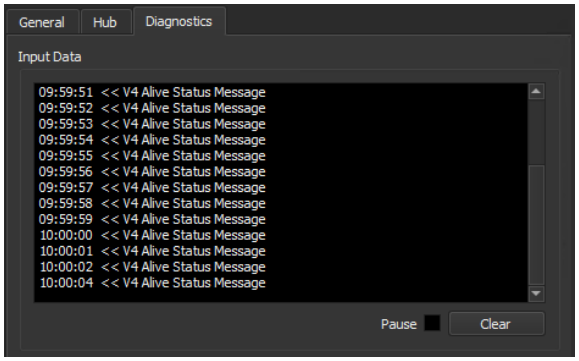
After a change of configuration select **[Apply]** to program the SeaHub with the new settings. The SeaHub will reset and reconnect to any devices currently in use after programming.

Following programming of the SeaHub the device will restart indicated by the LED indicators flashing and relays operating. If this does not happen you may need to power cycle the SeaHub and reapply the new settings.

The Diagnostics Settings Tab

The **Input Data** area will display the time stamped input data from the Altimeter and allow you to Pause and Clear the input data display.

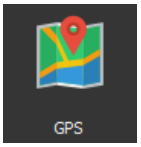
The **Alerts** area (not shown) will display any warnings or alerts specific to this device (e.g. loss of comms).



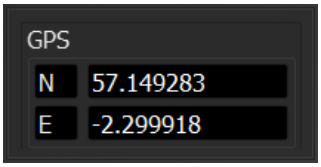
Using Genesis with a GPS

Genesis will accept COM Port connections to one or more GPS receivers, or to external systems than can output compatible position strings in NMEA format for example. The GPS is typically connected via USB or direct Serial Port connection.

To connect and display a GPS device in Genesis, add a new GPS device through the Devices button. This will add a Device Icon along with a GPS View into the main Genesis Display Window.



The initial display for the GPS device is in the corner of the main primary device view. Note that the display will remain blank and the device will not output any data to Genesis until it has a stable positional fix.



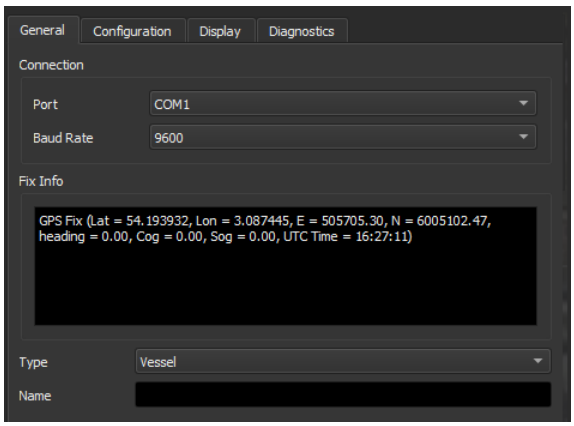
To adjust the settings and configuration for the GPS click in the GPS Device icon which will then display the settings tabs.

The General Settings Tab

The General Settings tab for the GPS Device allows selection of the serial port and baud rate.

Once the GPS has a stable position fix the details are displayed in the 'Fix Info' window. There will be no position shown in Genesis until the GPS obtains a valid position fix.

There is the option to name the device to aid identification if more than one is connected.



The Configuration Settings Tab

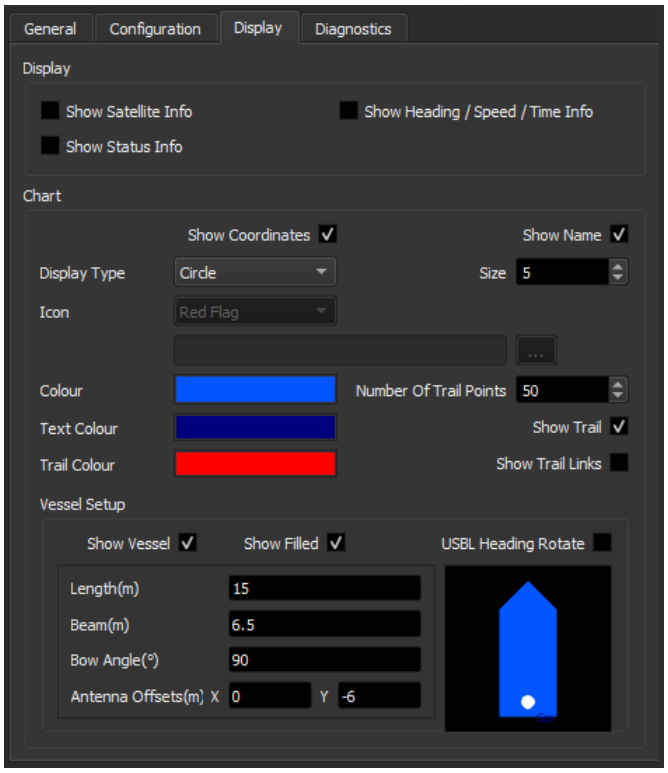
The Configuration tab allows the selection of specific NMEA input strings and the checksum verification control.

If these are left at Auto, the system will detect the decode string from the GPS and update the system time from the GPS time.

The Display Settings Tab

The position of the GPS and Vessel display options are found in the 'Chart' area on the GPS Device Display settings tab. From there the vessel measurements and GPS location on the vessel can be set. These options control how the Vessel is displayed on the Chart Device.

The **Display** options will increase the information shown on the GPS overlay. If the data is not available from the GPS device the information boxes will be blank.



The **Chart** settings control how the GPS location is displayed onto the Chart device view.

Show Coordinates displays the GPS origin coordinates next to the vessel / icon on the Chart display.

Show Name displays the GPS Device name next to the vessel / icon on the Chart display

Display Type / Size / Icon changes the appearance of the GPS trail markers displayed on the chart. The marker will only display if **Show Trail** setting is active.

Colour / Text Colour / Trail Colour control the colour of the vessel or GPS marker point, the colour of the coordinate and name text and the colour of the GPS trail points shown on the Chart display.

Number of Trail Points / Show Trail displays or hides the GPS location trail and specifies how many trail points are displayed on the Chart display.

Show Trail Links will show the path of the GPS location by linking the trail points

Show Vessel / Show Filled will display the vessel on the Chart display and show it as an outline or filled shape.

USBL Heading Rotate will rotate the vessel outline overlay on the Chart Display to align with the project heading input (GPS, Compass or USBL).

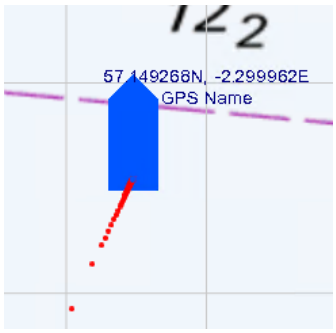
Length / Beam / Bow Angle will allow the vessel to be displayed to the same scale as the Chart display and with the correct shape.

Antenna Offsets should be entered to compensate for a differing location of the GPS receiver in relation to the centre point of the vessel. This will more accurately show the position of the vessel on the Chart display.

X axis	-ve. Port (L)	+ve. Stb (R)
Y axis	-ve. Aft	+ve. Fwd

The GPS receiver position is indicated by the white dot on the display.

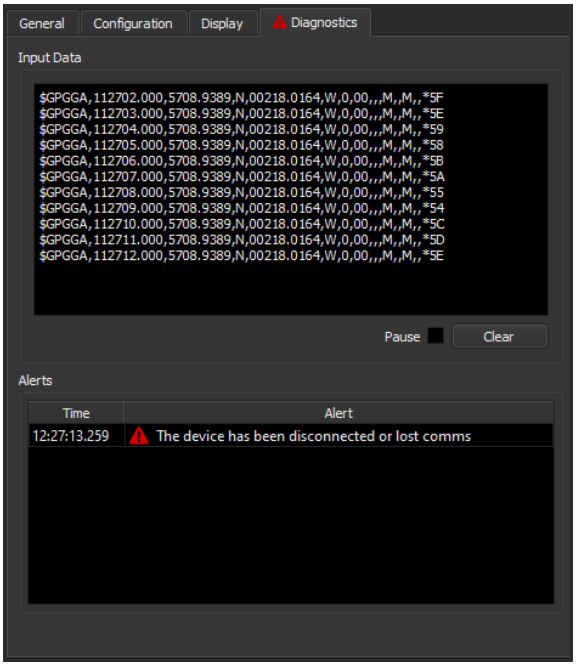
The picture on the right shows the Vessel shown on the Chart Display when configured as above.



The Diagnostics Tab

The Diagnostics tab shows the **Input Data** being received from the device and can be used for troubleshooting any issues with the output.

The **Alerts** area will display any warnings or alerts specific to this device (e.g. loss of comms).

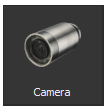


Using a Camera in Genesis

Genesis is capable of displaying and recording incoming video from a range of sources. External video devices will only display in Genesis if they are loaded into Windows as a Webcam type device or through an external capture card. The camera will act as a secondary device in Genesis.

Due to constraints within Windows, Genesis can display a maximum of two video devices at the same time.

To add a video device, click on the Devices button and add the Camera. When first added, the Camera will display in its own window. It can then be dragged onto one of the other device views as required.



To change the camera configuration, select the camera from the Device Bar. This will display the Camera Device Settings tabs.

The camera settings are dependent on the Windows drivers and the type of video device. Only the supported options and settings within Windows can be adjusted in Genesis.

The **Video Input** drop-down menu will allow selection from the available cameras within Windows.

The Processor Amplifier Settings Tab

These settings control the image options for the camera device:

Brightness increases the overall brightness of the image. Too high a level will cause the image to saturate.

Contrast adjusts the contrast (difference between dark and light areas) of the image.

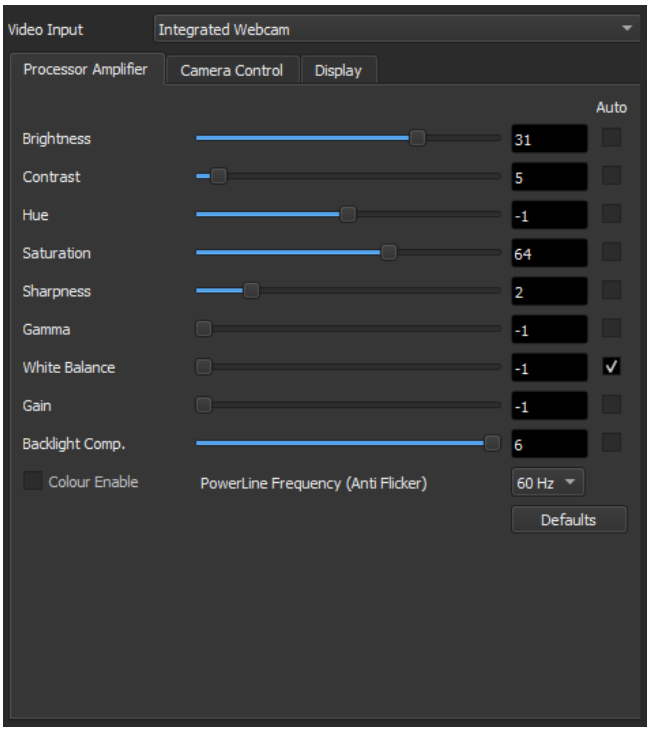
Hue alters the colour shading of the video image.

Saturation alters the intensity of the colours within the video image.

Sharpness alters the edge contrast of the video image.

Gamma controls of the luminance or tristimulus values within the video image.

White Balance alters the colour balance of the video image.



Gain directly adjusts the sensitivity of the capture device to compensate for low light environments.

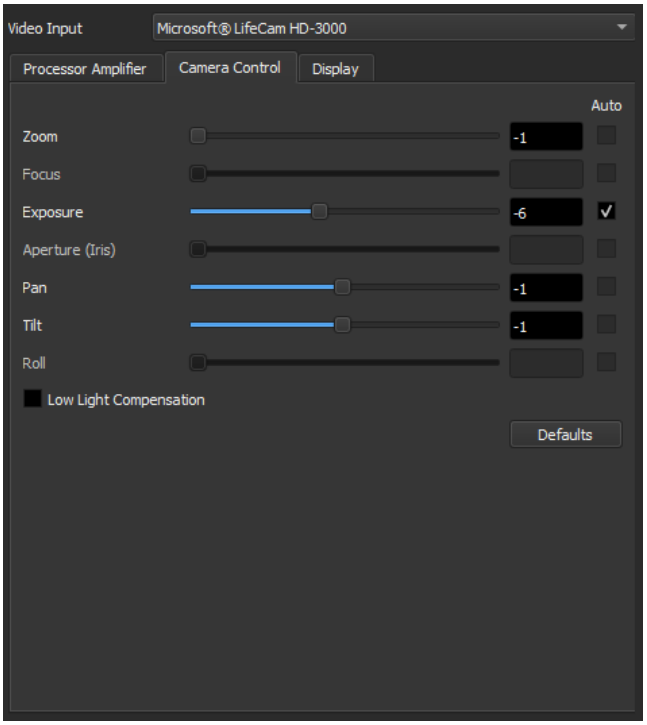
Backlight Comp. for direct digital camera feeds typically controls the amount of compensation so that high and low exposure areas of the video image are displayed equally.

Colour Enable switches the video image between colour and grayscale.

PowerLine Frequency compensates for any line flicker caused by power noise.

The Camera Control Settings Tab

These options control the configuration of the camera device:



Zoom enlarges and reduces the video image.

Focus alters the focus of the video image.

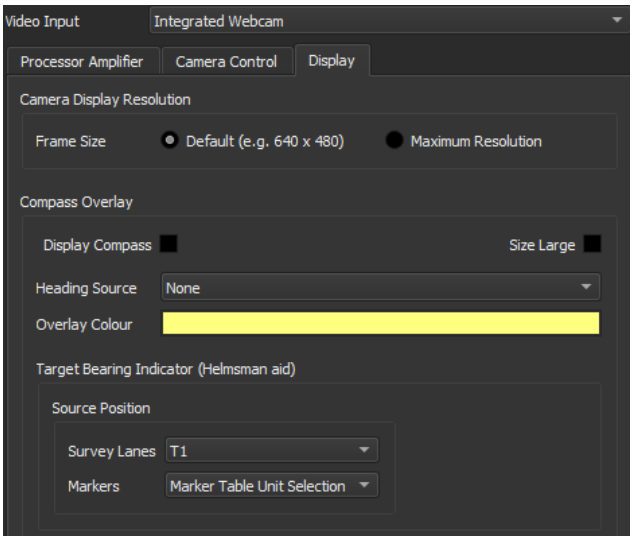
Exposure alters the exposure levels of the video image.

Aperture (Iris) effectively adjusts the amount of light and therefore brightness, of the image.

Pan / **Tilt** / **Roll** adjusts the orientation of the output image in the X Y and Z axis respectively.

Low Light Compensation will automatically compensate for reduced light levels.

The Display Settings Tab



These options control the display of the compass overlay onto the Camera device:

Frame Size can be set to **Default** or **Maximum Resolution**. The result will vary according to the capture device's native settings. Setting to Maximum will configure to any 16:9 & HD resolution modes built in.

Display Compass / **Size Large** will activate the compass overlay and modify the size.

Heading Source allows the selection of the compass device to use from those loaded into Genesis.

Overlay Colour sets the colour used for the compass overlay in the Camera display.

Target Bearing Indicator – see earlier *Helmsman Aid section*. The Target Bearing Indicator will be drawn on the Compass bar to indicate the bearing to the selected / next target to aid a helmsman steering towards that target. If Survey Lanes are drawn on the Chart then the Bearing Indicator will show the bearing to the next Survey Lane end point that is being steered towards. If no Survey Lanes are enabled, then the bearing indicator will always default to show the bearing of the selected Marker in the Chart Markers table.

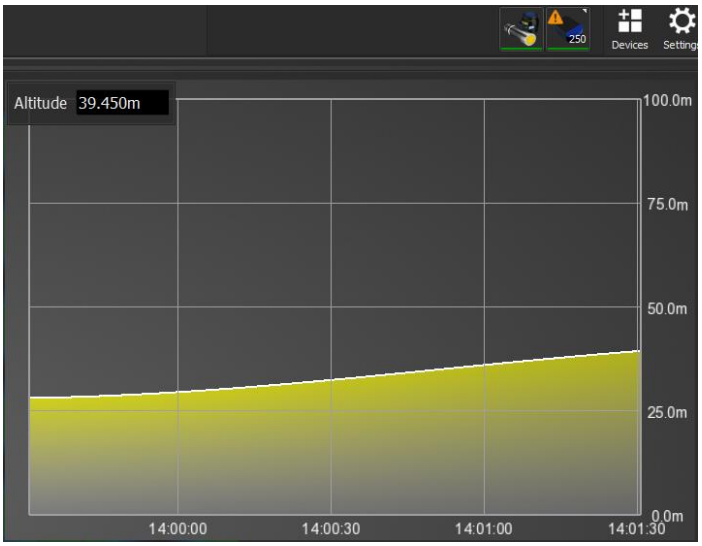
Using Genesis with an Altimeter or Echo-Sounder

Genesis will accept COM Port connections to one or more Altimeter sensors, or to external systems that can output compatible Altimeter or Echosounder strings. The Tritech PA Altimeter and Micron Echosounder are supported as well other industry standard sensors that output NMEA DBT or Tritech string formats.

To connect and display an Altimeter device in Genesis, add a new Altimeter device through the Devices button. This will add a Device Icon along with an Altimeter View into the main Genesis View.

If no device has been added to the Genesis main display then the Altimeter will display in the position of a primary device. If there is already a primary device in the Genesis display window, the Altimeter will display as a secondary device.

The Altitude chart (with digital display) can be moved around the Genesis main window into any of the secondary or primary positions. The digital display can also be moved independently to any of the secondary display positions.



Once added the Altimeter will display and indicate the status on the Device Bar at the top of the screen. Selecting this, or the devices button will display the settings tabs to configure the display and behaviour of the Altimeter.

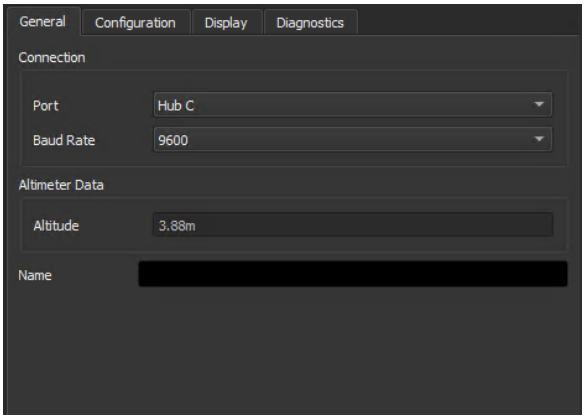
The General Settings Tab

Connection:
Port will display the open Windows COM ports and allow the selection of the relevant serial port for the data input.

Baud Rate should be selected to match the Altimeter input data

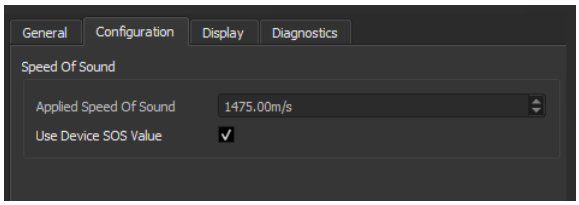
Altimeter Data, Altitude will display the decoded altitude string to allow verification of the connection.

Name allows you to input a unique name for the device. This is useful if there are more than one of the same type of devices added.



The Configuration Settings Tab

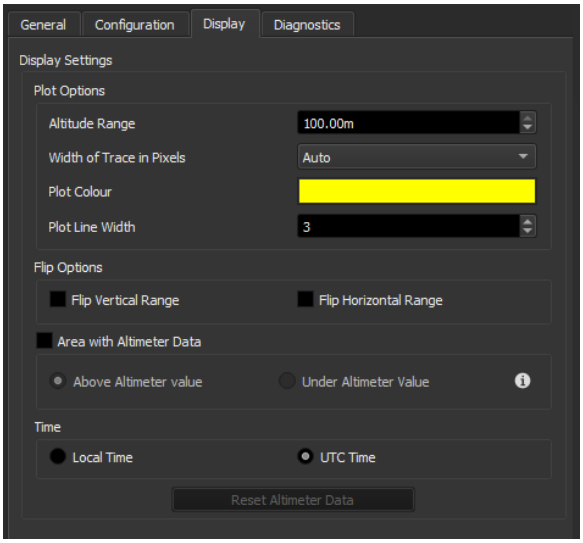
Currently only Free Running Altimeters are supported with the string inputs (PA Altimeter and NMEA DBT) automatically recognised and decoded.



Speed Of Sound:
Use Device SOS Value displays the Altitude value sent by the device applying its own in-built Speed Of Sound figure. De-select this control to apply and enter a different Speed of Sound to the displayed Altitude value.

The Display Settings Tab

These settings control the configuration and display of the altitude plot.



Altitude Range in Metres manually sets depth range displayed on the graph. Options are 10, 20, 30, 50 and 100 metres.

Time Range in Minutes sets the time period for the graph. Options are 1min, 2min, 5min, 10min, 20min(utes).

Plot Colour sets the chart plot colour for the depth / altitude line.

Plot Line Width sets the width of the depth / altitude plot line from 1 to 10.

Flip Vertical Range reverses the vertical axis with 0 at the top. This will support operation where a “depth below” is being measured.

Flip Horizontal Range reverses where the current Altitude update is plotted (left or right of graph).

Area with Altimeter Data when selected will fill in the area curve **Above** or **Under** the Altitude line plot with the selected Plot Colour gradient.

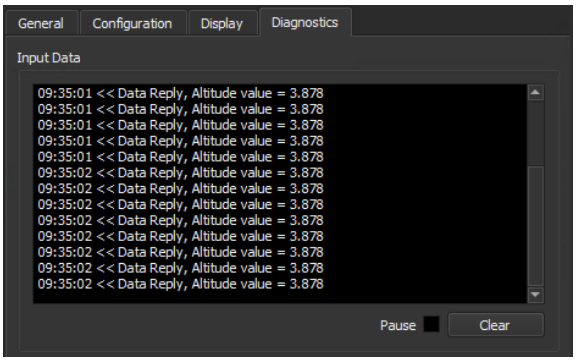
The **Time** axis can be set to **Local Time** or **UTC Time**.

Reset Altimeter Data will clear the Graph plot of any data.

The Diagnostics Settings Tab

The **Input Data** area will display the time stamped input data from the Altimeter and allow you to Pause and Clear the input data display.

The **Alerts** area (not shown) will display any warnings or alerts specific to this device (e.g. loss of comms).



Using Genesis with a Tritech Altimeter MKII

Genesis will accept serial COM Port connections from one or more Tritech Altimeter MKII sensors.

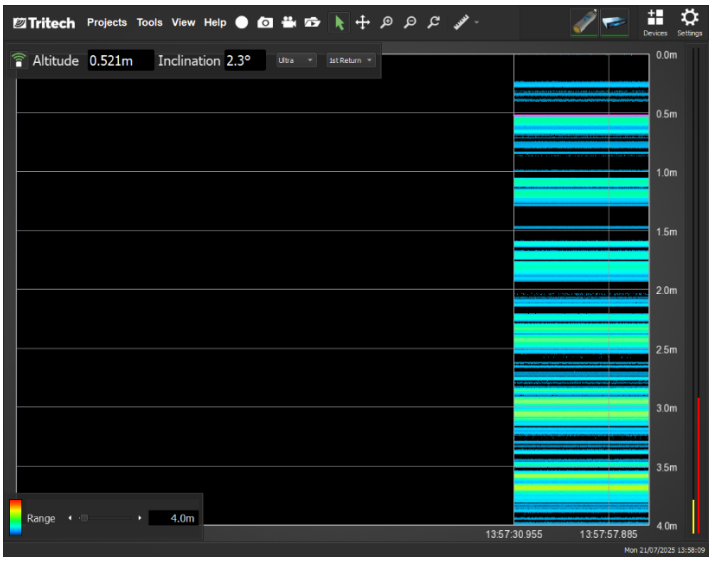
External systems that output compatible altimeter or echosounder strings can **only** be used with the Altimeter device described in the manual section *Using Genesis with an Altimeter or Echo-Sounder.*

To connect and display an Altimeter MKII device in Genesis, add a new altimeter MKII device through the Devices button. This will add a Device Icon along with an Altimeter MKII view into the main Genesis view.

The Altimeter MKII will display in the position of a primary device in the Genesis display window.

The altitude scanline chart (with digital text display) can be moved around the Genesis main window into any of the secondary or primary positions.

The Toolbar and Range/Colour overlays can also be moved independently to any of the secondary display positions.

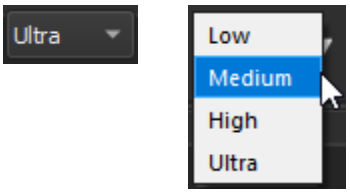


The altimeter can be operated in two modes, Altimeter MKII mode (MK3 Comms) or Legacy mode. In Genesis, the altimeter MKII runs on MK3 comms and Genesis has total control of the altimeter. Legacy runs the altimeter as a standalone unit without the requirement to be connected to a software package. In this mode, the altimeter MKII will run like an altimeter MKI. Legacy mode is the same as running a standalone MKI Tritech Altimeter.

Displayed in the top left of the altimeter MKII view is a secondary toolbar with controls specific to the altimeter and displays the numerical Altitude and Inclination (from vertical) values..

This button indicates and will toggle the altimeter MKII **Offline** or **Online**. The icons shown indicate the device as offline or online, respectively.

The **Resolution** drop-down control allows selection of the altimeter scan data resolution from the available options. This changes the number of samples in a scanline and so the resolution. The ping and update rate will decrease for higher resolutions. The sample size is shown in the Configuration tab.

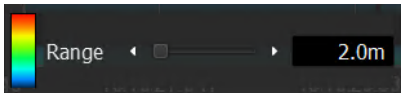


The **Echo Return** drop-down control allows selection of the processing model used for measuring Altitude.

Peak Echo calculates the measured Altitude from the strongest return echo received within the vertical range of the Altimeter

1st Return calculates the measured Altitude from the first return echo that meets the set threshold.

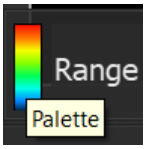
At the bottom left of the altimeter MKII view are a set of secondary controls for the display colour palette and range:



Range will allow control of the altimeter operating range between its minimum and maximum values.

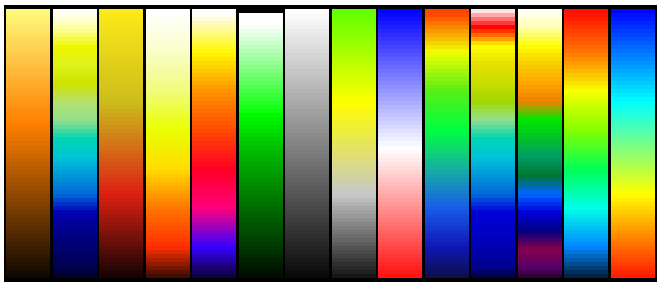
The Range set in this control is independent to the range set and saved to the Altimeter for use in MKI / Standalone operation. To change the range for MKI / Standalone operation the user should set this in the Standalone Settings Tab and save to the Altimeter.

Selecting the current **Colour Palette** with the mouse will display a range of different colour palettes to choose from. Strong returns will display in colours at the upper end of the palette and weaker returns at the lower end.

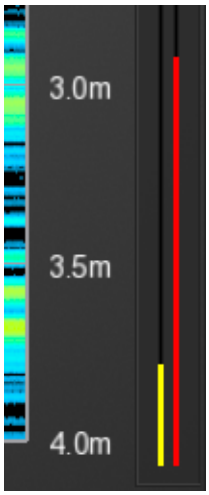


Available colour palettes are:

- Bronze
- Echosounder
- Fire 1, 2 & 3
- Green
- Grey scale
- Grey to Yellow
- Polarity
- Sonar 1, 2 & 3
- Spectrum
- Survey



At the bottom right of the altimeter MKII view there is a signal intensity display.

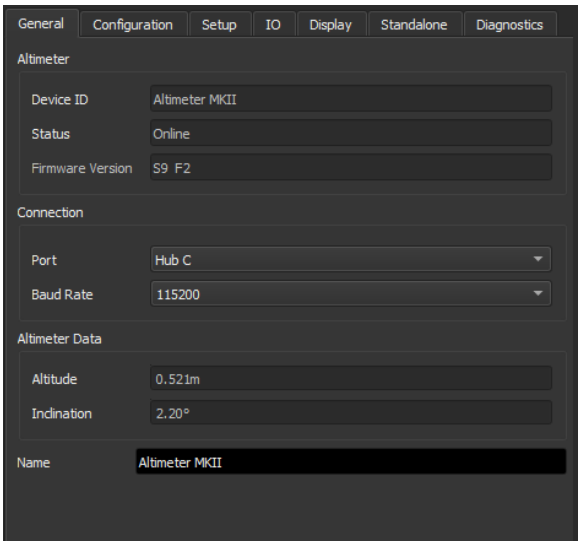


As the altimeter MKII operates, the thin yellow and red bars indicate the average and maximum strength of return for the current scanline, respectively.

This gives a simple visual indication of the difference between the maximum and the rest of the return echoes for an individual scanline.

Once Online, the Altimeter MKII will display and indicate the status on the Device Bar at the top of the screen. Selecting this, or the devices button will display the settings tabs to configure the display and behaviour of the Altimeter MKII.

The General Settings Tab



Altimeter
Device ID displays the name set for the altimeter.

Status will display the current status (online / offline / disconnected) of the altimeter.

Firmware Version shows the current version loaded onto the altimeter. If there is an update available, an [Update] button will show next to the firmware display.

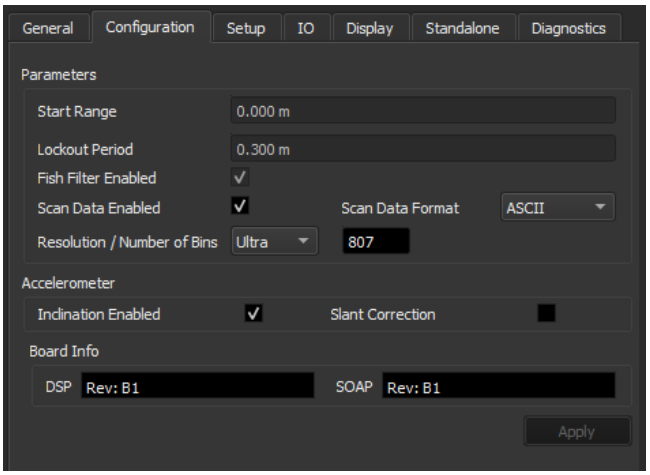
Connection:
Port will display the open Windows COM ports and allow the selection of the relevant serial port for the data input.

Baud Rate should be selected to match the Altimeter input data.

Altimeter Data
Altitude will display the decoded altitude string to allow verification of the connection.
Inclination will display the current inclination of the altimeter.

Name allows you to input a unique name for the device. This is useful if there are more than one of the same type of devices added.

The Configuration Settings Tab



Parameters

Start Range will display the internally programmed start range for the altimeter.

Lockout Period will display the internally programmed lockout period. This is the period that the altimeter is set not to listen for a reply. This will change depending on the maximum range of the altimeter.

Fish Filter Enabled enables the fish filter feature. The fish filter averages the last 3 altitude readings and if the next reading is out with 2% of the range of the average, the value is rejected and the last value is used.

Scan Data Enabled enables the scanline (echogram) display within Genesis. This should not be used at baud rates under 115200.

Scan Data Format has two options, ASCII or BASE64. This is not visible within Genesis and serves to reduce the bandwidth of the scanline data when operating in MKIII comms mode.

Resolution / Number of Bins is a duplicate of the main display Resolution button, and it also displays the number of bins in the scanline display.

Accelerometer

Inclination Enabled enables the inclination output from the altimeter. This is not used within Genesis.

Slant Correction will slant range correct the output with the limits being ±45°.

Board Info displays the revision of the two main processing boards within the altimeter.

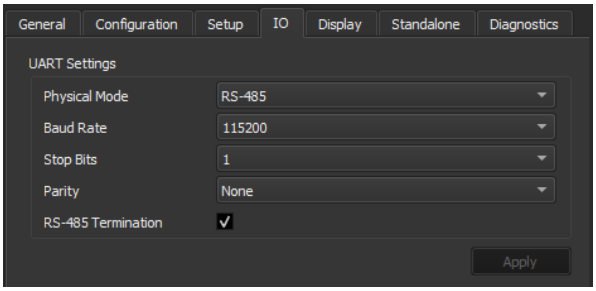
After changing settings, please select **[Apply]** to program the altimeter with the new settings.

The Setup Settings Tab

The **Setup** tab displays all internal acoustic settings within the altimeter. These cannot be changed within Genesis.

The IO Settings Tab

The **UART Settings** allow the user to change the communication protocol of the altimeter.



Physical Mode selects the available serial communication options.

Baud Rate controls the data speed for communications.

Stop Bits selects the number of stop bits used to mark the end of a frame.

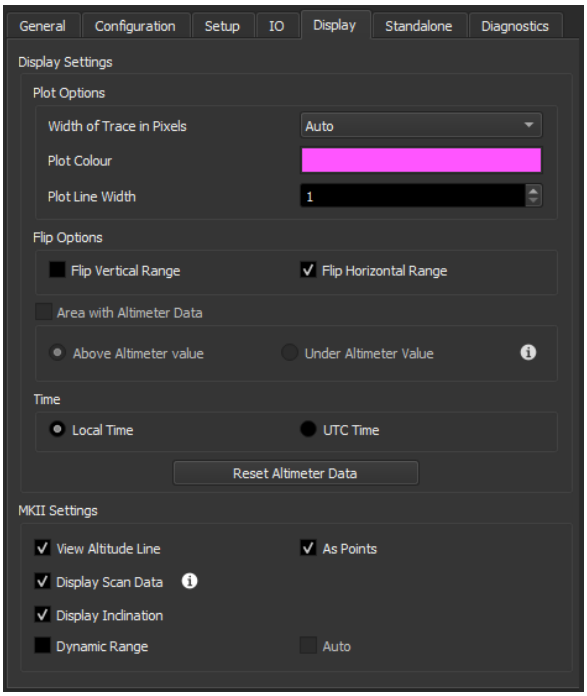
Parity selects whether a data integrity check is included.

RS-485 Termination will add a 150Ω termination across the RS485 lines when enabled.

After changing settings, please select **[Apply]** to program the altimeter with the new settings. The connection configuration in the 'General' settings tab may require to be changed to match changes to the UART Settings configuration.

Default communication settings for most Altimeter MKII units are:
Stop Bits: 1
Parity: None
RS-485 Termination: Off (Both RS232 & RS485 units)

The Display Settings Tab



These settings control the configuration and display of the altitude plot in the altimeter display.

Plot Options

Width of Trace in Pixels sets the width of one scanline within Genesis, 1 Pixel equals 1 screen pixel.

Plot Colour sets the chart plot colour for the depth / altitude line, if enabled.

Plot Line Width sets the width of the depth / altitude plot line.

Flip Options

Flip Vertical Range reverses the vertical axis with 0 at the top. This will support operation where a “depth below” is being measured.

Flip Horizontal Range reverses where the current Altitude update is plotted (left or right of graph).

The **Time** axis can be set to **Local Time** or **UTC Time**.

Reset Altimeter Data will clear the scanline display of any data on receipt of the next ping.

MKII Settings

View Altitude Line shows the digital altitude as a plot on the display.

As Points will plot the Altitude as individual points and not interpolate a line between them.

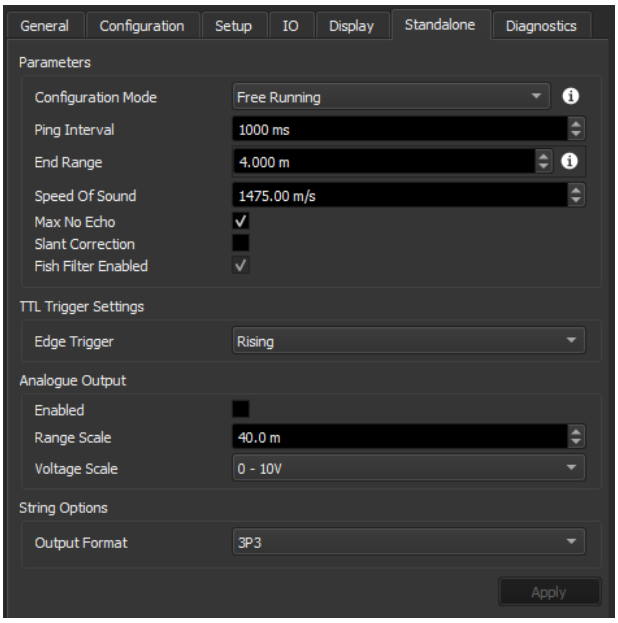
Display Scan Data shows the scanline data on the display. This should only be used at baud rates over 115200.

Display Inclination shows the vertical inclination of the Altimeter as a digital display on the device toolbar.

Dynamic Range allows for the manual adjustment of the dynamic range for the scanline display. **OFF** is the default and preferred position. **Auto** is a display setting that will automatically adjust the Contrast and Sensitivity (brightness) of the scanline display. Full instructions on how to control the dynamic range feature can be found under the *Sonar Dynamic Range Controls* section.

The Standalone Settings Tab

These are the settings to allow the Altimeter MKII to be used as a standalone unit outside of the Genesis software. These settings are similar to the switch settings within the legacy Altimeter MKI. These settings have no effect to how the unit works within Genesis.



Parameters
Configuration Mode allows the user to select from Free Running or Interrogate mode.

Ping Interval sets the ping rate of the altimeter when in Free Running mode.

End Range sets the end range of the altimeter. Please ensure this is set correctly before pressing [Apply] as this will change internal settings when the altimeter is used out with Genesis.

Speed of Sound sets the speed of sound used out with Genesis. When connected to Genesis the altimeter will use the speed set within the software environmental settings.

Max No Echo sets the output of the altimeter if no return is received. Disabling this will mean the altimeter is set to Zero No Echo.

Slant Correction sets the altimeter to post slant corrected altitudes.

Fish Filter Enabled will enable the internal fish filter algorithm.

TTL Trigger Settings
Edge Trigger allows the user to select the TTL Edge used for triggering.

Analogue Output
Enabled will enable the analogue output within the altimeter.

Range Scale sets the altimeter analogue range scale.

Voltage Scale sets the altimeter analogue voltage scale.

String Options
Output Format allows the user to set the serial output format for the altimeter when used out with the Genesis software.

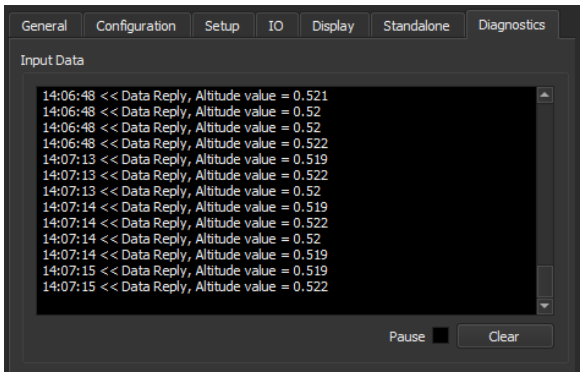
After changing settings, please select **[Apply** to program the altimeter with the new settings.

The altimeter will need to be power cycled in order to enter standalone mode after it has been connected to Genesis. If the unit remains powered after being connected to Genesis, it will not output the selected output format until it has been power cycled.

The Diagnostics Settings Tab

The **Input Data** area will display the time stamped input data from the MKII Altimeter and allow you to Pause and Clear the input data display.

The **Alerts** area (not shown) will display any warnings or alerts specific to this device (e.g. loss of comms).



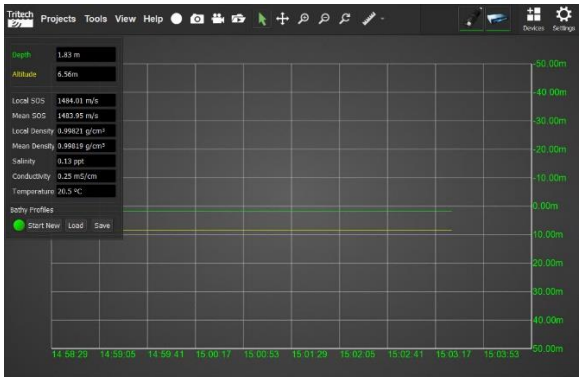
Using Genesis with a Bathymetric Sensor

A Tritech SeaKing or Super SeaKing Bathymetric Sensor (Bathy) can be added and displayed within Genesis. The properties and controls for the Bathy can be accessed in the same fashion as the other Genesis devices.

To connect and display a Bathymetric device in Genesis, add a new Bathy device through the Devices button. This will add a Device Icon along with output display into the main Genesis View. If you have connected a V7 Bathy over Ethernet it will automatically add itself into Genesis.

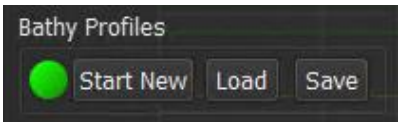
The Bathy is a primary device, and once added will split the Genesis Main Display vertically if another device is being displayed.

The Bathy display includes a main depth vs time plot and a more detailed text display of the sensor outputs as an overlay in the Bathy display. The Bathy overlay display box can be moved to a different secondary location on the Bathy or any other device display areas.



Bathy Profiles

The three buttons at the bottom of the Bathy overlay allow the user to:



[Start New] restart with existing parameters

[Load] open a previously saved profile

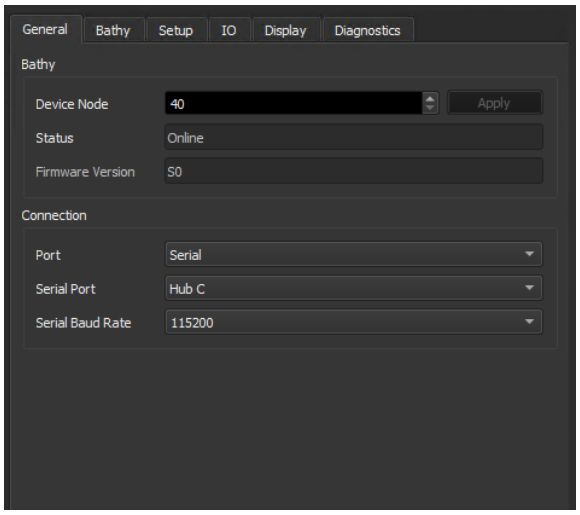
[Save] the existing Bathy profile

For further details, please refer to the *Profiling Density and Velocity of Sound* section of this manual.

Once added, the Bathy will display and indicate the status on the Device Bar at the top of the screen. Selecting this, or the devices button will display the settings tabs to configure the display and behaviour of the Bathy.

The General Settings Tab

These settings control the identification and connection properties of the Bathy.



Bathy:
Device Node will display the current setting for the device. This can be changed (between 40 and 44) by adjusting the Node number and selecting the 'Apply' button.

Status displays the current connected status of the device.

Firmware Version will display the current firmware version installed onto the Bathy. This is only relevant to the newer V7 Bathy models.

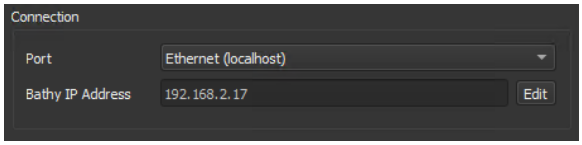
The **Connection** options shown will depend on the connection type being used by the Bathy. The screenshot above shows a Bathy connected over a serial connection.

Port allows the selection of serial COM port or ARCNET interface that the Bathy is connected to.

Serial Port allows the selection of the SeaHub or Windows COM port connected to the Bathy.

Serial Baud Rate allows selection of the appropriate communication speed setting for the serial port.

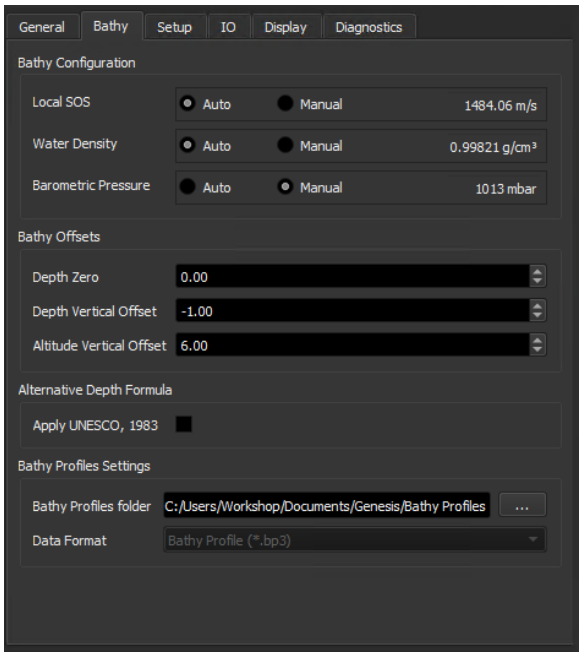
If the Bathy is connected via Ethernet, the options in the Connections area will change accordingly.



Bathy IP Address displays the current IP address of the unit. Selecting the [Edit] button will allow you to program the unit with a new IP address.

After setting the new IP address and the [Ok] button selected the device will be programmed with the new IP address, restart, and reconnect to Genesis. This may take 1-2 minutes.

The Bathy Settings Tab



These settings control some of the constants and inputs used for the Bathy internal data processing.

Bathy Configuration:
Local SOS displays and allows selection of the device derived Speed of Sound (Auto) or selection of the Genesis project value (Manual) set in the Genesis Settings Environment Tab.

Water Density displays and allows selection of the device derived value (Auto) or the value from the Genesis environment settings (Manual).

Barometric Pressure allows the use of a measured value from an external sensor device (Auto) or the value from the Genesis environment settings (Manual).

Bathy Offsets:
Depth Zero allows any offset for depth to be corrected prior to dive. A +ve value will increase the Depth value.

Depth Vertical Offset allows a mounting offset to be entered referenced back to the vehicle datum. A +ve value will decrease the Depth value.

Altitude Vertical Offset allows a mounting offset to be entered referenced back to the vehicle datum. A +ve value will increase the Altitude value.

Alternative Depth Formula allows selection of an alternative UNESCO, 1983 formula to be used to calculate depth.

Bathy Profiles Settings allows selecting of the folder for the .bp3 profile files to be saved to. Pressing the ellipsis button […] will display a windows dialog box to select the folder.

The Setup Settings Tab

The Setup Settings Tab will contain different information depending on the version of Bathy connected. The Setup tab will display the calibration coefficients for the Bathy and allow you to save them, or to load a different set of coefficients.

The one opposite is for a SeaKing V3 Bathy.

DigiQuartz Coefficients displays the calibration coefficients loaded for the DigiQuartz pressure sensor and the sensor serial number.

CT Probe Coefficients displays the calibration coefficients loaded for the conductivity sensor and the sensor serial number.

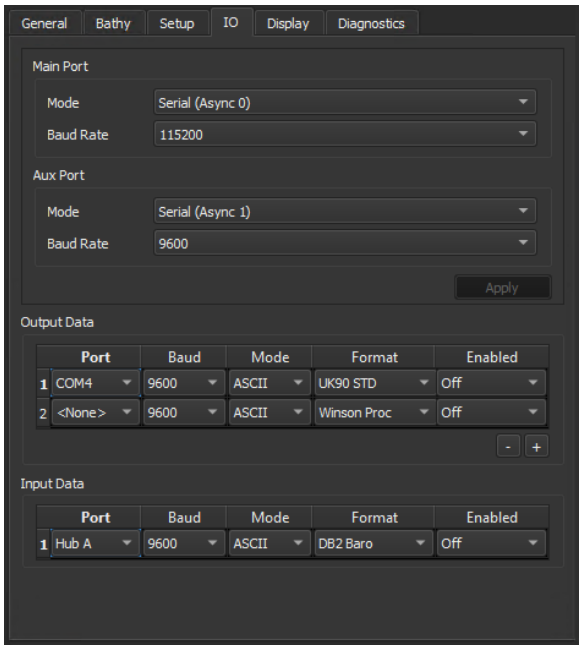
Load Config opens a window dialog box and allows loading of a `.userbbcfg` file containing a differing set of calibration coefficients and serial number settings. Select **Apply** to program the Bathy with the new values.

Save Config will open a windows dialog box to save the current calibration and serial number data to a `.userbbcfg` file.

Programming the Bathy with new serial number data and calibration coefficients will overwrite those stored in the memory, the device will not store any previous values. Reprogramming the calibration data should only be carried out at the direction of Tritech Support as loading of incorrect data will affect the operation of the Bathy and may require remedial work not covered under warranty.

The IO Settings Tab

These settings control the communication settings to the device and any additional input and output data specific to the Bathy.



Main Port Mode / Baud Rate sets the main communications mode and baud rate between the Bathy and Genesis. If changed the communications settings in the General settings tab will require to be changed to match.

Aux Port Mode / Baud Rate sets the communications mode for the Aux port of the Bathy if applicable.

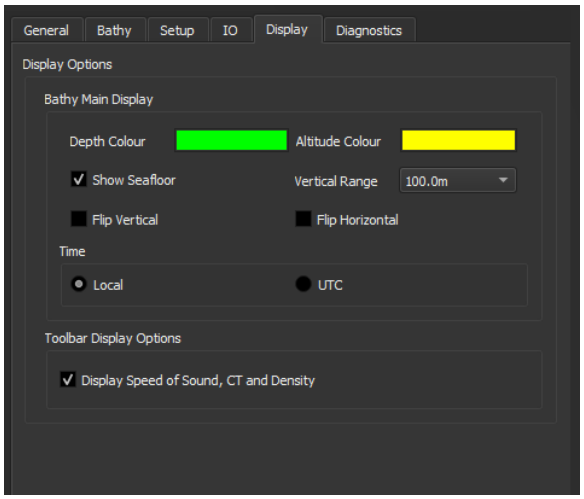
The **[Apply]** button should be selected after any changes to reconfigure the Bathy. Depending on configuration this may disconnect the device.

Output Data allows the selection and configuration of Bathy output data strings to an available Windows COM port. A list of the available data types can be found in manual 0706-SOM-00004 Seanet Remote Communications.

Input Data allows the selection and configuration of Barometer data string from an external sensor. A list of the supported data types can be found in manual 0706-SOM-00004 Seanet Remote Communications.

The Display Settings Tab

These settings control the configuration and display of the depth plot.



Depth Colour sets the chart plot colour for the depth data.

Altitude Colour sets the chart plot colour for the altitude data.

Show Seafloor shows a trace representing the seafloor on the Bathy main display.

Vertical Range allows you to manually set the vertical (depth) range for the output display.

Flip Vertical reverses the vertical axis with 0 at the top. This will support operation where a “depth below” is being measured.

Flip Horizontal reverses direction and where the current Altitude update is plotted (left or right of graph).

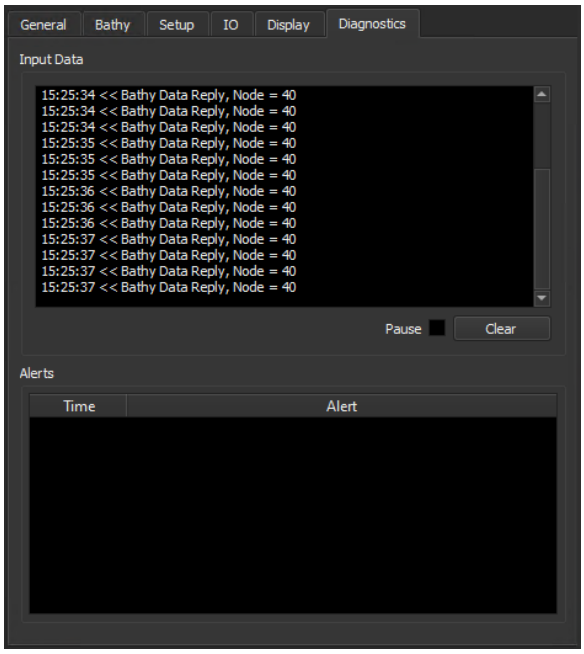
The **Time** axis can be set to Local Time or UTC Time.

Display Speed of Sound, CT and Density enables or disables the display of these values in the Bathy Data overlay box on the main view.

The Diagnostics Settings Tab

The **Input Data** area will display the time stamped data sent from the Bathy (including initialisation and data replies) and allow you to Pause and Clear the input data display.

The **Alerts** area will display any warnings or alerts specific to this device (e.g. loss of comms).



Profiling Density and Velocity of Sound

This function provides a running mean update of density and velocity of sound (VOS) during Bathy descent and this data is logged to a look-up table. The displayed VOS at the surface will always be the measured value local to the sensor.

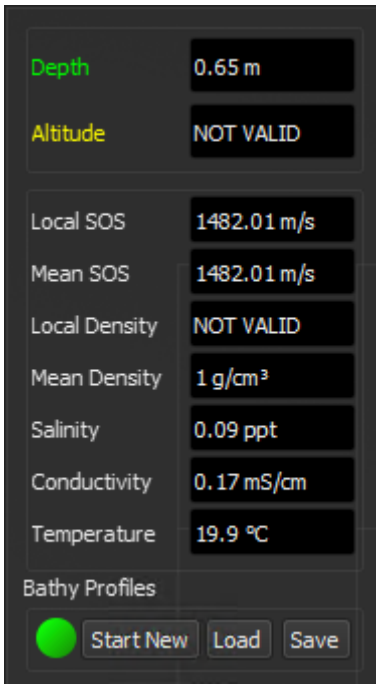
During descent calculations and measurements taken by the Bathy unit are stored in a look-up table at index intervals of 1psi. This is for the purpose of maintaining a running calculation of mean density and mean velocity of sound during deployment down to operating depth. If an index interval is missed, interpolation is applied to the preceding and the next index entries for mean density and mean velocity of sound data. The update of the Bathy data may periodically stall during the save routine and result in areas where the interpolation is used to fill in the missed intervals within the recorded profile.

This look up table can be saved as a Profile or a previously saved file imported. The file is saved as a space-delimited text file (with file extension .BP3) that can be imported into a spreadsheet for further analysis or post-processing. For details of the file format please refer to the supplementary manual 0716-SOM-00002 Genesis Supported Interface Strings and File Formats.

Operation of Profiles

The profile should be started immediately before the dive and after the Bathy has been zeroed. If a profile is started when at depth the density and sound velocity entries up to that point will be filled in with the current measurements at the starting depth.

At the start of the dive, or at any point, a new profile can be started by selecting the [**Start New**] button on the Bathy overlay.



During operations the profile can be saved by selecting the [**Save**] button on the Bathy overlay. This will save the profile `.BP3` data file in the default Genesis folder with the current date and time as the filename. **Saving profiles should not be performed while the Bathy is in descent**.

For the current dive the operator can opt to load all the profile data from a previous dive and apply this Bathy data to the current dive. When a profile has been loaded, its mean density table will be applied to current pressure readings in order to calculate depth. Also, local and mean VOS from the table will be used wherever applicable within the system.

To load a profile select the [**Load**] button on the Bathy overlay and a Windows dialog box will open to allow you to select the file.

Data will automatically be appended when diving to a greater depth than the last (maximum) depth entry stored in the loaded or saved profile. To save any appended data to the profile table it will be necessary to select [Save] once again.

It is very important to remember to save and therefore close off a recorded profile. Depending on the length of the descent to the working depth, a profile can take several seconds to be saved to disk.

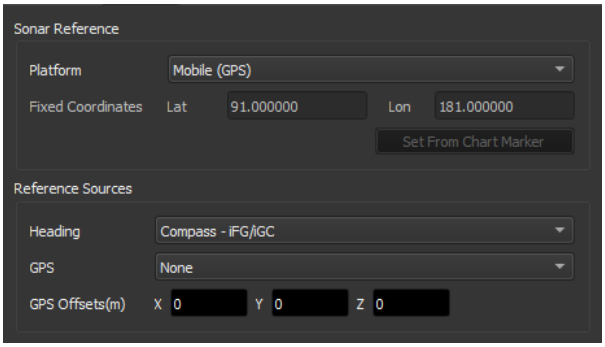
Using Genesis with an External MRU, AHRS or Compass Input

Genesis can display the data from an external Motion Reference Unit (MRU), Attitude and Heading Reference System (AHRS), Compass or similar device. The data from the external device must be presented in an industry standard ASCII string on a COM port recognised by Windows. For details of the input data strings supported please refer to the supplementary manual 0716-SOM-00002 Genesis Supported Interface Strings and File Formats available from the Tritech website at www.Tritech.co.uk.

After connection to the computer, add the device to Genesis as a Compass using the Devices button in the top right of the Genesis window.

The Compass device is a secondary device and will automatically position itself in the corner of an existing primary device view.

Once active and receiving a valid input into Genesis, the Compass can be used as the Heading Reference Source for a sonar or other valid device. The picture to the right shows the General settings Tab for a Gemini Sonar as an example. For more detail please refer to the relevant section of this manual for the sonar type..

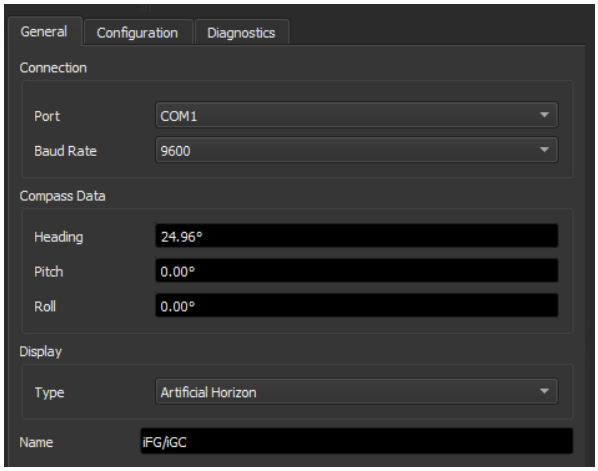


To adjust the settings and configuration for the Compass, MRU or AHRS click the Compass Device icon which will then display the settings tabs.

The General Settings Tab

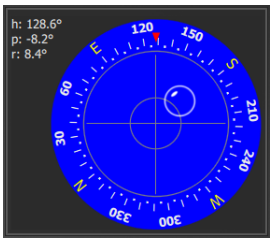
The **Connection** settings allow the selection of the serial port and baud rate.

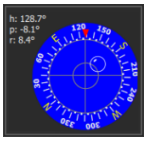
The **Compass Data** displays the values from a recognised input string. If the data is not being transmitted and/or recognised the output will remain blank.



The compass **Display Type** can be selected from a 'Spirit Level or more typical 'Artificial Horizon' display type. Both options are also available in a smaller form factor.

The **Name** field allows a separate label to be given to the device to aid identification. If left blank a sequential number is used for the Device Bar and Main Display.

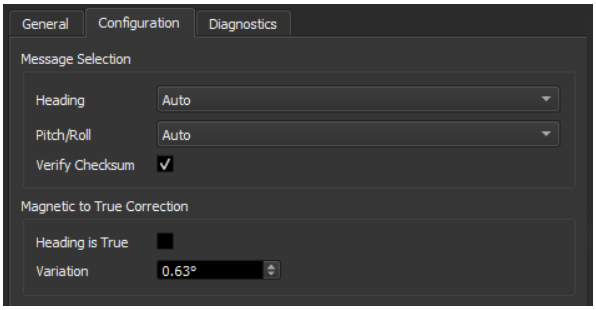




The Configuration Settings Tab

The **Message Selection** options allow selection of the specific input strings, or to allow Genesis to automatically recognise a compatible input. There is the option to enable or disable checksum verification.

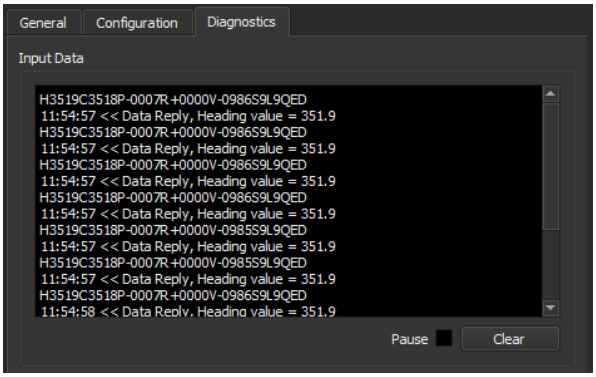
Magnetic to True Correction allows correction of the input between true and magnetic heading with the variation specified as required.



The Diagnostics Settings Tab

The **Input Data** shows the raw data being received from the device and can be used for troubleshooting any issues with the output.

The **Alerts** area (not shown) will display any warnings or alerts specific to this device (e.g. loss of comms).



Using Genesis with an External Pressure/Depth Input

Genesis can display the data from an external Depth string input or calculate depth using the Pressure input from an external device. The data from the external device must be presented in the standard manufacturers or industry standard ASCII string on a COM port recognised by Windows. For details of the file format please refer to the supplementary manual 0716-SOM-00002 Genesis Supported Interface Strings and File Formats or the OEM documentation.

After connection to the computer, the device should be added to Genesis as a Compass using the Devices button in the top right of the Genesis window.

The Depth device is a secondary device and will automatically position itself in the corner of an existing primary device view.

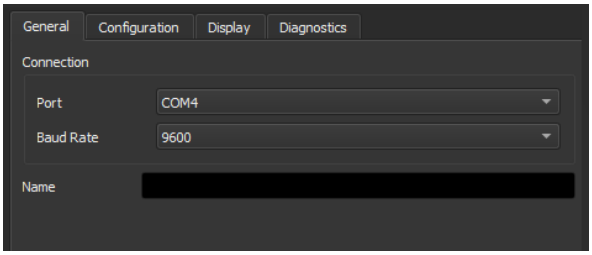
Once active with a valid input the Pressure/Depth Device will display the numerical depth.

To adjust the settings and configuration for the Pressure/Depth click the Pressure/Depth Device icon which will then display the settings tabs.

The General Settings Tab

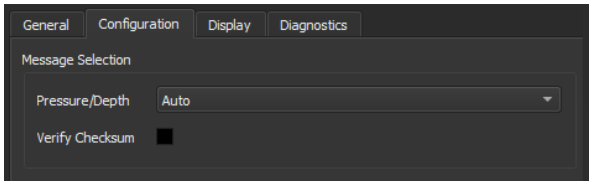
The **Connection** settings allow the selection of the serial port and baud rate.

The **Name** field can be changed to aid identification.



The Configuration Settings Tab

The **Message Selection** options allow selection of the specific input strings, or to allow Genesis to automatically recognise a compatible input. There is the option to enable or disable checksum verification.



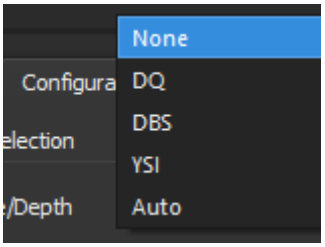
Genesis can accept calculate and/or display the depth from:

DQ - Digiquartz standard pressure string

YSI - YSI standard pressure string

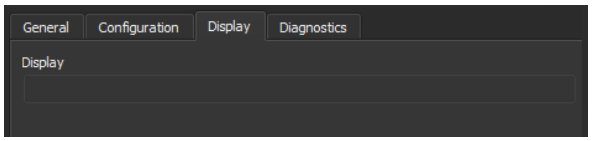
DBS - the standard NMEA DBS string

Auto - select and display the first recognised input string



The Display Settings Tab

Dependant on the input format or sensor, the Display settings will show any relevant configuration options.



The Diagnostics Settings Tab

The **Input Data** shows the raw data being received from the device and can be used for troubleshooting any issues with the output.

The **Alerts** area (not shown) will display any warnings or alerts specific to this device (e.g. loss of comms).