Sonar Image Tiler

Software Manual

0706-SOM-00002, Issue: 04

Tritech

Table of Contents

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 a Warranty Statement at the end of the manual.

Tritech International Ltd can be contacted as follows:

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	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 the 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.

1. Introduction

The Tritech Sonar Image Tiler is designed to allow sonar images to be stitched together into a single larger image or mosaic. This allows mapping or surveying work to build up a complete picture of the seafloor in important areas such as harbour floors, wreck sites or around underwater structures such as bridge and platform supports.

Note

This manual applies to software version 1.3

Hardware & Software Requirements

• A laptop, PC or SCU running Seanet Pro *OR* a computer running the offline DumpLog utility and a previously recorded Sidescan log file.

• Positional data either from an external GPS/USBL linked into Seanet Pro or from a manually entered `World Position` for the sonar installation.

2. Installation

The installer file for the Sonar Image Tiler can be found on the Tritech Software Installation CD or downloaded from: www.tritech.co.uk

The installation CD will autorun on disc insertion, first select the `Seanet Pro` button to open the correct section:
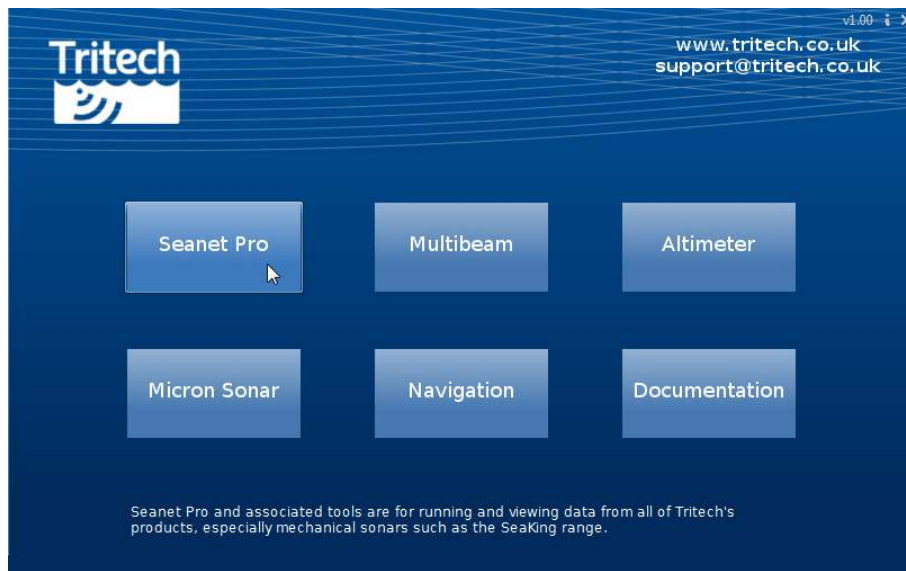
Figure 2.1. Tritech Software Installation Screen

Next, select the `Sonar Image Tiler` button to begin the software installation.
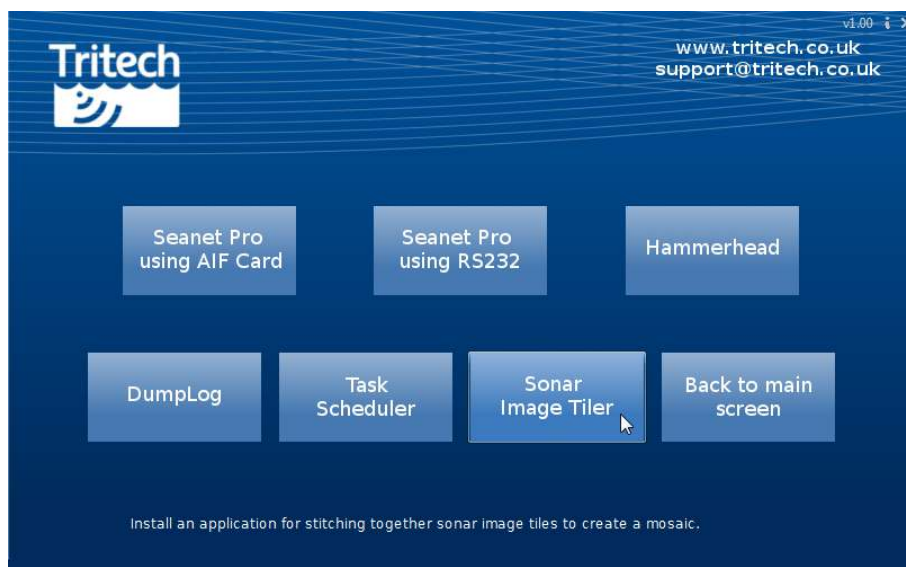
Figure 2.2. Select Sonar Image Tiler

i **Note**

If installing from the Internet an executable file called `ImageTilerSetup.exe` will be downloaded. Run this file and follow the on-screen instructions.

Upon installation a program icon will be created on the Windows desktop and a `Tritech Image Tiler` folder will be added to the Windows Start menu.

Figure 2.3. Desktop Icon

3. Supported File Formats

3.1. For Loading Tiles

In order to correctly position the images each image tile file should be accompanied by an equivalent "world file" which contains positional data. This data should come from a GPS linked into Seanet Pro. If a GPS is available Seanet Pro will automatically create a world file with the correct data when a `Snapshot` is taken.

The following file formats are supported:

Image Type	World File
.bmp	.bpw
.jpeg/.jpg	.jgw
.tiff/.tif	.tfw
.png	.pgw

Note

The image file and world file should have the same filename (i.e., `sonar.bmp` and `sonar.bpw`).

Note

The image tiles have to be saved from the latest version of Seanet Pro; if an older version is used they will not open in the Sonar Image Tiler. If in doubt, remove the current version of Seanet Pro and either download the latest version from www.tritech.co.uk or re-install from the CD-ROM which contained the Image Tiler installation program.

3.2. Saving Images or Mosaics

Saving an image can either be the whole chart (with any visible tiles or markers), a marked out section or a mosaic of tiles either way the supported formats are:

.bmp   Bitmap image

.kmz   Google Earth format

.png   Portable Network Graphic

Note

The Sonar Image Tiler will automatically create at matching world file for the saved image.

3.3. Project Files

The Sonar Image Tiler uses a customised XML format for saving and loading projects. These project files will preserve any tile data or marker data so that they can be manipulated again at a later stage or transferred to another computer for editing.

Note

Due to the fact that the project files contain the data for all the tiles, if the project has many tiles it can result in the production of large XML files.

3.4. Marker Files

Two different marker file types are supported both of which are in CSV format but with different filename extensions and different complexity:

.mrk   Seanet Pro full length marker files.

.csv   A shortened version of the Seanet Pro format.

Note

For full details of the marker file formats please see Appendix A, *Marker Files*.

4. Hammerhead Sonar Image Capture

This manual only describes the procedure for capturing sonar images and assumes that sonar operation and installation (including any GPS setup) has already been covered. The example is for a *Tritech International Ltd* SeaKing Hammerhead Sonar. If other sonar heads are to be used then please contact *Tritech International Ltd* for details on how to configure them.

4.1. Setting up Seanet Pro

By default the Hammerhead installation of Seanet Pro is set up for `Single Sonar`. If this has been changed for any reason, return to the default setting so that the main screen shows sonar, attitude and compass displays.

In the top left click on the `Settings` button and then click on `Installation`:
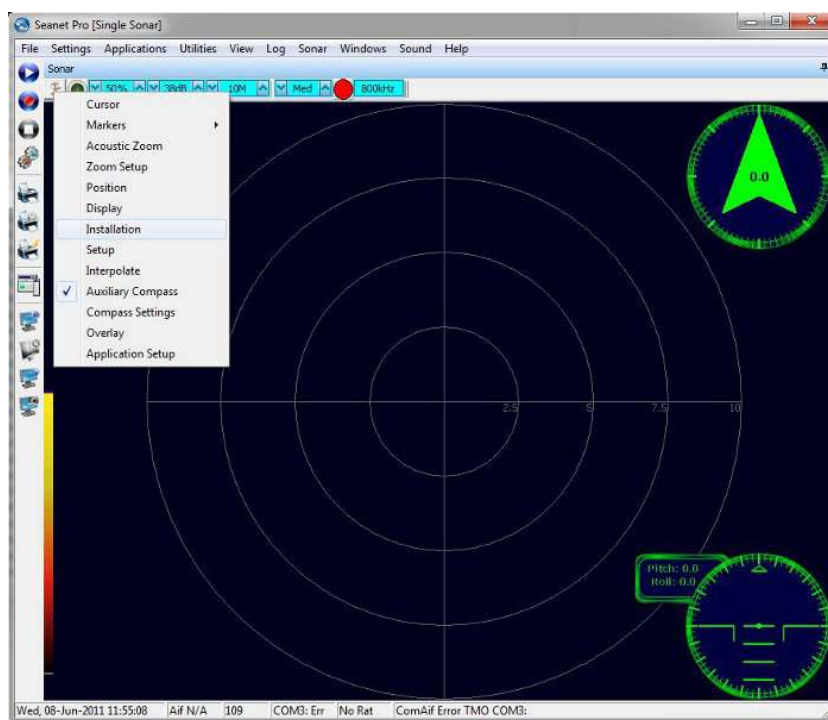
The `Installation` page allows geo-referencing to be applied for either `GPS Position Updates` (which requires an enabled GPS input) or from a manually entered `Fixed Position`:
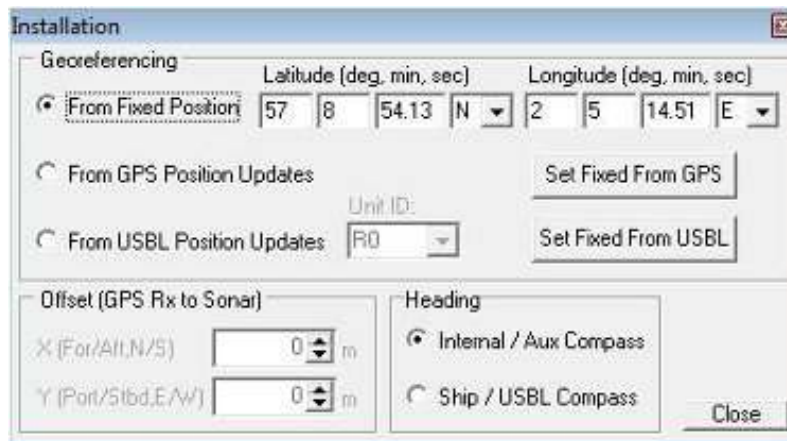
If there is a MicronNav system installed with the Hammerhead the USBL position updates can be applied instead. Select `From USBL Position Updates` and select the appropriate `Unit ID` corresponding to the device to be used to input the positional data (R0 is the Responder and T1-T15 are the Transponders - the menu will only display those devices which are available).

If the `Fixed Position` option is selected this data can be acquired from either the GPS or USBL position without having to manually enter values. Use the `Set Fixed From GPS` and `Set Fixed From USBL` buttons.

The Hammerhead can use its internal compass for the `Heading` and to North-correct captured images. For the internal or a secondary compass attached to the sonar AUX port select `Internal/Aux Compass`. The USBL also has a compass that can be used by selecting `Ship/USBL Compass` if a MicronNav system is connected. If no MicronNav is available the vessel's compass can be used; connect to the computer via an available COM port and configure using the `Utilities` menu and `Com Setup` option.

To capture sonar images at any time click on the `Snapshot` button to save the bitmap. If GPS/USBL data is present or a Fixed Position has been entered a World File will also be created in the same folder as the Image file.
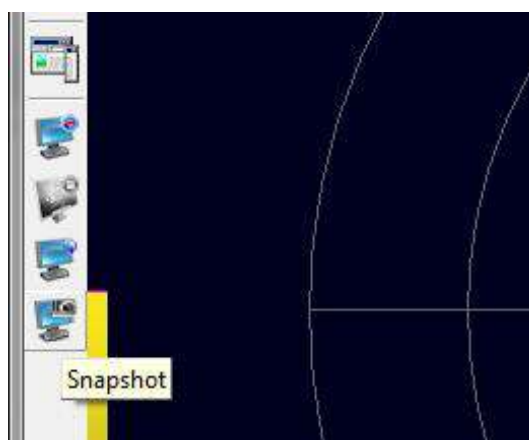
Clicking on `Snaphot` will open the `Save to Bitmap` dialog where a folder can be selected and the image file named. Click on `Save as Type` to select either a `.bmp` or a `.tiff` image format
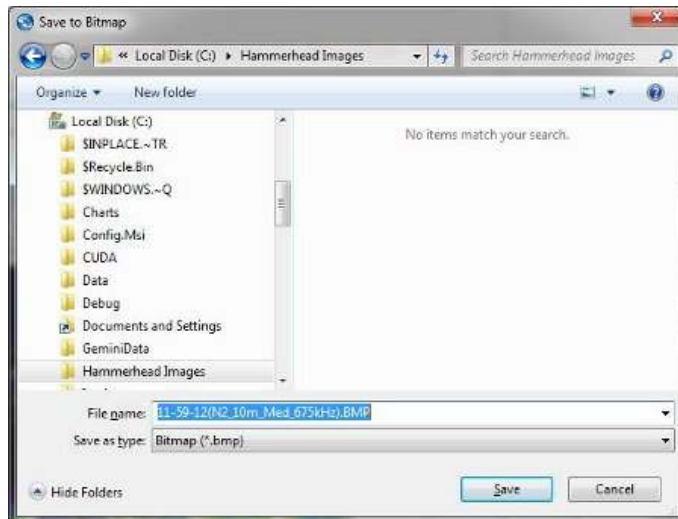
i   **Note**

The filename will default to include the current time and sonar configuration details.

i   **Note**

The dialog box can be suppressed by enabling the `Quick  Print` button. The current folder, last selected image file type and default naming convention will then be used automatically every time the `Snapshot` button is pressed.
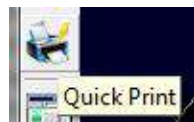
5. SeaKing Sidescan Image Capture

The Sidescan and GPS data first has to be recorded into a log file (`.v4log`) using Seanet Pro. This log file is then opened in the DumpLog offline utility program and a GeoTiff output is created. This GeoTiff output will also contain a World File assuming that there is valid GPS data within the log file.

For the latest version of the DumpLog utility please visit: www.tritech.co.uk

Run DumpLog and click on `Open File(s)`
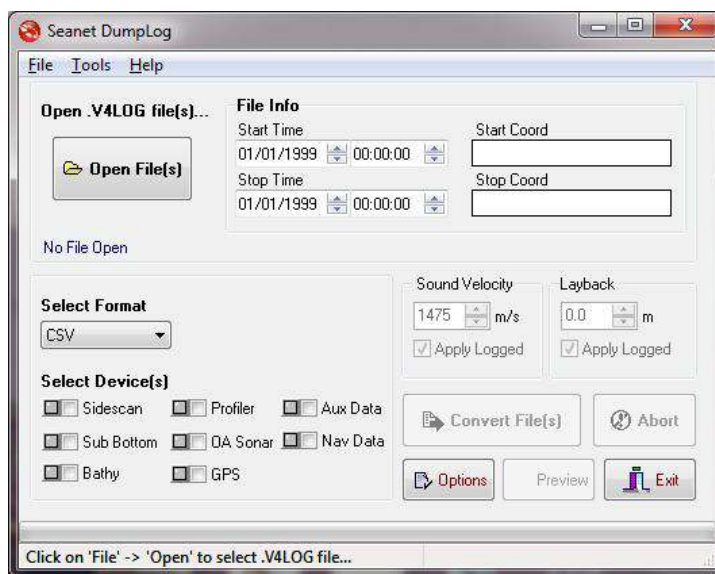
Select the log file or files that are to be converted.
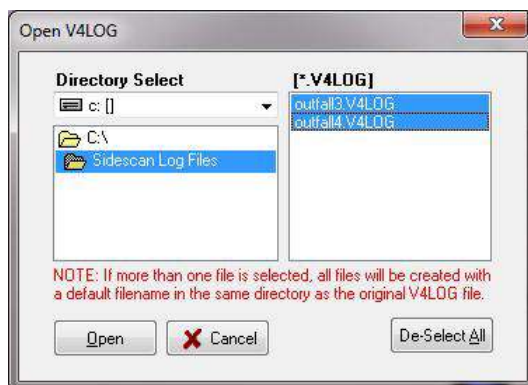
Select the `GEOTIFF` output format and then tick the `Sidescan` and `GPS` device boxes as shown below:

Note

If the indicators next to the `Sidescan` or `GPS` boxes are not illuminated red after opening the log file it indicates that there is no matching data. If this is the case it will not be possible to create a GeoTiff and World File output for use with the Image Tiler.

There are several TIF and GeoTiff settings that can be altered by clicking on `Options` and selecting the `TIF/GEOTIFF` tab page.
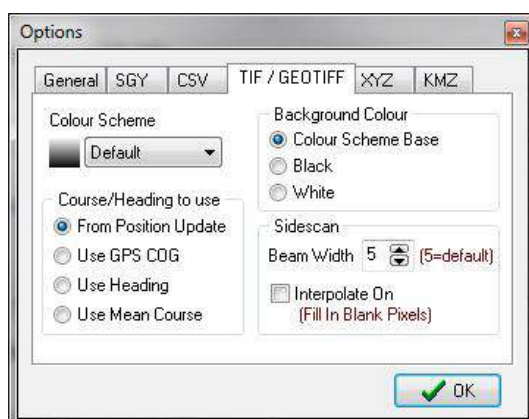
The main settings are for a `Colour Scheme` to be applied to the output sidescan imagery and a choice of methods to apply heading/course correction to the output file. The `Beam Width` sets the width of each scan line which can help with gaps that may occur, particularly when cornering.

Once setup is complete click on `Convert File(s)` to create the output. This will create `.TIF` (GeoTiff image) and `.TFW` (World File) files which can then be imported into the Sonar Image Tiler.

6. Software Functions

6.1. Toolbar

- ❶   Import chart
- ❷   Export as image
- ❸   Save project
- ❹   Load project
- ❺   Clear project
- ❻   Add tile
- ❼   Delete all tiles
- ❽   Reset all tiles
- ❾   Resize tile
- ❿   Create mosaic
- ⓫   Save mosaic
- ⓬   Zoom in
- ⓭   Fit to screen
- ⓮   Zoom out
- ⓯   Toggle coordinates dialog
- ⓰   Toggle coordinate system dialog
- ⓱   Toggle tile list dialog
- ⓲   Toggle chart
- ⓳   Show markers
- ⓴   Move marker
- ㉑   Pan tool
- ㉒   Erase tool
- ㉓   Area erase tool
- ㉔   Remove tile background
- ㉕   Export area

6.1.1. Project Controls

Import/Create Chart

For creating a blank chart or importing a previously created chart. For more information on this function please see Section 7.2, "Create the Background Chart".

Export As Image

If an area is selected this button will export the selected area. If no area is selected the whole chart will be exported.

For details of the supported file format please refer to: Section 3.2, "Saving Images or Mosaics".

Note

The markers will be embedded into the image file and if the image is loaded again it will no longer be able to modify or hide them. If exporting the image to use again as a chart the markers should first be hidden (see Section 6.7, "Using Markers").

Save Project

The first time this is pressed it opens a dialog to name and then save the current state of the chart, tiles and markers as an XML file. Using this option allows the project to be loaded later and the markers or tiles moved or hidden.

Subsequent presses of the button will not prompt for a filename and instead save over the existing project - to save under a different name navigate to the `File` menu and select `Save Project As...`.

Note

If the tiles have been moved or rotated away from their original positions it will no longer be possible to restore them after the Project has been saved, i.e., the new "original" position which they will be returned to when they are "reset" will be the position which they were in when the `Save Project` button was pressed.

Load Project

For loading a previously saved Project file. The files are only generated by the Sonar Image Tiler and are in XML format.

For details of the supported file format please refer to: Section 3.3, "Project Files".

Clear Project

Removes any loaded data and clears the workspace. Any unsaved data will be lost.

6.1.2. Tile Controls

Add Tile

Opens a dialog to load an image tile. Image tiles must be in the correct format and have an associated world file.

For details of the supported file format please refer to: Section 3.1, "For Loading Tiles".

Delete All Tiles

Removes all the tiles from the chart. Any unsaved changes will be lost

> **Note**
>
> To delete a tile individually use the `Tile List` as detailed in Section 6.6, "Tile List Dialog".

Reset All Tiles

Resets all the tiles using the position, orientation and size from when they were first loaded.

If the tiles were loaded as part of a project then they will be reset to the original state that they were when the project was saved.

> **Note**
>
> To reset a tile individually use the `Tile List` as detailed in Section 6.6, "Tile List Dialog".

Resize Tile

Tiles can be resized individually using this tool. When the tool is enabled each tile will show a thin red outline with anchors at the corners and side midpoints. The

mouse pointer will change to arrows indicating the available resize direction when it is positioned above the resize points. Click, hold and drag to resize the tile. The corner anchors maintain aspect ratio while it is resized whereas the side anchors allow the image to be stretched.

Create Mosaic

This will stitch all the *visible* tiles together into a single image. If only some of the tiles are to be included the remaining ones should be hidden from view using the `Tile List` as detailed in Section 6.6, "Tile List Dialog".

Save Mosaic

Saves the newly created mosaic as an image with an accompanying world file which can then be loaded as a tile for future Projects.

Using the `Save Mosaic` function has the advantage over `Create Mosaic` in that it does not alter the tiles within the project so they can still be modified if desired. The newly created mosaic is in a completely separate file.

For details of the supported file format please refer to: Section 3.2, "Saving Images or Mosaics".

6.1.3. Zoom

The zoom controls allow the user to `Zoom In` on an area of the screen by using the button or by scrolling the mouse wheel forward.

Similarly, zooming out can be accomplished using the `Zoom Out` button or scrolling the mouse wheel backwards.

The view can be reset so as the chart fits into the window by pressing the `Fit To Screen` button

6.1.4. View/Hide Controls

These controls are the same as those found in the `View` menu and allow the different dialogs to be shown or hidden from the workspace.

The background chart can be hidden to allow better viewing of the individual tiles by selecting the `View/Hide Chart` button:

For more detail on the functionality of the dialogs refer to Section 6.5, "Information Dialogs" and Section 6.6, "Tile List Dialog".

6.1.5. Markers

Using these buttons the markers can be shown, hidden or moved. For a full description of the use of markers see Section 6.7, "Using Markers"

6.1.6. Tile Manipulation

Pan Tool

The pan tool is the default operation and allows the current viewpoint to be moved around by clicking and holding the left mouse button - useful if zoomed in or using a very large chart.

When this tool is selected and the mouse pointer is hovered over the tile handles the functionality will change to that of move a single tile or rotate the tile (depending on where the mouse pointer is located).

Note

This tool does not alter the *position* of the chart - it simply changes the visible portion on the screen.

Erase Tool

Note

This action cannot be undone. To restore the original tile the tile has to be deleted and then added afresh.

This tool allows parts of the sonar tile to be removed manually as if using an eraser. To remove a section of sonar tile select this tool then click and drag the left mouse button over the desired area. When this tool is active the mouse cursor should change to an eraser.

If multiple tiles are overlapping the erase tool will work on the uppermost tile only but if a portion is already erased the eraser will start to erase the tile below as well. To avoid accidentally erasing the wrong tile, it is recommended that the tiles that are not being worked on are disabled or hidden using the `Tile List` (see Section 6.6, "Tile List Dialog").

Area Erase Tool

Note

This action cannot be undone. To restore the original tile the tile has to be deleted and then added afresh.

This tool erases polygonal-shaped sections from the sonar image tile. To use it select the tool then click (and release) on the sonar tile, move the mouse and click again to add another point (the points will be joined by a red line). Keep adding points until the desired shape has been constructed and then double-click to close the area (i.e., the last added point will be joined to the first point with a straight line). When the area is closed the polygon that is created will be automatically deleted from the tile and the red outline will also disappear. While this tool is active the mouse cursor will change to a cross-hair with polygon shape.

All visible tiles that intersect with the defined polygon will have a section deleted. To make sure that some tiles are preserved, first hide them from view - see Section 6.6, "Tile List Dialog".

Crop Background

Note

This action cannot be undone. To reset the tile, it must be deleted and added again as if it is new.

To control the amount of sonar data displayed in a tile the automatic background removal tool uses an intelligent algorithm to determine unwanted sections and remove them from the tile. Unwanted background pieces are those that are typically around the edge of the sonar scan and do not add any detail to the images. In general, acoustic shadows around areas of high intensity should be kept as they add detail and context to the image.

6.1.7. Image Export Area

The Image Export Area selection tool enables restricted areas of the workspace to be exported to an image file. The mouse pointer will change to a cross-hair for more accurate selection. To use, simply draw a box around the area to be exported and then press the `Export As Image` button ( )

Note

Only when this button is enabled will the selection be used as the export area, otherwise the entire chart will be used.

6.2. Moving tiles

The `Pan Tool` button has to be selected for this function to work.

When the mouse pointer is over the centre of the tile it will change to a hand icon. Hold down the mouse button to drag the tile and position it correctly.

6.3. Rotating tiles

The `Pan Tool` button has to be selected for this function to work.

A tile can be rotated by selecting and moving the rotation lever (see Figure Figure 6.1, "Rotating the Tile"). The mouse pointer will change to show a hand with rotation arrows when it is positioned above the end of the lever. Holding the mouse button down and dragging in a circular motion will rotate the tile:
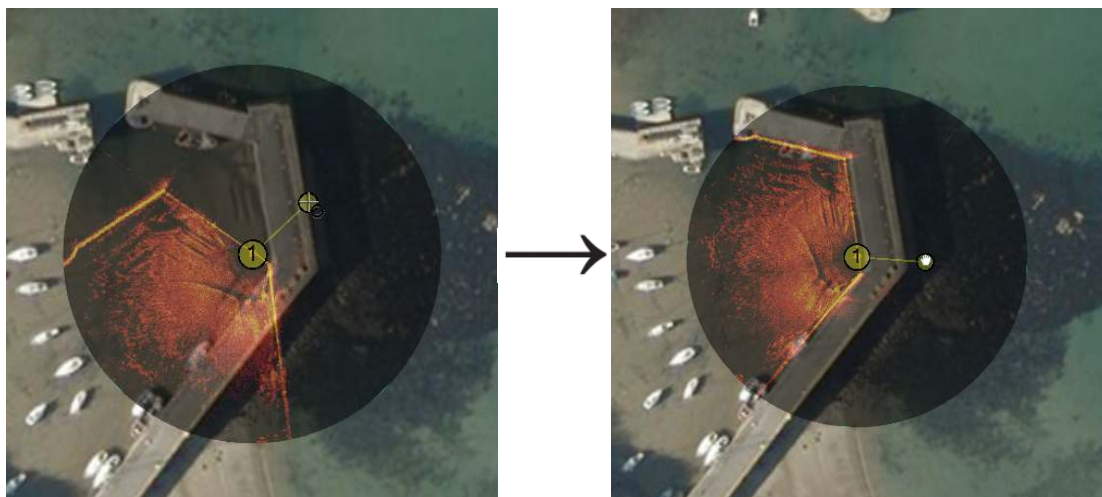
Figure 6.1. Rotating the Tile

The amount of rotation will be displayed in the `Tile List` panel (which can be displayed using the `View` menu and selecting `Tile List`).

N°	Latitude	Longitude	Rot(°)	Opac(%)
☑ 1	56° 57' 34.3" N	2° 11' 59.9" W	318.38	50
☑ 2	56° 57' 35.5" N	2° 12' 3.8" W	173.57	50

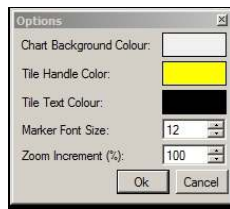The colour of the rotate handle can be changed by navigating to the `Tools` menu and selecting `Options`

6.4. Mosaic of Tiles

To create a mosaic of tiles it will be necessary to have multiple tiles together within a single geographic region. It will not be possible to create a mosaic if the tiles are very far apart, likely as a result of having an incorrect or corrupt world file which results in their incorrect placement.

Creating a mosaic is a simple process, first arrange the tiles as desired and hide tiles that are not going to be included in the final mosaic, then press the mosaic button on the toolbar ( ) which will start the mosaicking process. An example of this is presented in Figure 6.2, "Mosaicking Tiles".

Note

The mosaicking process is irreversible and will result in a new tile created which cannot be split into the original tiles. To restore the original tiles they will have to be re-loaded.
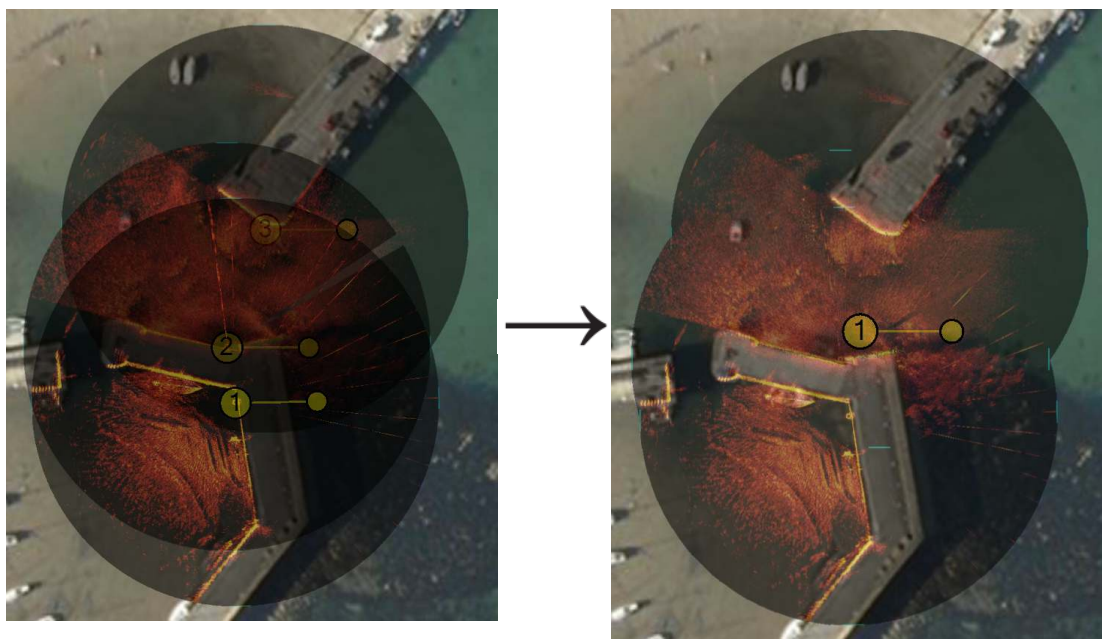
Figure 6.2. Mosaicking Tiles

Note

If `Save Mosaic` is pressed instead the output will not be on the screen but to a file so a file chooser dialog will present itself.

6.5. Information Dialogs

There are also three information panels accessible from the toolbar or the `View` menu: the tile list; mouse position; and the coordinate system used. Both the tile list and the mouse view display the position of tile centres or mouse pointer, respectively, using the selected coordinate system.

Coordinate System

The `Coordinate System` display can be viewed and controlled by selecting the button ▨ or using the `View` menu and select `Coordinate System` option. This allows the user to choose between using `Decimal Degree`, `Degrees and Decimal Minutes`, `Degrees, Minutes and Seconds` and `Universal Transverse Mercator (UTM)`. Selecting one of these options automatically updates the display in the both the `Mouse Position` and `Tile List` display panels.

Mouse Coordinates

The `Mouse Coordinates` display is also controlled from the `View` menu and `View` button collection 🖱 . It shows the mouse position in the context of the chosen coordinate system.

6.6. Tile List Dialog

The `Tile List` panel can be made visible using the `View` menu and selecting the `Tile List` option.

Alternatively the `Tile List` can also be viewed using the button: ▤.

Action on Multiple Tiles

By holding down the `shift` key on the keyboard it is possible to select multiple tiles in the `Tile List` and move them up/down the layers together, show/hide them as a group or delete/reset multiple tiles in one go.

Saving the tile will only work on one tile at a time.

Layering tiles

Layering the tiles determines the order in which they are displayed, i.e., tile 1 is displayed in front of tile 2. The order can be changed by moving tiles up and down in this list, either as individual tiles or in groups.

Note

If centre marks or rotation handles obscure one another interaction will occur using the lowest numbered (corresponding to the topmost) tile so it may be necessary to re-order the tiles to gain access to the handles.

Click on the row containing a tile to highlight it and then press either the *UP* or *DOWN* arrow to bring the image forward or backward on the display by one layer.

Multiple tiles can be moved in one go by selecting each one and holding down the `control` key on the keyboard (or by selecting a span using the `shift` key). Once selected the tiles can be dragged as a group by holding down the mouse button and moving up or down the list to re-order them.

The tiles will be automatically renumbered with the lowest number being the first one displayed.

The tiles can also be controlled using a menu that is accessible by clicking on the tile entry in the list with the right mouse button. Using this method the tile can also be moved immediately to the front or the back of the display stack.

Save Selected Tile

Saving a tile will export it with a new world file so that any changes that have been made to the position or orientation can be preserved.

Delete Selected Tiles

Deleting a tile will permanently remove it from the display. Any changes made to it will be lost.

If multiple tiles are selected when this button is pressed they will all be deleted.

Reset Selected Tiles

Resetting a tile changes the tile location, orientation and size to the coordinates and rotation value contained in the world file that was originally used to load the tile. Any subsequent movements or rotations that have been made are lost.

If multiple tiles are selected when this button is pressed they will all be reset.

Note

If a project has been loaded the tile will be reset to the orientation *when the project was loaded*. The process of saving the chart and tiles as a project removes the original tile data so the only way to restore the original tile would be to delete it and reload it.

Show/Hide Selected Tiles

Tiles are hidden by de-selecting the check box to left of the tile number.

If multiple tiles are selected when this button is pressed they will all be shown/hidden.

6.7. Using Markers

The Image Tiler has the ability to import a marker file which has been saved from Seanet Pro (marker files have the extension ".mrk") or from a CSV text file (full details of the marker files are in Appendix A, *Marker Files*).

First create the marker file from the chart in the MicronNav application in Seanet Pro. Then open the marker file by navigating to `Import Marker File` from the `Tools` menu.

The imported markers will be overlayed on top of the chart:
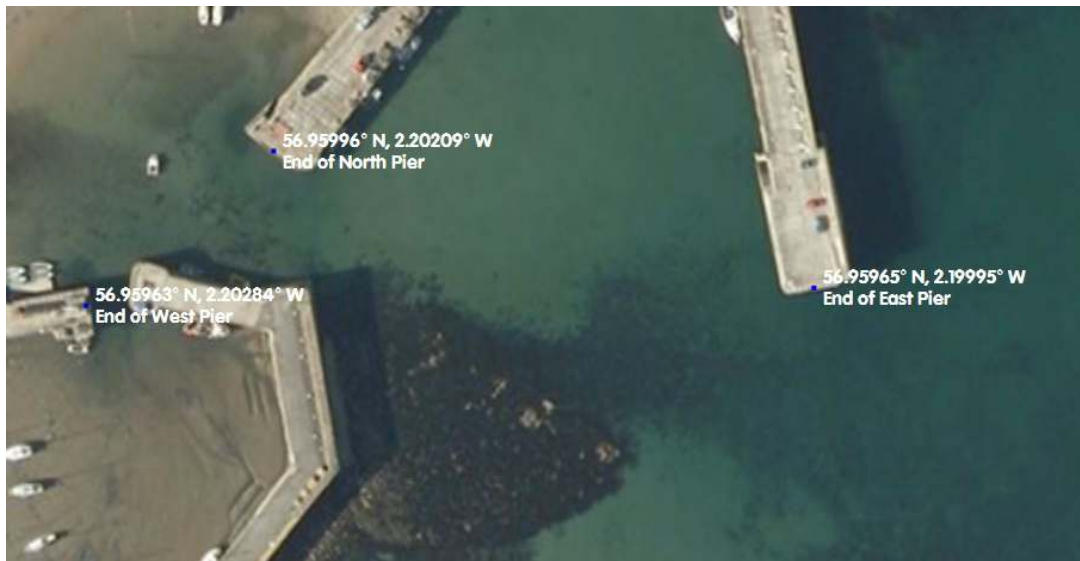
The positions of the markers is shown next to the location. Markers can be hidden using the button on the toolbar: ⚑ .

To move a marker first select the move marker button (⚑) and then click on the marker and drag it to the new location.

Note

If markers are displayed and `Export as Image` is selected they will be merged with the background. If the chart is to be used again it will not be possible to move or remove the markers. For this functionality the chart should be saved without the markers or with them hidden. If `Save Project` is selected the chart, tiles and markers are all saved as individual entities and can be interacted with as normal.

7. Creating the Mosaic Image
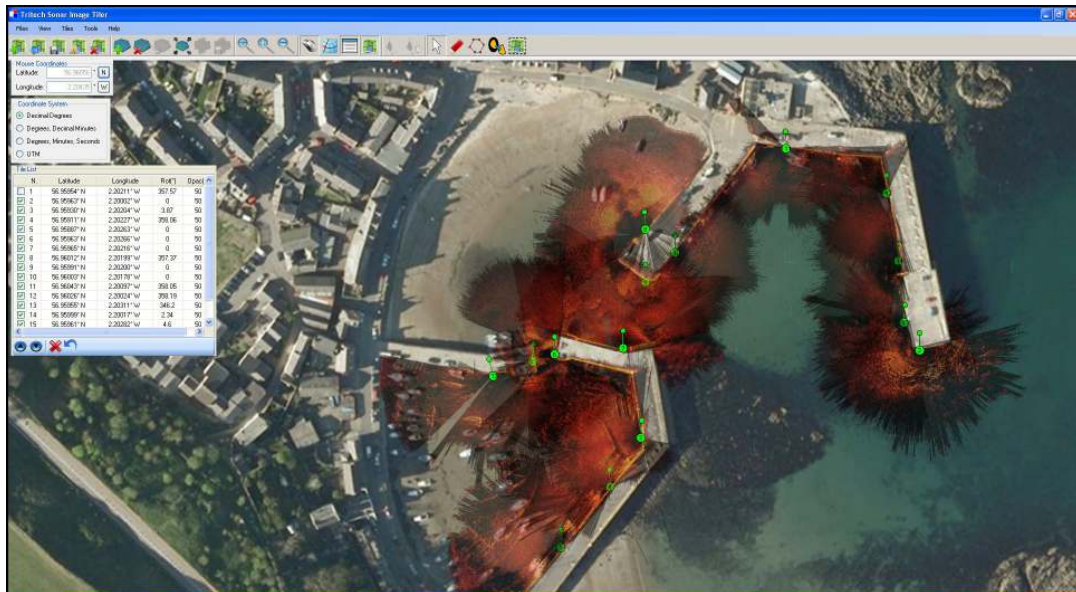
Figure 7.1. Completed Mosaic

A mosaic as shown in Figure Figure 7.1, "Completed Mosaic" can be created with the Sonar Image Tiler using a background chart, and sonar image tiles with their associated world files. The user must first set a background to place the image tiles. This background is called a "chart"; although if an actual survey chart is not available a blank canvas can be used. There is also the option to use the first added tile as a reference. All image tiles and background chart or blank canvas require geo-referencing. This is done during the creation of the chart by entering `Position Co-ordinates` for the top-left corner and a chart `Width` and `Height`.

With a background chart in place the sonar image tiles can then be loaded and any position or rotation corrections made. The entire chart and tiles, or a selected area, can be exported as an image file and a (separate) world file.

This chapter is organised into sections explaining the process of creating a mosaic, the tools available to the user, and also exporting an image or saving the project.

Note

`Load Project` allows a previously created chart, collection of tiles and markers to be loaded for further editing or for selecting an area to be exported as a bitmap.

7.1. Overview of Process

Prior to starting the mosaic process it is necessary to obtain the following:

- An image with GPS data in an associated world file to use as a background. Or appropriate GPS coordinates and geographical dimensions sufficient to encompass all of the sonar image tiles if creating the chart manually.

- A set of sonar image tiles from a Seanet Pro session which include GPS data in accompanying world files.

Given data already created using Seanet Pro the process for tiling images into a mosaic is as follows:

1. Create a chart: either from an image, import a previously created chart or create a blank chart from GPS data.

2. Load sonar image tiles onto the chart.

3. Manipulate the image tiles to the correct position (if required).

4. Either export the resulting mosaic as a bitmap (with world data) or save as a project (containing a chart and a collection of tiles) to work on again later.

7.2. Create the Background Chart

The Sonar Image Tiler starts with a blank screen:
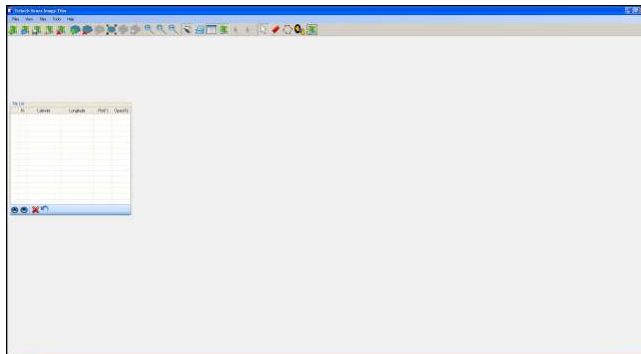
First create a chart background onto which the sonar image tiles will be placed. If Seanet Pro is running on the PC and has a chart configured as part of its `Nav` application then you can select it using the `Files` menu and `Open Seanet Chart` option. If no Seanet chart is available click on the `Import/Create Chart` button ![icon] to set up a new chart background.

> **(i)** **Note**
>
> It is also possible to use the first tile as the chart background - see below for the procedure for adding tiles. This tile cannot be moved or rotated and acts as the fixed reference point for other tiles.

In the `Add Chart` dialog box there are three options for adding or creating a chart. The user can select to use an image with associated world file; an image with manually

entered position and scale; or a blank chart with manually entered position data. These options are explained further in the following sections.

7.2.1. Image with World File

Select `Import World File` for the `Open World File` dialog and select the appropriate world file. The format of the world file can be either .bpw (bitmap), .jgw (jpeg), .tfw (tiff) or .wld (generic/CAD).
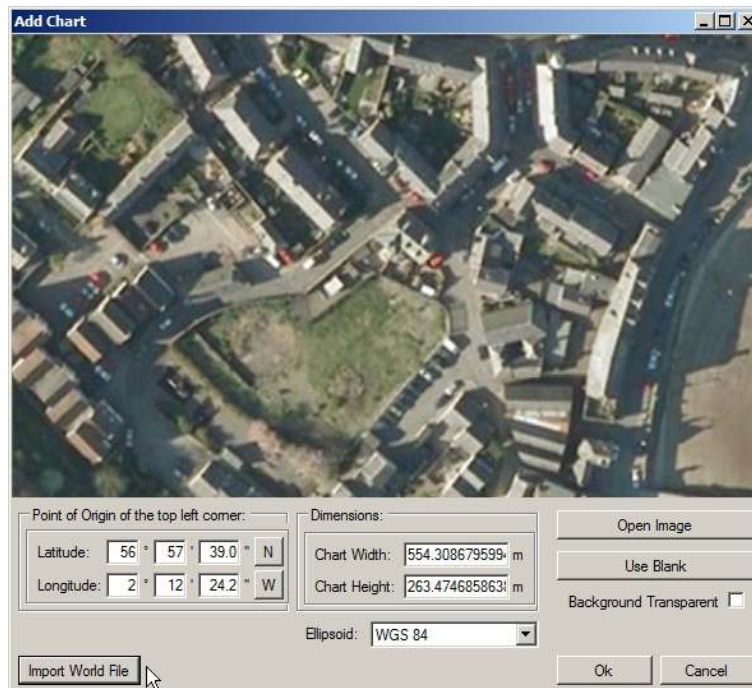
The world file format for `x` and `y` co-ordinates can either be in Eastings/Northings (E/N) or Longitude/Latitude (L/L). If co-ordinates are in E/N then a `Zone` will need to be entered and a reference `Ellipsoid` selected (for definition of latitude, longitude and elevation).
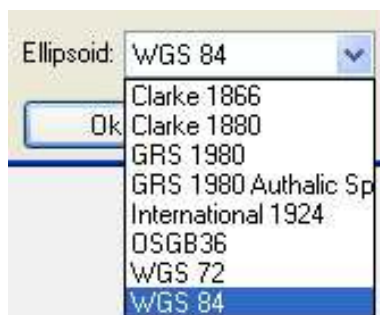
Verify chart parameters are correct and click `OK` to confirm and load this chart onto the display.
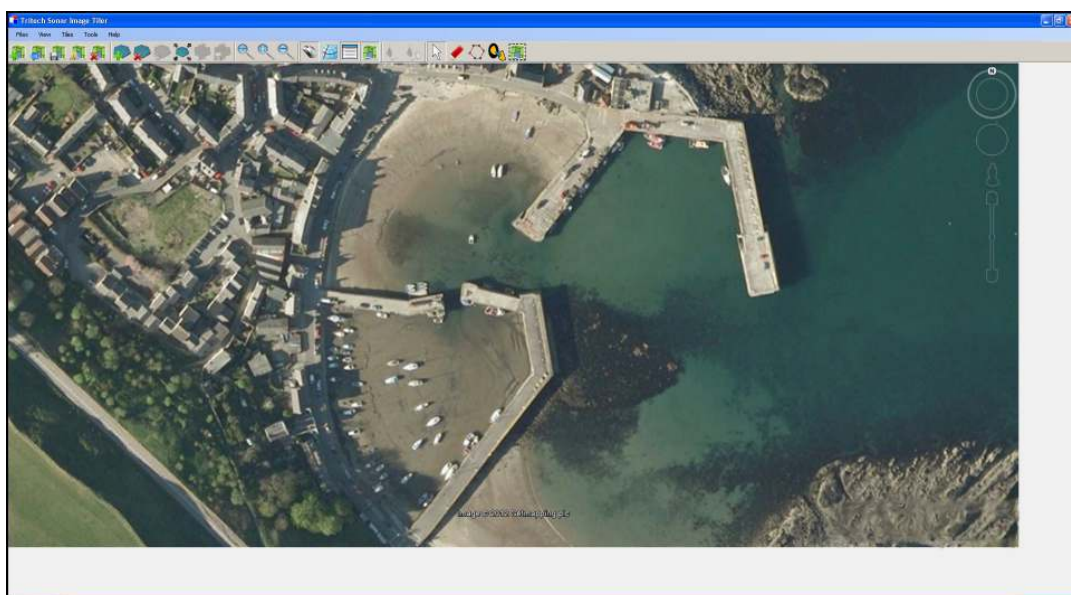
7.2.2. Image with Manual Positional Data

First, select `Open Image` button to bring up the `Open Chart` dialog and select the required chart image. The image format can either be .bmp (bitmap), .jpg (jpeg) or .tif (tiff).
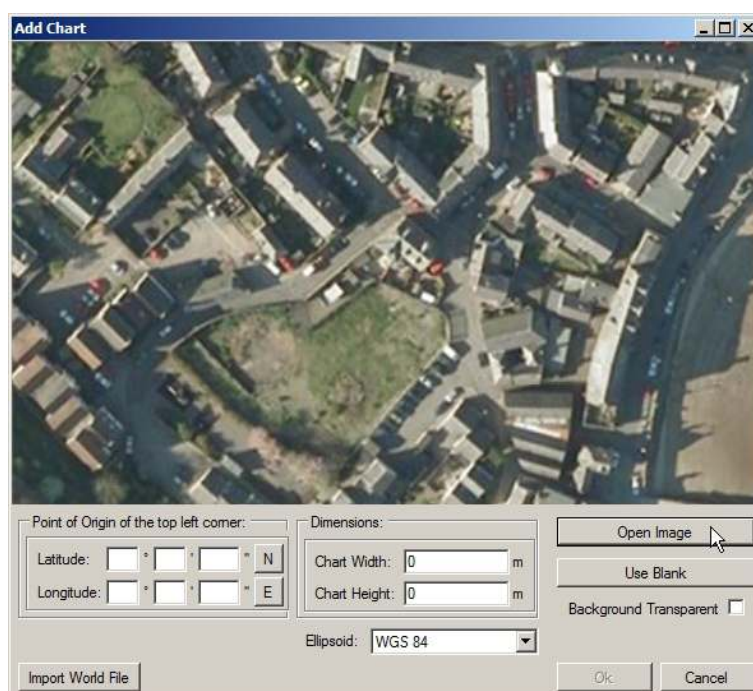
Note

Where an associated world file (matching name) is detected in the same folder as the selected image the chart parameters will automatically be loaded.

Next, enter the `Point of Origin` co-ordinates and the chart `Dimensions`. If the Universal Transverse Mercator (UTM) coordinate system is used a reference `Ellipsoid` will also have to be selected at this point (the default is WGS84 (World Geodetic System 1984)).

7.2.3. Blank Chart

Select `Use Blank` to create a blank image for the chart background. A default width and height will be set.
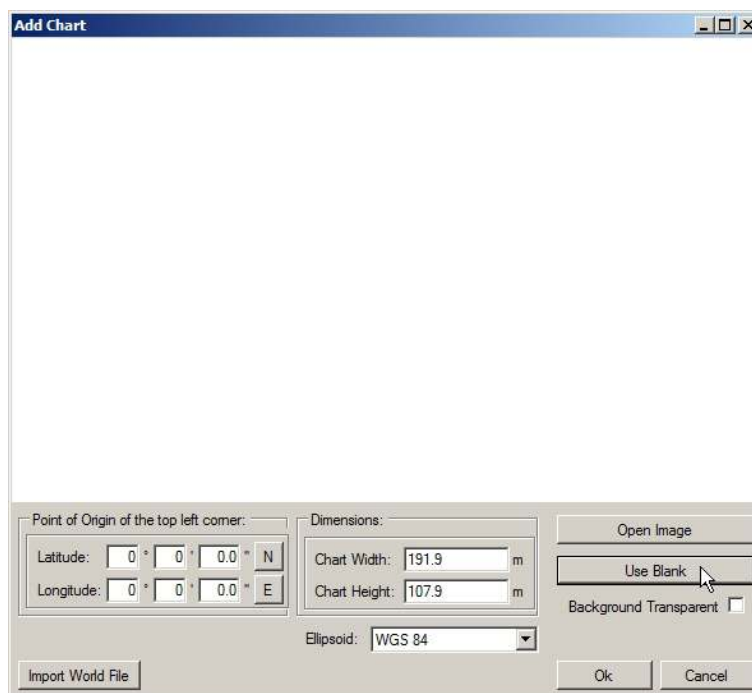
The `Point of Origin` co-ordinates and the chart `Dimensions` will have to be set. If UTM then also select a reference `Ellipsoid` at this point (the default is WGS84).

7.2.4. Co-ordinate System

When creating charts the `Point of Origin` co-ordinates will be in the format that is currently selected in the `Coordinate System` panel. To change this select `Cancel` and navigate to the `Coordinate System` control (if this is not visible go to the `View` menu and select `Coordinate System`).
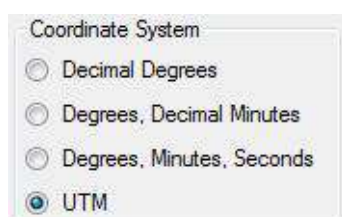
7.3. Add Image Tiles

Once the chart background has been loaded sonar image tiles can be added. Tiles must be within the same geographic area of the chart background.

Either click on the `Add  Tile` icon, or add the tile through the `Tools` menu and `Add Tile` option.

- A dialog enabling searching and adding of images is shown. The images can be in .bmp (bitmap), .jpg (jpeg) or .tif (tiff) formats. **A matching world file is required in the same folder or the image will not load.**

- The tile will be added on top of the chart if the geographic co-ordinates are within the background area.

- Simply repeat these steps to add further tiles.

Note

Several files can be added at the same time by holding down the `Ctrl` key whilst selecting the images.

7.4. Manipulate Image Tiles

The position information for tiles is dependent on the settings when the tile scans were created.

If the imported position is incorrect the tiles can be repositioned on the chart at any point after they have been added to provide a more accurate mosaic. There are several repositioning functions available: moving, rotating, and resizing. As well as tools to alter the appearance of shadows in tiles: automatic cropping of unwanted shadows, manual eraser, and area erase.

For full details of the possible ways to manipulate the tiles please refer to Chapter 6, *Software Functions*

7.5. Save the Project

`Save Project` allows the chart to be saved as a chart and a collection of tiles (and any markers) so it can be loaded for editing at a later date. The user is prompted for a file name, with the file type being XML.

7.6. Exporting the completed mosaic as an image

Charts can either be exported whole or areas can be selected and saved. To export the entire image simply select `Export as Image` from the `Files` menu. This will then display a dialog prompting for the desired location and name of the file. This output image will have an associated world file so it can be imported into other software packages with the geo-referencing intact.

> **Note**
>
> If there is an area selected on the chart, clicking `Export as Image` will only save what is contained within the selection region. The format of the saved chart will depend on the format of the input chart (i.e., a `.bmp` input will generate a `.bmp` output).

To create an output image using the `Selection Tool` follow these steps:

First click on the `Image Export Area` button:

Using the left mouse button click and hold anywhere on the chart and then drag the cursor across the screen to create a selection area.

Click on the `Files` menu and go to `Export as Image`. Enter a filename and select the desired file type (.jpeg, .bmp or .tiff) then click `Save`. A world file will be created with the same filename as the image file.

> **Note**
>
> There will also be a `.kmz` file created. This is a Google Earth file format and will allow the image to be viewed in Google Earth.
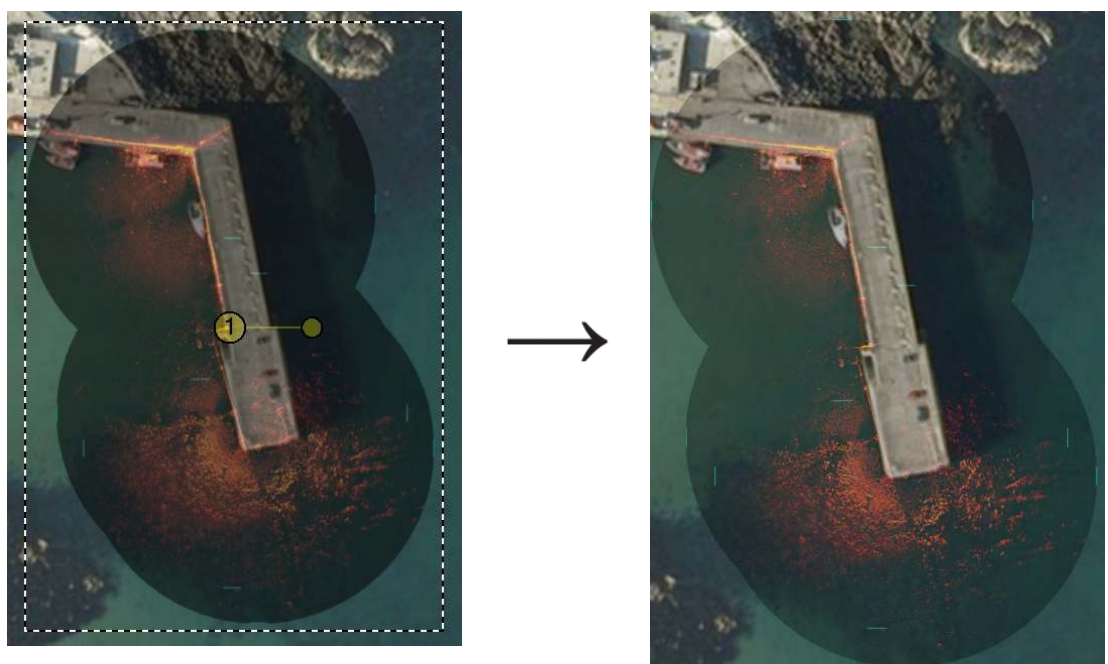
Selection area within dotted line   Output image

Note

It is also possible to output just the tiles (i.e., without the background chart) by clicking on the `Save Mosaic` button:

8. Example: Using Sidescan Image Tiles

Several `.v4log` files have been created in Seanet Pro that contain SeaKing Sidescan and GPS NMEA data. Each file contains the sidescan data for one track from a lawnmower style survey. GeoTiff files (and corresponding world files) were created using the DumpLog utility and these file-sets were added/imported into the Image Tiler application as sonar image tiles.

The files used for this example were as follows:

GeoTIFF file: `Outfall3.TIF`
World File: `Outfall3.TFW`
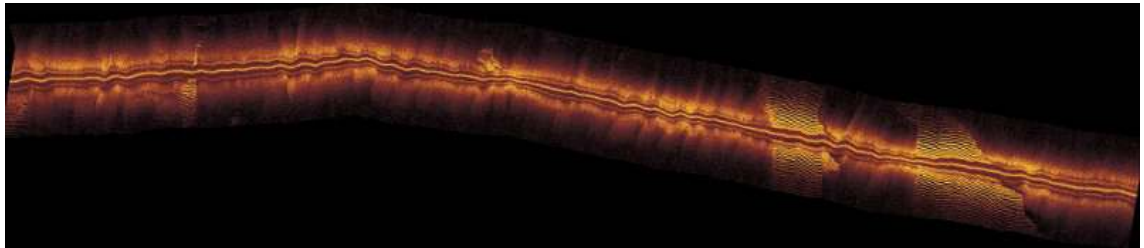
Outfall3.TIF image, ©Cawthron

Contents of
Outfall3.TFW:

```
0.0121457489878543
        0
        0
        -0.121457489878543
        299883.8970386512
        4836012.20188229
```


Outfall4.TIF image ©Cawthron

Contents of
Outfall4.TFW:

```
0.0121457489878543
        0
        0
        -0.121457489878543
        300067.466645638
        4835950.35472915
```

The TIF and TFW file sets were imported into the Sonar Image Tiler using the `Add Tile` button. The first tile imported was used as the reference background image. Further tiles were added and repositioned.
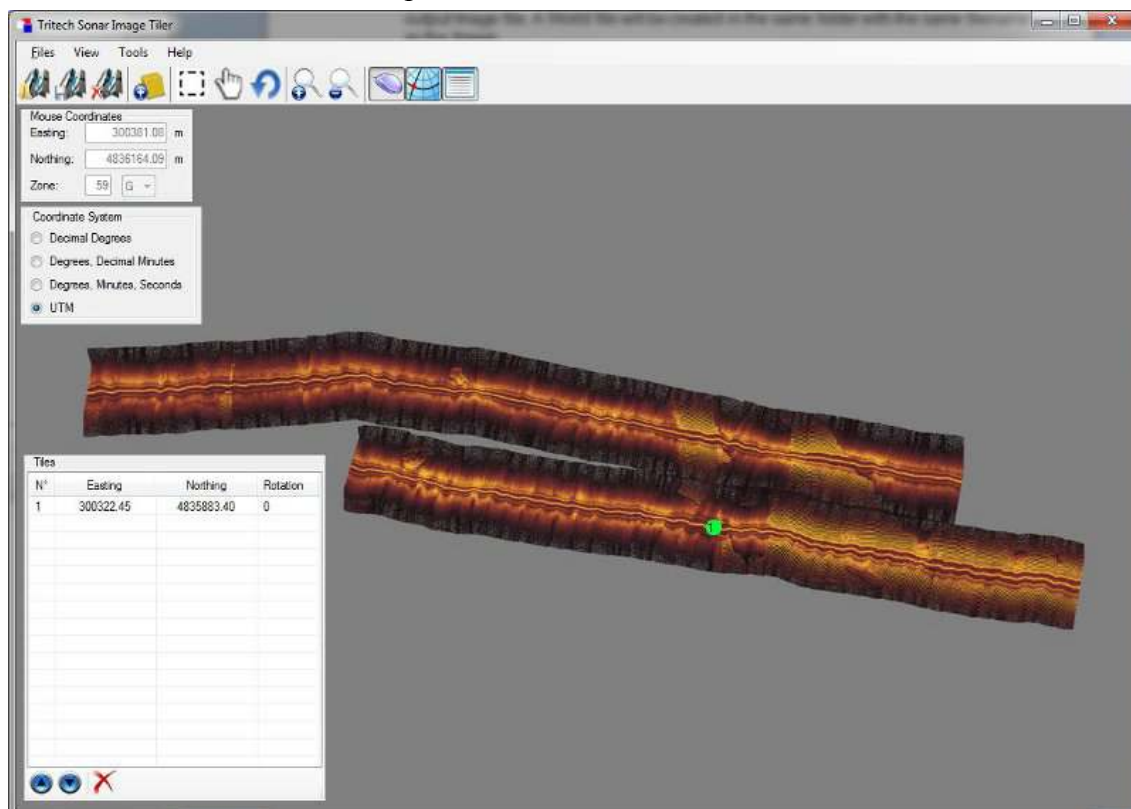
With the image tiles added an area was highlighted using the `Selection Tool` and the area was saved to file using the `Export Chart as Image` button. The saved image mosaic appears as follows:

Sidescan Images provided courtesy of Cawthron, New Zealand (image shows mega ripples of sand off the coast of Foveaux Strait near Bluff)

9. Troubleshooting

The following table outlines some problems which can readily be fixed by altering settings or other simple procedures. If any of these solutions do not solve the problem please contact *Tritech International Ltd* using the contact details listed in the Help & Support Section at the start of this manual.

No World File created by Seanet Pro	This is likely caused by a lack of GPS/USBL data. If using a GPS/USBL ensure that they are connected and set up properly Check the `Installation` page to make sure that the correct positioning device is being selected, or that `Fixed Position` is selected.
`Snapshot` captures entire Seanet Pro screen	Incorrect registry setting. Modify the Windows registry using regedit.exe to ensure that the following setting is applied: HKEY_CURRENT_USER\Software\System Technologies\SeaNet\ScrnCapSonarOnly = 1

Appendix A. Marker Files

Seanet Pro includes the facility to lay a series of markers to label and track objects, points of interest and way positions. These markers can be saved to file for the purpose to re-load at a later date, to form part of a report or for use with the Sonar Image Tiler program.

There are two formats of marker file:

1. A full, comma separated file format with the filename extension `.mrk`

2. A shortened, comma separated format with the filename extension `.csv`

Full Marker File Format (.mrk extension)

This is the format that is native to Seanet Pro and includes full details of the marker configuration. The file is in an ASCII Comma Separated format and contains the following fields:

Index	Value	Description
1	ID	This is a unique string ID. It comprises a 2 letter header ("mk") followed by a DateTime code. Any unique string value is acceptable.
2	Group	This is unused and should be set to 0.
3	X Coordinate	For the .mrk file this will always be output in UTM Easting.
4	Y Coordinate	For the .mrk file this will always be output in UTM Northing.
5	Altitude	This is UTM Altitude and is currently unused.
6	UTM Zone Parallel	Zone latitudinal letter (e.g. 'C' through 'X').
7	UTM Zone Meridian	Zone longitudinal number (e.g 1 through 60).
8	UTM Ellipsoid	Ellipsoid code (0 = Airy, 1 = Australian National, 2 = Bessel1841, 3 = Clarke 1866, 4 = Clarke 1880, 5 = Everest, 6 = GRS80, 7 = International 1924, 8 = Modified Airy, 9 = WGS84).
9	Point Size	Applies to Circle, Square & Triangle shape types only, otherwise set to 0.
10	Date & Time	Date & Time in English(GB) Locale. Format is "dd/mm/yyyy hh:mm:ss"
11	Shape Type	0 = Circle, 1 = Square, 2 = Triangle, 3 = Sonar Range, 4 = Preset Image (see Image Info below).

Index	Value	Description
12	Shape Colour	Applies to Circle, Square and Triangle shape types only, otherwise set to 00000000 (32 bit RGBA).
13	Font Inner Colour	Applies to Comment Text (32 bit RGBA).
14	Font Outer Colour	Applies to Comment Text (32 bit RGBA).
15	Marker Bitwise	Bit 1 = Show Marker, Bit 2 = Show Coordinates, Bit 3 = Show Comment Text (i.e. 00000111 = Show All).
16	Image Info	Presets = Red Flag, Blue Flag, Green Flag, Buoy, Anchor, Rock, Danger, POI, ViewPort, Sonar, Diver, Wheel, Comment or MLO Alternatively can be full path and name of an image file (e.g. 'C:\Image1.bmp').
17	Comment	Comment text.

For example, the following two markers would produce a two line .mrk file as shown:
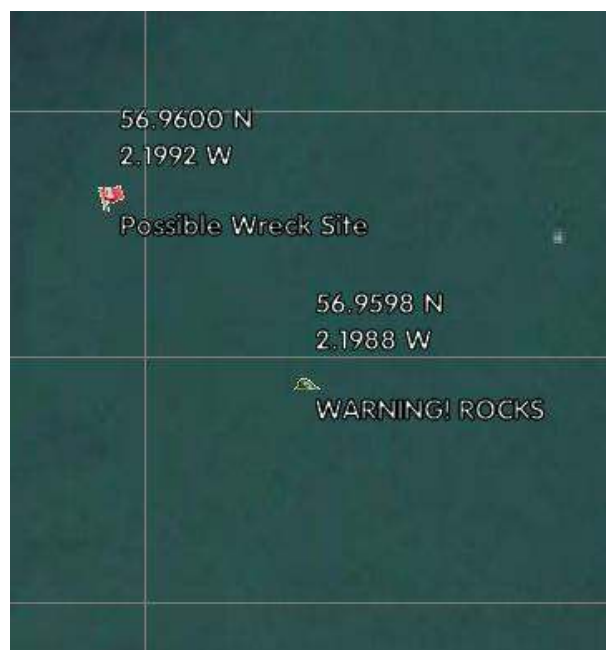


```
mk41149.5595988657,0,548699.614997778,6313221.96999907,-5.35449020
    28/08/2012 13:25:51,4,00000000,00FFFFFF,00000000,7,Red Flag,Pos
mk41149.5605201736,0,548724.213265236,6313198.87994614,-5.35449020
    28/08/2012 13:27:48,4,00000000,00FFFFFF,00000000,7,Rock,WARNING
```

Shortened Marker File Format (.csv extension)

This file format is a more concise and usable format, particularly for loading a pre-defined target list into Seanet Pro. The file is in an ASCII Comma Separated format and contains the following fields:

Index	Value	Description
1	ID	This is a unique string ID. It comprises a 2 letter header ("mk") followed by a DateTime code. Any unique string value is acceptable.
3	X Coordinate	For the .csv file, will be in coordinate system used in Seanet (either Longitude or UTM Easting).
4	Y Coordinate	For the .csv file, will be in coordinate system used in Seanet (either Latitude or UTM Northing).
17	Comment	Comment text.
11	Shape Type	0 = Circle, 1 = Square, 2 = Triangle, 3 = Sonar Range, 4 = Preset Image (see Image Info below).
16	Image Info	Presets = Red Flag, Blue Flag, Green Flag, Buoy, Anchor, Rock, Danger, POI, ViewPort, Sonar, Diver, Wheel, Comment or MLO Alternatively can be full path and name of an image file (e.g. 'C:\Image1.bmp').
10	Date & Time	Date & Time in English(GB) Locale. Format is "dd/mm/yyyy hh:mm:ss"

For example, the following two markers would produce a two line .csv file as shown:
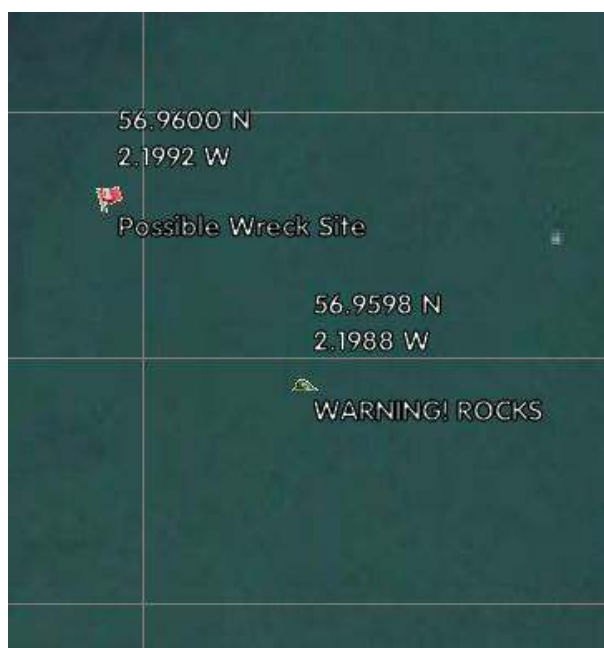
```
mk41149.5595988657,-2.1991799999203,56.9600300036883,Possible Wrec
   28/08/2012 13:25:51
mk41149.5605201736,-2.19877999992026,56.9598200036882,WARNING! ROC
   28/08/2012 13:27:48
```

Glossary

.bmp	The standard filename extension for bitmap images.
.kml	The standard filename extension for a Keyhole Markup Language file which contains georeferencing data. This file will either be incorporated within a `.kmz` file or requires an accompanying image file (with the same file name) to be valid. Used by Google Earth.
.kmz	The standard filename extension for a compressed file containing the Keyhole Markup Language file (`.kml`) and image file. For storing georeferencing data and images in a single file. Used by Google Earth.
.mrk	The standard filename extension for marker files exported from Seanet Pro, saved as a text file in tabular format with table cells separated by commas.
.png	The standard filename extension for Portable Network Graphics - a bitmapped image format employing lossless compression.
.tiff or .tif	The standard filename extension for Tagged Image File Format.
.v4log	The standard file format used by Seanet Pro log files.
ASCII	American Standard Code for Information Interchange - a character encoding scheme originally based on the English alphabet.
CD-ROM	Compact Disc - Read Only Memory
CSV	Comma Separated Value - a text file in tabular format with table cells separated by commas, usually given the filename extension `.csv` but this can vary depending on the application.
GeoTiff	A public domain standard file format which allows georeferencing information to be embedded into a TIFF (Tagged Image File Format) image, uses the filename extension `.tif` or `.tiff`.
Google Earth	A virtual globe, map and geographical information program, originally called EarthViewer 3D prior to being acquired by Google Inc. in 2004.
GPS	Global Positioning System.
Hammerhead	A survey sonar produced by *Tritech International Ltd* and part of the SeaKing range. Capable of producing very high resolution sonar images which can then be loaded into the Sonar Image Tiler software as part of a site survey.

JPEG or JPG	Joint Photographics Expert Group - a compression method and file format for image files, files can be stored with either `.jpeg` or `.jpg` file extensions
MicronNav	An Ultra Short Baseline (USBL) system for location and tracking of ROVs, divers, etc. Consists of the MicronNav 100 surface control unit (similar to the SeaHub but with different functionality) a "dunking transducer" which is mounted on the vessel/dockside under the waterline and a responder which is mounted on the ROV or Hammerhead tripod.
NMEA	National Marine Electronics Association - a USA based standards association responsible for overseeing electrical and data communications standards between marine devices (due to become the IMEA or International Marine Electronics Association in 2012).
PC	Personal Computer
SCU	Surface Control Unit - a specially manufactured computer which is rack mountable and capable of processing the data from the sonar equipment running either Windows XP Embedded or Windows 7 and Seanet Pro or Gemini software.
SeaKing	A specific sonar produced by *Tritech International Ltd* but also refers to the family of sonar equipment manufactured by *Tritech International Ltd* comprising of the SeaKing, SeaKing DST scanning and profiling sonars and the Hammerhead survey sonar.
Seanet Pro	The software supplied by *Tritech International Ltd* which is capable of running all the sonar devices.
Sidescan	A sonar that is typically towed behind a boat or mounted to the side of an ROV which takes a series of narrow sonar images that are joined together to form strips. Typically used for survey work.
USBL	Ultra Short Base Line (positioning system)
UTM	Universal Transverse Mercator coordinate system - a 2-dimensional Cartesian coordinate system to give locations on the surface of the Earth.
WGS84	World Geodetic System (1984 revision) - a standard for use in cartography, geodesy and navigation and used as the reference coordinate system by GPS devices.
world file	A file used by the Tritech Sonar Image Tiler program which is designed to accompany an image file and contains geo-referencing data. The file format will have different extensions depending on the format of the image file:

Image type	World file extension
.bmp	.bpw
.jpg or .jpeg	.jgw
.tif or .tiff	.tfw
.png	.pgw

XML — Extensible Markup Language. A markup language and file format that is designed to be both human and machine readable.